



Class-X

20 Solved Papers

NTSE

National Talent Search Examination

MAT/SAT

National Level 2012-2017
State Level 2014-2017



NTSE

National Talent Search Examination

SAT+MAT

for
Class X

20

Solved Papers

National Level 2012-2017

State Level 2014-2017



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NTSE - 2017

NATIONAL LEVEL

MENTAL ABILITY TEST

1. Some translated words in an artificial language (in which the word order is not necessarily same) are given below:

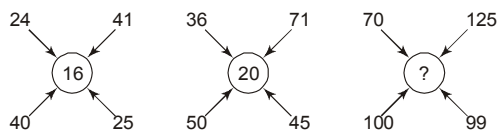
mie pie sie good person sing
 pie sie rie sing good lyrics
 tie rie sie love good lyrics

What is the translation for "person love lyrics"?

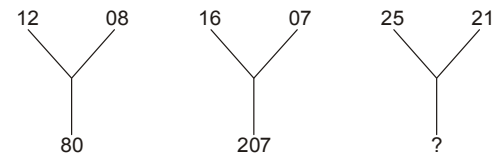
- (1) pie tie rie (2) tie rie sie
 (3) rie mie tie (4) sie mie pie
2. In the given sequence, some letters are missing. Which of the given options can fill the blanks in the correct order from left to right?

ab_ab_aaa_bbbaa_bbbb

- (1) abab (2) abba
 (3) aabb (4) baba
3. Identify the number in the position of '?'



- (1) 24 (2) 28
 (3) 32 (4) 36
4. Find the missing number.



- (1) 184 (2) 210
 (3) 241 (4) 425

5. If A, B, C, D are distinct decimal digits, then which of the following options is correct?

$$\begin{array}{r} A\ 4\ B\ C \\ \times\ C \\ \hline 1\ A\ 1\ D\ C \end{array}$$

- (1) A = 3 B = 7 C = 5 D = 9
 (2) A = 2 B = 3 C = 6 D = 5
 (3) A = 3 B = 8 C = 6 D = 5
 (4) A = 2 B = 3 C = 5 D = 7
6. Observe the following figures representing a balance.



Which of the following figures represents the correct balance?



7. Choose appropriate option from given alternatives such that the relationship defined by ‘:’ is preserved. PNIJ : LIFC and VTRP : _____
- (1) ROLI (2) SOLH
(3) RPOM (4) DMEN
8. A coin is in a fixed position. Another identical coin is rolled around the edge of the first one. How many complete revolutions will be made by the revolving coin before it reaches its starting position?



- (1) 1 (2) 2
(3) 3 (4) 4
9. If South-East becomes North; and North-East becomes West; then West becomes
- (1) North-East (2) South-East
(3) North-West (4) South-West
10. A cube is 6 cm in length, breadth and height. It is painted red on two opposite faces, black on the other two opposite faces and green on the left over faces. It is then cut into 216 cubes of side 1 cm. How many small cubes have no face painted?
- (1) 16 (2) 8
(3) 64 (4) 24
11. Find the odd-one out of the following terms:
EF22, JK42, GH24, VW90, IJ38
- (1) EF22
(2) GH24
(3) IJ38
(4) VW90
12. Choose the conclusions which logically follow from the given statements.

Statement:

All the pens are papers

All the papers are boats

Some birds are boats.

Conclusions:

(A) Some boats are pens

(B) Some birds are papers

(C) None of the pens are birds

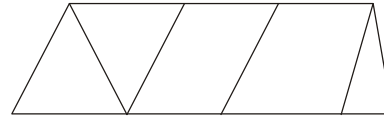
(1) Only A and B

(2) Only A

(3) Only C

(4) Only A and C

13. How many quadrilaterals are there in the given figure?



- (1) 10 (2) 11
(3) 12 (4) 13
14. Which of the following alternatives will fit in place of ‘M’?
255, 3610, 4915, M, 8125
- (1) 5100 (2) 5420
(3) 6420 (4) 6422
15. Which of the following alternatives will fit in place of ‘M’?
L6, O8, R11, M, X25, A42, D75
- (1) U15 (2) U16
(3) W14 (4) U14
16. Which of the following alternatives will fit in place of ‘M’?

7	3	6	2
2	8	5	4
1	1	2	4
4	2	1	M

- (1) 6 (2) 5
(3) 4 (4) 3

17. If ' Σ ' means 'X', ' δ ' means ' $\div$ ', ' σ ' means '+' and ' φ ' means '-' then evaluate the following expression using standard operator precedence.

$$56\delta(6\sigma 8)\Sigma 4\varphi 1$$

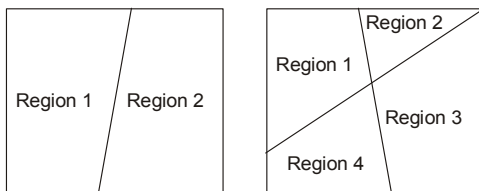
- (1) 52 (2) 24
(3) 15 (4) 43
18. With what operators, should the symbols @ and < be replaced so that the following expression is valid.
- $$100 - 81 \div 27 @ 3 < 6 = 115$$
- (1) + and -
(2) $\times$ and $\div$
(3) + and $\times$
(4) $\div$ and -
19. x is an integer such that it leaves a remainder of 2 when divided by 3, leaves a remainder of 3 when divided by 5, and leaves a remainder of 5 when divided by 7. What could be a possible value of x from among the following options?

- (1) 53 (2) 68
(3) 74 (4) 83

20. In how many ways can you distribute 10 identical balls into two non-identical boxes so that none are empty?

- (1) 2 (2) 8
(3) 9 (4) 10

21. One line forms two regions in a plane. Similarly, two lines in a plane can form a maximum of four regions. These are shown in the figures below:



What is the maximum number of regions that can be formed by 4 lines in a plane? Lines need not be concurrent.

- (1) 7 (2) 8
(3) 10 (4) 11

22. You need to take n arbitrary points on or inside a square of side 2 cm such that there will always be a pair of points at a distance of not more than $\sqrt{2}$ cm. What is the minimum value of n ?

- (1) 2 (2) 4
(3) 5 (4) 8

23. The following facts are known about an unknown number X :

I : The sum of digits of X is 15.

II : The unit's digit of X is 6.

Then which of the following statements is certainly true about X ?

- (1) X is divisible by 3 but not by 6
(2) X is divisible by 6 but not by 9
(3) X is not divisible by 6 but divisible by 9
(4) X is divisible by both 6 and 9

24. The average age of A , B and C is 43 years. Which of the following statements are required to find the eldest among them?

Statements:

I : Age of C is 65 years.

II : Age of A is 25 years.

- (1) I is sufficient
(2) Both I and II are required
(3) I and II together are not sufficient
(4) II is sufficient

Directions (Q. 25-26) : A class is to be taught five subjects—Hindi, Physics, Chemistry, Biology and Mathematics by five different teachers— A , B , C , D and E in five periods (1 to 5). A teacher can teach in only one of the periods. The following details are available about the teaching.

- A teaches Mathematics which is not taught in the first period.
- Physics is taught by D in an even numbered period.
- Chemistry is taught in an odd period, and it precedes Mathematics period.
- E teaches in the first period.
- C teaches Chemistry but not in the first or the last periods.
- Hindi is taught in the last period.

25. Which of the following statements is necessarily true?

- (1) Third period is of Hindi taught by B
- (2) Second period is of Physics taught by C
- (3) Fourth period is of Mathematics taught by A
- (4) Fifth period is of Biology taught by D

26. Which subject is taught by B?

- (1) Physics
- (2) Chemistry
- (3) Biology
- (4) Hindi

27. A solid metallic cylinder of radius 12 cm and height 175 cm is melted and moulded into another solid cylinder of height 63 cm. What is the radius of the new cylinder?

- (1) 14
- (2) 4π
- (3) 20
- (4) 5π

28. Choose the option which shows the correct mirror image of the characters given below.

D I V E R T 6 4 7 5 A L E

- (1) DIAEBJL9†Δ2VTE
- (2) DIAEBJL9†Δ2VTE
- (3) DIAEBJL9†Δ2VTE
- (4) DIAEBJL9†Δ2AGE

Directions (Q. 29-30) : There are 150 students in a class. 20 students play both hockey and kabaddi. The same numbers of students play only football. 35 students play both hockey and football but not kabaddi. 25 play both football and kabaddi but not hockey. The number of students who play only hockey is the same as the number of students who do not play any of three mentioned games and the number of students who play only hockey is half of the number of students who play only football.

29. How many students play only kabaddi?

- (1) 10
- (2) 20
- (3) 30
- (4) 40

30. How many students play only hockey?

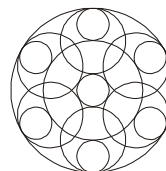
- (1) 10
- (2) 15
- (3) 20
- (4) 25

31. What will be the number in the blank box?

1	3	4	6	7	9
2	14	5	77	8	

- (1) 98
- (2) 128
- (3) 189
- (4) 194

32. What is the total number of circles in the figure given below?

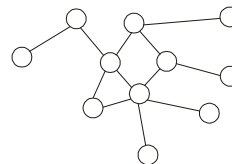


- (1) 13
- (2) 14
- (3) 15
- (4) 16

33. A bucket contains milk mixed with water, of which 3 parts are water and 5 parts are milk. A part of the mixture is removed from the bucket and is replaced by water. What portion of the mixture should have been removed so that the new mix contains milk and water is equal proportion?

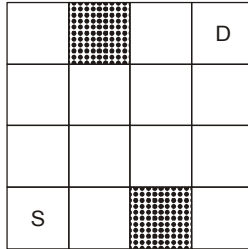
- (1) $\frac{1}{3}$
- (2) $\frac{1}{4}$
- (3) $\frac{1}{5}$
- (4) $\frac{1}{6}$

34. You need to colour the circles in such a way that no two circles connected by a line get the same colour. What is the minimum number of distinct colours needed to colour all the circles in the figure?



- (1) 4
- (2) 5
- (3) 6
- (4) 7

35. From each box you can move only to the immediate right box or the immediate top box. You cannot move into or through a shaded box. How many ways are there to move from the box marked S to the box marked D?



- (1) 8 (2) 10
(3) 12 (4) 14
36. Which number will come in the place of 'M'?

16	7	2	20
25	8	2	30
36	9	5	24
49	10	7	M

- (1) 21 (2) 32
(3) 40 (4) 63
37. The square of the length of a rod AB is 72 cm^2 . If we place the rod in the corner of a room, so that the end A is always on the edge between the two walls of the corner and the end B is always on the floor, what is the maximum possible area of the triangle formed by the rod, the edge between the walls and the floor?
- (1) 6 cm^2 (2) 12 cm^2
(3) 18 cm^2 (4) 24 cm^2
38. What is the missing term "?" in the following series?
2, 6, 6, 5, 10, 4, 14, 3, 18, ?
- (1) 1 (2) 2
(3) 19 (4) 22
39. In the question given below, there are two statements followed by two conclusions. You have to take the given statements to be true even if they seem to be at

variance from commonly known facts. Read all the conclusions, and then decide which of the given conclusions logically follows from the given statements?

Statements:

Some kings are queens

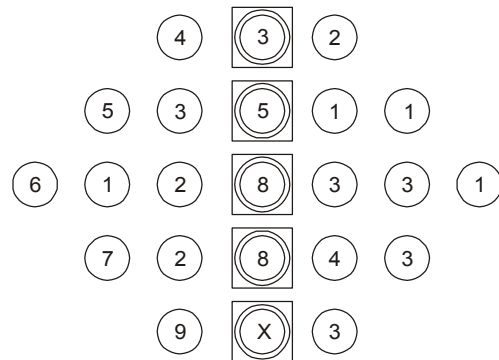
All the queens are beautiful.

Conclusions:

I. All the kings are beautiful

II. All the queens are kings.

- (1) Only I follows
(2) Only II follows
(3) Neither I nor II follows
(4) Both I and II follow
40. If prime numbers are assigned to English alphabets from A to Z in order MAT will be:
- (1) 31 1 67 (2) 41 1 67
(3) 37 2 71 (4) 41 2 71
41. What number comes inside the square in place of 'X'.



- (1) 5 (2) 6
(3) 7 (4) 8
42. Find the alphabet that will replace '?'

I	2	2	3	1	5
II	3	4	2	4	2
III	H	P	I	?	Y

- (1) A (2) D
(3) O (4) N

- (1) Mr. Ronald and Mrs. Shalu
 - (2) Mr. Ronald and Mrs. Firdaus
 - (3) Mr. Aaditya and Mrs. Firdaus
 - (4) Mr. Aaditya and Mr. Ronald
50. Just before sunset Veena and Zeba were talking to each other standing face-to-face. If Veena sees Zeba's shadow to be exactly towards the right of Zeba, which direction was Veena facing?
- (1) South
 - (2) North
 - (3) East
 - (4) North-East

ENGLISH LANGUAGE

Directions (Q. 1-5) : Read the following passage and answer the questions based on it. Choose the most appropriate answer.

It is taken for granted by the advocates of oriental learning that no native of this country can possibly, attain more than a mere smattering of English. They do not attempt to prove this. But they perpetually insinuate it. They designate the education which their opponents recommend as a mere spelling-book education. They assume it as undeniable that the question is between a profound knowledge of Indian and Arabic literature and science on the one side, and superficial knowledge of the rudiments of English on the other. This is not merely an assumption, but an assumption contrary to all reason and experience. We know that foreigners of all nations do learn our language sufficiently to have access to all the most abstruse knowledge which it contains sufficiently to relish even the more delicate graces of our most idiomatic writers. There are, in this very town, natives who are quite competent to discuss political or scientific questions with fluency and precision in the English language. I have heard the very question on which I am now writing discussed by native gentlemen with a liberality and an intelligence which would do credit to any member of the Committee of

Public Instruction. Indeed it is unusual to find, even in the literary circles of the Continent, any foreigner who can express herself/himself in English with so much facility and correctness as we find in many Indians. Nobody, I suppose, will contend that English is so difficult to an Indian as Greek to an Englishman. Yet an intelligent English youth, in a much smaller number of years than our unfortunate pupils pass at the Sanskrit College, becomes able to read, to enjoy, and even to imitate not unhappily the compositions of the best Greek authors. Less than half the time which enables an English youth to read Herodotus and Sophocles ought to enable an Indian to read Hume and Milton.

1. The writer feels that the advocates of oriental learning are
 - (1) cautiously open to the idea of English education.
 - (2) aware of the tyranny of English education.
 - (3) irrational in their views about English education.
 - (4) aware of the politics of English education
2. Which of the following ideas does the writer have a problem with?
 - (1) Some natives are proficient in discussing complex topics
 - (2) Knowledge of English is pitched against that of Indian and Arabic literature.
 - (3) Foreigners can read and enjoy some of the difficult English writings.
 - (4) Learning English for an Indian can be easier than learning Greek for an Englishman
3. The foreigner discussed in the passage is
 - (1) an Arab
 - (2) a Greek
 - (3) an Indian
 - (4) an Englishman

4. Which of the following sentences best captures the main argument of the writer?

- (1) Many Indians are capable of using English like any Englishman.
- (2) Learning English is as difficult as learning any other foreign language.
- (3) The importance of English education needs to be recognised by the supporters of oriental learning.
- (4) An Indian can learn English in half the time taken by an Englishman to learn Greek.

5. According to the author, it is easier for

- (1) Indians to have a profound knowledge of Arabic literature and science than learn English.
- (2) Indians to learn Sanskrit than for Englishmen to appreciate Greek literature.
- (3) foreigners to learn Indian language than for Indians to learn foreign languages.
- (4) Indian to appreciate English literature than for Englishmen to appreciate Greek literature.

Directions (Q. 6-10) : Read the following passage and answer the questions based on it. Choose the most appropriate answer.

Every day new careers and professional opportunities emerge. No matter how much each career option excites you, you will have to prioritize and choose the best option for yourself. Your personality, interests, abilities, aspirations, strengths and weaknesses will help you to decide the most viable option for you. The following exercises are important for career planning, and following these will ensure that you are on the right track.

Self-Assessment : The entire process of career planning should be ideally done in conjunction with your career counsellor, so that you have professional help at every step. A trained career counsellor can help you identify a variety of professions in which you

can excel. Remember to keep your list of possible professions long, so that your confidence in yourself does not wane.

When I took my test, the long list of professions included being a florist, teacher, counsellor, doctor and sales executive. The very idea that I have an aptitude for several professions - and not just to be a doctor - was very comforting. I thought to myself, "When patients get tired of me I can always be a salesman!" Do not let anyone ever tell you that you are good for nothing. Each one of us has several talents, and it is important to first identify them, and then work hard to develop them.

Self-Analysis: Another important aspect of self-assessment is self-analysis or soul searching. We are the best judge of our abilities strengths and weaknesses. If you concentrate and decide to be honest with yourself, self-analysis can help you understand your career options better.

Need for Planning : If you ask adults around you whether they actually became what they had wanted to become when they were young, chances are that very few of them actually became what they had aspired towards in childhood. This may not essentially be a reflection of their failure but an indication of change. Circumstances change, ideas change, and so do people. By the time you grow up, you may end up working in professions that neither you nor your parents know about today. Of course some of you may get to work in traditional professions and move along a well-planned path. Whatever the consequence of your planning, the truth about matting a plants that it may not work. But in the words of Henry C. Link, if "you do make a plan, the chances of getting what you want significantly increase."

But one thing is quite certain: only those of you who work hard at your studies, acquire new skills as' you move along in life, involve yourself in cultural/sports activities and attempt to plan your life will be successful.

6. Career planning is an activity that requires

- (1) analysing one's personality, interests, abilities, aspirations, strengths and weaknesses.
- (2) working hard at your studies, acquiring new skills as you move along in life and involving yourself in cultural/sports activities.
- (3) following three important steps in consultation with one's career counsellor, and making a plan that may work.
- (4) understanding and being aware of the fact that whatever the consequences of one's planning the truth about asking a plan is that it may not work.

7. This passage may be summarized as

- (1) In career planning, it is important to involve oneself in cultural/sports activities as much as working hard or acquiring new skills.'
- (2) 'Before making a career choice, one should learn to prioritize career options and use one's personality, interests, abilities, aspirations, strengths and weaknesses to plan and decide the most viable option.
- (3) 'In choosing a career, it is important not to allow anyone to tell us that we are good for nothing, because our personality, interests, abilities, aspirations, strengths and weaknesses will help us decide the most viable career options for ourselves.'
- (4) 'A good career choice results when you follow traditional professions and move along a well-planned path.'

8. Self-analysis is considered an important part of self-assessment because

- (1) soul searching helps us to judge our abilities honestly and helps us understand our career options better.
- (2) we are the best judge of our abilities, strengths and weaknesses, and self-

analysis will enable others to analyse our abilities accurately.

- (3) by the time we grow up we may end up working in professions that neither we nor our parents know about today.
- (4) each one of us has career options, and it is important to first identify them, and then work hard to attain them.

9. A trained career counsellor can help us

- (1) do self-analysis, so that we are honest with ourselves.
- (2) decide whether to be a florist, teacher, counsellor doctor, or sales executive, so that we can be a salesman if we cannot be a doctor.
- (3) identify our talents, because each one of us has several talents, and it is important to first identify them, and then work hard to develop them.
- (4) identify different professions that will help us use our abilities, because a trained professional can help us prioritize and choose the option that is most viable for us.

10. An important point highlighted in the passage is that

- (1) only a trained counsellor can help you make the right career choice.
- (2) it is our abilities, strengths and weaknesses that help us succeed in our career.
- (3) there is not much use of making a plan - very few people get their plans fulfilled.
- (4) many people do not get to pursue the career of their choice because circumstances, ideas and people change.

Directions (Q. 11-15) : Read the following passage and answer the questions based on it. Choose the most appropriate answer.

If the fact of the fire did not immediately penetrate my consciousness, the heat of the

blast did and soon propelled me from my seat. All around me, there was a confusion of upended tables, overtuned chairs, bodies pitched toward the door of the dining room, and the squads of broken glass and crockery. Fortunately, the windows toward the street, large windows through which a body might pass, had been thrown open by an enterprising diner. I remember that I rolled sideways through one of these window frames and fell onto the snow and was immediately aware that I should move aside to allow others to land as I had - and it was in that moment that my altruism was finally triggered.

I rose to my feet and began to assist those who had sustained cuts and bruises and broken bones, or who had been mildly crushed in the chaos. The blaze lit up the escaped diners with a light greater than any other that could be produced in the night. So that I was able to see clearly the dazed expressions of those near to me. Many people were coughing and some were crying, and all looked as though they had been struck by a blow to the head. A few men attempted heroics and tried to go back into the hotel to save those who remained behind, and I think one student did actually rescue an elderly woman who had succumbed to paralysis beside the buffet table; but generally there was no thought of reentering the burning building once one had escaped. Indeed, so great was the heat that we in the crowd had to move farther and farther across the street until we all stood in the college quadrangle, surrounded by bare oaks and elms and stately sycamores.

11. The passage describes

- (1) the heat and smoke that was generated by the sudden fire.
- (2) the effect of the blast on unsuspecting hotel guests.
- (3) the loss of crockery glass and bodies in the accident.
- (4) the layout of the college quadrangle, surrounded by bare oaks and elms and sycamores.

12. The dazed expression on people's faces was caused by

- (1) the blow to their heads.
- (2) the heat generated by the blast.
- (3) The suddenness and extent of damage caused by the impact of the blast.
- (4) the impact of broken glass and crockery being hurled around in the confusion.

13. The words in the passage that suggest there was a blast include

- (1) fire, heat, confusion, overturned and chaos.
- (2) blazed, dazed, heroic, succumbed and paralysis.
- (3) broken glass, cuts, bruises and sycamores.
- (4) rescue, quadrangle, altruism, trigger and heat.

14. 'The blaze lit up the escaped diners with a light greater than any other that could be produced in the night' can be paraphrased as

- (1) 'The fire set all the escaped diners ablaze.'
- (2) 'The light that set the escaped diners on fire was from a divine night fixe.'
- (3) 'The night sky was lit by such brightness that one could, see the blaze clearly.'
- (4) 'The fire burned in such a way that the writer could see the escaped diners clearly.'

15. The word altruism here means

- (1) 'the act of rolling across a window.'
- (2) 'a sudden movement triggered by a blast.'
- (3) 'selfless concern for the well being of others.'
- (4) 'the dazed feeling generated by an accident.'

Directions (Q. 16-17) : The following five sentences come from a paragraph. The first and the last sentences are given. Choose the right order in which the three sentences (PQR) should appear to complete the paragraph.

S1 : A man who possesses a strong will and firm determination finds all difficulties solved.

S2 : _____

S3 : _____

S4 : _____

S5 : It is therefore, the man who labours hard with a strong resolution and an unshaken will, who achieves success and makes his fortune.

P : Such a man goes on working hard and even if he fails he is never downcast.

Q : In turn failures make him all the more determined and resolute and he persists in his task till he attains the desired success.

R : To him there are a thousand ways open to steer clear of all dangers and difficulties.

16. Choose from the options given below :

- (1) RPQ
- (2) PRQ
- (3) QRP
- (4) PQR

17. S1 : Film theory is an academic discipline that aims to explore the essence of cinema and provides conceptual frameworks for understanding a film's relationship to reality, other arts, individual viewers, and society at large.

S2 : _____

S3 : _____

S4 : _____

S5 : Film review, on the other hand, is the way in which critics assess a film's overall quality and determine whether or not they think the film is worth recommending to viewers.

P : Film theory incorporates various aspects of filmmaking, including analysis and review.

Q : One way of analysing films is by the shot-by-shot analysis, though that is typically used only for small clips or scenes.

R : Film analysis is the process of analysing a film in terms of mise-en-scene, cinematography, sound and editing.

Choose from the options given below:

- (1) PQR
- (2) QRP
- (3) PRQ
- (4) RQP

Directions (Q. 18-19) : The following questions have the second sentence missing. Choose the appropriate sentence from the given options to complete it.

18. A. A few months ago I went to Princeton University to see what the young people who are going to be running our country in a few decades are like.

B. _____

C. I went to sleep in my hotel room around midnight and when I awoke, my mailbox was full of replies . sent at 1:15 a.m., 2:59 a.m., 3 : 23 a.m

- (1) One senior told me that she went to bed around two and woke up each morning at seven; she could afford that much rest because she had learned to supplement her full day of work by studying in her sleep.
- (2) As she was falling asleep she would recite a math problem or a paper topic to herself; she would then sometimes dream about it, and when she woke up, the problem might be solved.

- (3) Faculty members gave me the names of a few dozen articulate students, and I sent them e-mails, inviting them out to lunch or dinner in small groups.
- (4) Young people stay up late replying to their emails and indulging in social networking.
19. A. We are usually inclined to look upon bad temper as a very harmless weakness,
 B. _____
 C. And yet all religious texts condemn it as one of the most destructive elements in human nature.
- (1) This shows that we lack judgement.
 (2) Often work pressure creates bad temper.
 (3) Bad temper harms human relationship.
 (4) We speak of it as a mere infirmity of nature, perhaps a family failing.
- Directions (Q. 20-29) :** Fill in the blank with the most appropriate option from the given alternatives.
20. We are trying to _____ correct information and dispel wrong information that is being circulated.
 (1) raise (2) foster
 (3) cultivate (4) disseminate
21. When we decided to, move, my mother wanted a place with a _____ outside every window to keep potted plants
 (1) balcony
 (2) ledge
 (3) curtain
 (4) stained glass
22. While Dinesh can never acquire a choir boyish innocence, he has _____ and seems to know that an entire nation's sporting image stands on the team's sportsmanship.
 (1) mellowed
 (2) discarded
 (3) plummeted
 (4) flipped
23. The construction of identity (for both men and women) is _____ by culture, rationality, class and historical differences.
 (1) inferred (2) interlocked
 (3) influenced (4) instigated
24. While we believe that BMI is a standard in measuring the fat in our body, there is a growing _____ among scientists that it may not be the best tool to do so.
 (1) concord (2) consensus
 (3) congruous (4) confluence
25. Under the new rule, the civic body can take _____ action against the violators by imposing, a fine.
 (1) punitive (2) vindictive
 (3) pejorative (4) diminutive
26. The SG has cautioned HCs against reversing the acquittal of an accused by the trial court unless the judgment was _____ wrong.
 (1) ostensibly (2) tangibly
 (3) palpably (4) allegedly
27. From the rim of the excavation site the archaeologist was unable to surmise exactly what the _____ chamber might hold.
 (1) terra firma (2) subterranean
 (3) ground level (4) beneath
28. The heat was becoming unbearable as the temperature was rising. _____, the rains had been delayed.
 (1) However (2) Therefore
 (3) Moreover (4) Nonetheless
29. Miles Davis, the jazz player, _____ supremely expressive, didn't have the range or technique to play convincingly in the bebop style.
 (1) moreover
 (2) though
 (3) nevertheless
 (4) on the one hand

Directions (Q. 30-35) : Select the meaning of the underlined phrases/idioms.

- 30.** It is easy for you to splurge when you have your mom's credit card, but remember after the feast comes the reckoning.
 (1) Trust is easy to break.
 (2) Truth can't be hidden forever.
 (3) Every action has a consequence.
 (4) Don't take your parents for granted.
- 31.** The distance between the towns is only 30 kms as the crow flies.
 (1) when measured in a straight line
 (2) when measured in a random manner
 (3) when measured between the two highest points
 (4) when the curves of the road are included in the measurement
- 32.** I didn't want to go to the exhibition but Leena twisted my arm.
 (1) forced me (2) teased me
 (3) fought with me (4) discouraged me
- 33.** In this age of super specialisation, industrial engineers are in demand because they are the only ones who can see the big picture.
 (1) realistic view of something
 (2) complete view of something
 (3) narrow view of something
 (4) accurate view of something
- 34.** What is the matter with him? He is falling foul of his friends.
 (1) betraying
 (2) quarrelling with
 (3) losing touch with
 (4) being badly hurt by
- 35.** She gave me a cold shoulder when I went to see her.
 (1) abused me
 (2) insulted me
 (3) ignored me
 (4) scolded me

Directions (Q. 36-43) : In the following passage there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the given options.

Carnatic vocalist, playback singer and composer Mangalampalli Balamurali Krishna, who burst into the music world, as a child (36)_____, passed away on 22 November 2016. The (37)_____ of Balamurali Krishna include a musical (38)_____ which showed up as his ability to (39)_____ and reproduce music heard just once, his ability to (40)_____ more than one musical instrument, his ability to compose from the age of 15 and finally, his (41)_____ voice manifested as his ability to utter clearly, pronounce faithfully and accent correctly the lyrical phrases along with the (42)_____ of the underlying musical (43)_____ and microtones.

- 36.** (1) spectacle (2) prodigy
 (3) paragon (4) demigod
- 37.** (1) talents (2) potentials
 (3) capacities (4) advantages
- 38.** (1) perception (2) smartness
 (3) denseness (4) acumen
- 39.** (1) recite (2) retain
 (3) realize (4) repeat
- 40.** (1) handle (2) work
 (3) create (4) manoeuvre
- 41.** (1) abled (2) gifted
 (3) stunned (4) staggered
- 42.** (1) signs (2) slots
 (3) tokens (4) nuances
- 43.** (1) notes (2) marks
 (3) records (4) remarks

Directions (Q. 44-47) : Select the most appropriate option to fill in the blanks from the given alternatives.

- 44.** Worries_____all kinds of illness, from high blood pressure to stomachache.
 (1) believe to have caused
 (2) are believed to be caused
 (3) are believed to cause
 (4) believed to be caused

45. I _____ all the books on the reading list before I attended the lecture.
 (1) had read (2) have read
 (3) would have read (4) would read
46. Bala Chandra _____ school before. The desire to become a famous novelist led him to attend the adult literacy classes.
 (1) never attends (2) was never attentive
 (3) had never attended (4) will be attending
47. I set the alarm for 6.30 in the morning _____ I wouldn't miss the train.
 (1) in case (2) unless
 (3) until (4) so that

Directions (Q. 48-50) : Select the word which means the opposite of the underlined word.

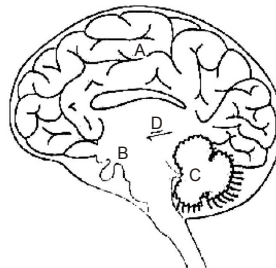
48. The activities of the cine club will conclude early next year owing to the volume of work that has kept its members occupied.
 (1) continue (2) commence
 (3) comprehend (4) conduct
49. The town is unique in its appearance.
 (1) picturesque (2) singular
 (3) drab (4) typical
50. Mr. Prakash was candid at a history TV promotional in Mumbai recently.
 (1) fickle (2) forthright
 (3) unapologetic (4) guarded

SCHOLASTIC APTITUDE TEST

1. Small cut pieces of soft stems are placed in growth medium with following plant hormones. Which combination of plant hormones will show slowest growth ?
 (1) Auxin + Cytokinin
 (2) Gibberellins + Auxin
 (3) Gibberellins + Cytokinin
 (4) Absciscic Acid + Auxin
2. Which one of the following demonstrates the characteristics of cardiac muscle cells?

- (1) Involuntary and multinucleated
 (2) Unbranched and uninucleated
 (3) Cylindrical and uninucleated
 (4) Unbranched and involuntary

3. From the given figure identify the part of human brain controlling most of the involuntary actions:



- (1) A & B
 (2) B & C
 (3) C & D
 (4) D & A

4. An animal kept in a jar has the following features.

- (I) It is bilaterally symmetrical.
 (II) It has coelomic cavity
 (III) The body is segmented
 (IV) It has jointed appendages.

To which phylum does the animal belong to?

- (1) Arthropoda
 (2) Annelida
 (3) Platyhelminthes
 (4) Mollusca

5. Read the following statements and select the correct option.

Statement-I : Nostoc and Bacteria are prokaryotes.

Statement-II: *Penicillium* and *Spirogyra* are fungi.

- (1) Only statement I is true
 (2) Only statement II is true
 (3) Both statements I and II are true
 (4) Both statements I and II are false

6. You find a herbaceous flowering plant growing in your school garden having leaves with parallel venation.
Choose the correct additional features the given plant would be possessing.
(I) It has no secondary vascular tissues.
(II) Its flower possesses three sepals.
(III) It possesses tap root.
(IV) Its embryo has 2 cotyledons.
(1) (I) and (II) (2) (I) and (III)
(3) (II) and (IV) (4) (III) and (IV)
7. Varieties of vegetables such as cabbage, broccoli and cauliflower have been produced from a wild cabbage species. Such process of producing new varieties of living organisms is called
(1) Natural selection
(2) Artificial selection
(3) Speciation
(4) Genetic drift.
8. Which of the following are pairs of analogous organs ?
(I) Forelimbs of horse - Wings of bat
(II) Wings of bat - Wings of butterfly
(III) Forelimbs of horse - Wings of butterfly
(IV) Wings of bird - Wings of bat
(1) (I) and (II) (2) (II) and (IV)
(3) (III) and (IV) (4) (II) and (III)
9. Which of the following organisms is used as a biopesticide ?
(1) Azolla (2) Anabaena
(3) Rhizobium (4) Trichoderma
10. A tall plant (TT) is crossed with a dwarf plant (tt). All F₁ plants showed tall phenotype.
Which of the following correctly defines a test cross ?
(1) TT (F₁) × Tt (P)
(2) Tt (F₁) × Tt (P)
(3) tt (F₁) × Tt (P)
(4) Tt (F₁) × tt (P)
11. Which one of the following pairs of causative agent and type of disease are correct ?
(I) Leishmania - Sleeping sickness
(II) Nematode - Elephantiasis
(III) Trypanosoma - Kala azar
(IV) Staphylococcus - Acne
(1) (I) and (II) (2) (II) and (III)
(3) (II) and (IV) (4) (III) and (IV)
12. Pancreatic juice contains more than one enzyme. Which among the following combination is correct ?
(1) Pepsin and Lipase
(2) Amylase and Pepsin
(3) Pepsin and Trypsin
(4) Trypsin and Lipase
13. You discover a new species of a plant. You also discover that it produces motile sperms and dominant generation has diploid cells. It belongs to
(1) Bryophyte (2) Angiosperm
(3) Gymnosperm (4) Pteridophyte
14. At every 20 minutes, one bacterium divides into two. How many bacteria will be produced after two hours, if one starts with 10 bacteria ?
(1) $2^5 \times 10$ (2) $2^5 \times 10^5$
(3) $2^6 \times 10$ (4) $2^6 \times 10^6$
15. The metal (M) forms an oxide, M₂O₃. The formula of its nitride will be
(1) M₂N₃ (2) MN
(3) M₂N (4) M₃N₂
16. A solution is a homogeneous mixture of two or more substances. Which of the following is a solution?
(1) Milk (2) Smoke
(3) Brass (4) Face Cream
17. 1.80 g of glucose is dissolved in 36.00 g of water in a beaker. The total number of oxygen atoms in the solution is
(1) 12.405×10^{23} (2) 12.405×10^{22}
(3) 6.022×10^{23} (4) 6.022×10^{22}

18. ^{35}Cl and ^{37}Cl are the two isotopes of chlorine, in the ratio 3 : 1 respectively. If the isotope ratio is reversed, the average atomic mass of chlorine will be—

(1) 35.0 u (2) 35.5 u
(3) 36.0 u (4) 36.5 u

19. The turmeric solution will turn red by an aqueous solution of—

(1) potassium acetate
(2) copper sulphate
(3) sodium sulphate
(4) ferric chloride

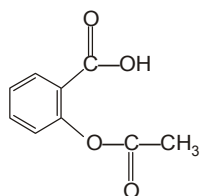
20. A metal 'M' of moderate reactivity is present as its sulphide 'X'. On heating in air, 'X' converts into its oxide 'Y' and a gas evolves. On heating 'Y' and 'X' together, the metal 'M' is produced. 'X' and 'Y' respectively are—

(1) 'X' = cuprous sulphide, 'Y' = cuprous oxide
(2) 'X' = cupric sulphide, 'Y' = cupric oxide
(3) 'X' = sodium sulphide, 'Y' = sodium oxide
(4) 'X' = calcium sulphide, 'Y' = calcium oxide

21. Which one of the following statement is incorrect about graphite and diamond ?

(1) Graphite is smooth and slippery.
(2) Diamond is good conductor of heat.
(3) Graphite is a good conductor of electricity.
(4) Physical and chemical properties of graphite and diamond are different.

22. The functional groups present in the following compound are—



(1) alcohol, ketone and ester
(2) ester and carboxylic acid
(3) carboxylic acid and ketone
(4) ester and alcohol

23. A part of the modern periodic table is presented below in which the alphabets represent the symbols of elements.

Table

Group →	1	2	14	15	16	17
Period ↓						
2				M	Q	
3	A	J			R	
4	E		L			T
5	G					X

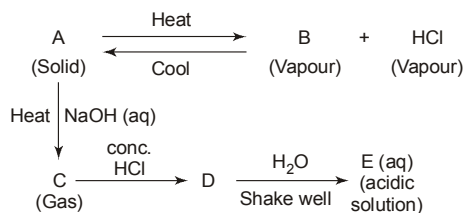
Consult the above part of the periodic table to predict which of the following is a covalent compound.

(1) RQ_2 (2) AT
(3) JQ (4) JX_2

24. A compound 'X' reacts with a compound 'Y', to produce a colourless and odourless gas. The gas turns lime water milky. When 'X' reacts with methanol in the presences of concentrated H_2SO_4 , a sweet smelling substance is produced. The molecular formula of the compound 'X' is—

(1) $\text{C}_2\text{H}_4\text{O}$
(2) $\text{C}_2\text{H}_4\text{O}_2$
(3) $\text{C}_2\text{H}_6\text{O}$
(4) $\text{C}_2\text{H}_6\text{O}_2$

25. The schematic diagram is given below.



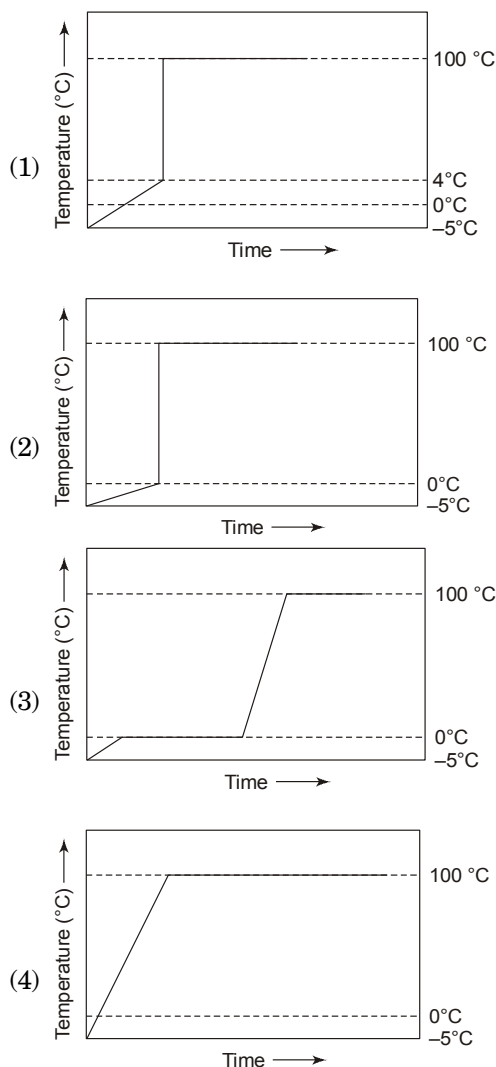
Which of the following is an incorrect statement ?

(1) A and E are chemically same.
(2) A and D are chemically same.
(3) D and E are chemically same.
(4) C and E are chemically same.

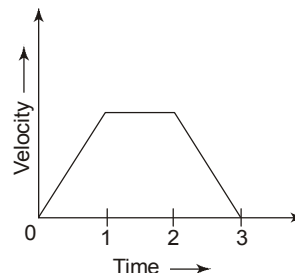
26. Which of the following is a feasible reaction ?

- (1) $\text{Ba(s)} + \text{K}_2\text{SO}_4(\text{aq}) \rightarrow \text{BaSO}_4(\text{aq}) + 2\text{K(s)}$
- (2) $\text{Zn(s)} + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{Zn(NO}_3)_2(\text{aq}) + 2\text{Ag(s)}$
- (3) $\text{Mg(s)} + \text{Na}_2\text{SO}_4(\text{aq}) \rightarrow \text{MgSO}_4(\text{aq}) + 2\text{Na(s)}$
- (4) $\text{Cu(s)} + \text{MgSO}_4(\text{aq}) \rightarrow \text{CuSO}_4(\text{aq}) + \text{Mg(s)}$

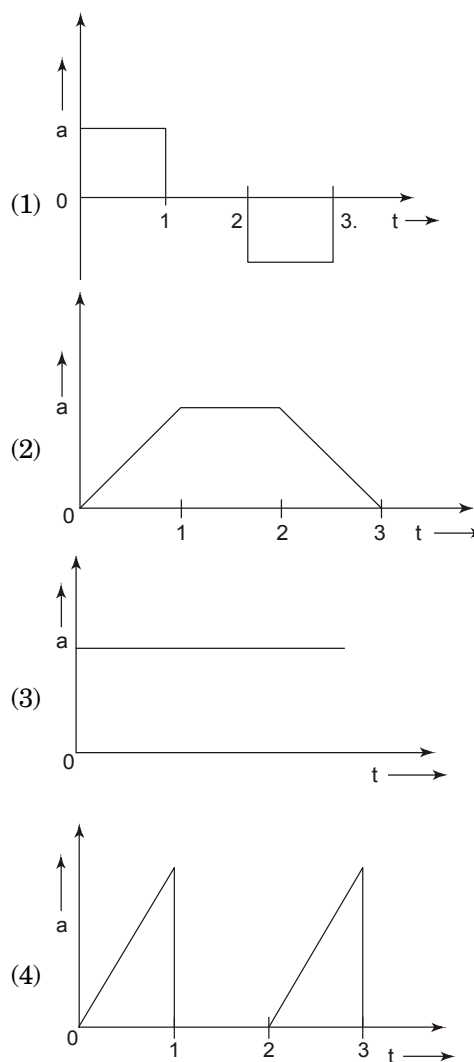
27. Some ice pieces kept at a temperature -5°C are heated gradually to 100°C in a beaker. The temperatures of the contents are plotted against time. The correct plot is-



28. The velocity-time graph of an object moving along a straight line is shown below:



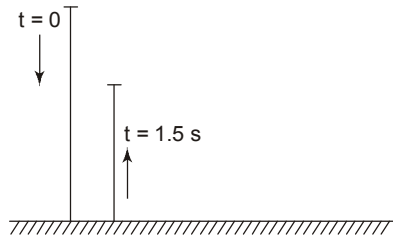
Which one of the following graphs represents the acceleration (a) - time (t) graph for the above motion?



29. To read a poster on a wall, a person with defective vision needs to stand at a distance of 0.4m from the poster. A person with normal vision can read the poster from a distance of 2.0 m. Which one of the following lens may be used to correct the defective vision ?

(1) A concave lens of 0.5 D
 (2) A concave lens of 1.0 D
 (3) A concave lens of 2.0 D
 (4) A convex lens of 2.0 D

30. A ball released from rest at time $t = 0$ hits the ground. It rebounds inelastically with a velocity 5 m s^{-1} and reaches the top at $t = 1.5 \text{ s}$. What is the net displacement of the ball from its initial position after 1.5s? ($g = 10 \text{ m/s}^2$)

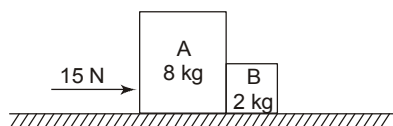


(1) 1.25 m (2) 3.75 m
 (3) 5.00 m (4) 6.25 m

31. A horizontal jet of water is made to hit a vertical wall with a negligible rebound. If the speed of water from the jet is ' v ', the diameter of the jet is ' d ' and the density of water is ' ρ ', then the force exerted on the wall by the jet of water is-

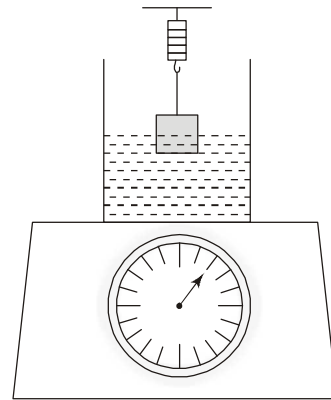
(1) $\frac{\pi}{4} d^2 \rho v$ (2) $\frac{\pi}{4} d^2 \rho v^2$
 (3) $\frac{\pi}{8} d^2 \rho v^2$ (4) $\frac{\pi}{2} d^2 \rho v^2$

32. Two blocks A and B of masses 8 kg and 2 kg respectively, lie on a horizontal frictionless surface as shown in the figure. They are pushed by a horizontally applied force of 15 N. The force exerted by B on A is



(1) 1.5 N (2) 3.0 N
 (3) 4.5 N (4) 6.0 N

33. A beaker half-filled with water is put on a platform balance which is then set to zero. A 800 g mass is immersed partially in water using a spring balance as shown in the figure. If the spring balance reads 300 g, what will be the reading on the platform balance ?



(1) 200 g (2) 300 g
 (3) 500 g (4) 800 g

34. An object falls a distance H in 50 s when dropped on the surface of the earth. How long would it take for the same object to fall through the same distance on the surface of a planet whose mass and radius are twice that of the earth ? (Neglect air resistance.)

(1) 35.4 g
 (2) 50.0 s
 (3) 70.7 s
 (4) 100.0 s

35. A source produces sound waves under water. Waves travel through water and then into air. Which of the following statements about the frequency (f) and the wavelength (λ) is correct and sound passes from water to air?

(1) f remains unchanged but λ decreases.
 (2) f remains unchanged but λ increases.
 (3) λ remains unchanged but f decreases.
 (4) λ remains unchanged but f increases.

36. The diameter of a wire is reduced to one-fifth of its original value by stretching it. If its initial resistance is R , what would be its resistance after reduction of the diameter ?

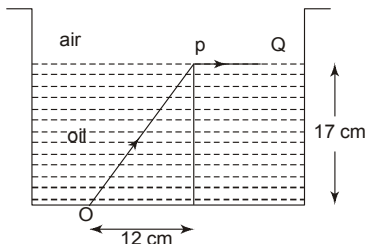
- (1) $\frac{R}{625}$
 (2) $\frac{R}{25}$
 (3) $25 R$
 (4) $625 R$

37. An object of mass 'm' moving along a straight line with a velocity 'u' collides with a heavier mass 'M' and gets embedded into it. If the compound system of mass $(m + M)$ keeps moving in the same direction then which of the given options is true ?

- (1) The kinetic energies before and after collision are same.
 (2) The kinetic energy after collision is $\frac{1}{2}(M + m)u^2$.
 (3) There will be a loss of kinetic energy equal to $\frac{1}{2} \frac{m^2 u^2}{(M + m)}$
 (4) There will be a loss of kinetic energy equal to $\frac{1}{2} \frac{Mm}{(M + m)} u^2$

38. A vessel is filled with oil as shown in the diagram. A ray of light from point O at the bottom of vessel is incident on the oil-air interface at point P and grazes the surface along PQ. The refractive index of the oil is close to

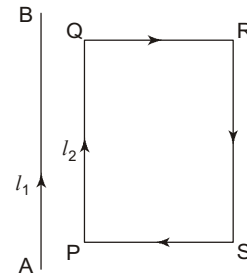
- (1) 1.41
 (2) 1.50
 (3) 1.63
 (4) 1.73



39. A charged particle placed in an electric field falls from rest through a distance d in time t . If the charge on the particle is doubled, the time of fall through the same distance will be

- (1) $2t$ (2) t
 (3) $\frac{t}{\sqrt{2}}$ (4) $\frac{t}{2}$

40. AB is a long wire carrying a current I_1 , and PQRS is rectangular loop carrying current I_2 (as shown in the figure).



Which among the following statements are correct?

- (a) Arm PQ will get attracted to wire AB, and the arm RS will get repelled from wire AB.
 (b) Arm PQ will get repelled from wire AB and arm RS attracted to wire AB.
 (c) Forces on the arms PQ and RS will be unequal and opposite.
 (d) Forces on the arms QR and SP will be zero.
 (1) only (a) (2) (b) and (c)
 (3) (a) and (c) (4) (b) and (d)

41. The sum of all the possible remainders, which can be obtained when the cube of a natural number is divided by 9, is

- (1) 5 (2) 6
 (3) 8 (4) 9

42. When a polynomial $p(x)$ is divided by $x - 1$, the remainder is 3. When $p(x)$ is divided by $x - 3$, the remainder is 5. If $r(x)$ is the remainder when $p(x)$ is divided by $(x - 1)(x - 3)$, then the value of $r(-2)$ is

- (1) -2 (2) -1
 (3) 0 (4) 4

43. For what value of p , the following pair of linear equations in two variables will have infinitely many solutions?
- $$px + 3y - (p - 3) = 0$$
- $$12x + py - p = 0$$
- (1) 6
(2) -6
(3) 0
(4) 2
44. Two quadratic equations $x^2 - bx + 6 = 0$ and $x^2 - 6x + c = 0$ have a common root. If the remaining roots of the first and second equations are positive integers and are in the ratio 3 : 4 respectively, then the common root is
- (1) 1 (2) 2
(3) 3 (4) 4
45. First term of an arithmetic progression is 2. If the sum of its first five terms is equal to one-fourth of the sum of the next five terms, then the sum of its first 30 terms is
- (1) 2670 (2) 2610
(3) -2520 (4) -2550
46. A circle C is drawn inside a square S so that the four sides of S are tangents to C . An equilateral triangle T is drawn inside C with its vertices on C . If the area of S is k times the area of T , then the value of k is
- (1) $\frac{16}{3\sqrt{3}}$ (2) $\frac{16}{\sqrt{3}}$
(3) $\frac{32}{3\sqrt{3}}$ (4) $\frac{32}{\sqrt{3}}$
47. Let AP be a diameter of a circle of radius r and PT be the tangent to the circle at the point P such that the line AT intersects the circle at B . If $PT = 8$ units and $BT = 4$ units, then r is equal to
- (1) $4\sqrt{3}$ units (2) 4 units
(3) $\frac{4}{\sqrt{3}}$ units (4) $2\sqrt{3}$ units
48. If the quadratic equation $x^2 + bx + 72 = 0$ has two distinct integer roots, then the number of all possible values for b is-
- (1) 12 (2) 9
(3) 15 (4) 18
49. If the area of a square inscribed in a semicircle is 2 cm^2 , then the area of the square inscribed in a full circle of the same radius is-
- (1) 5 cm^2
(2) 10 cm^2
(3) $5\sqrt{2} \text{ cm}^2$
(4) 25 cm^2
50. If the discriminants of two quadratic equations are equal and the equations have a common root 1, then the other roots-
- (1) are either equal or their sum is 2
(2) have to be always equal
(3) are either equal or their sum is 1
(4) have their sum equal to 1
51. Three circular wires are attached in series such that, if one wire is rotated, other two also get rotated. If the diameter of a wire is $\frac{4}{5}$ times that of immediate left wire and the left most wire rotates at the speed of 32 revolutions per minute, then the number of revolutions made by right most wire per minute will be-
- (1) 40 (2) 49
(3) 50 (4) 60
52. Let ABC be an equilateral triangle. If the co-ordinates of A are $(1, 2)$ and co-ordinates of B are $(2, -1)$, then-
- (1) C cannot lie in the first quadrant
(2) C cannot lie in the second quadrant
(3) C is the origin
(4) C cannot lie in the third quadrant
53. Shyam wants to make a solid brick shape structure from 400 wooden cubes of unit volume each. If the sides of the solid brick have the ratio 1:2:3, then the maximum

- number of cubes, which can be used, will be-
- (1) 400 (2) 288
(3) 300 (4) 384
- 54.** Positive integers from 1 to 21 are arranged in 3 groups of 7 integers each, in some particular order. Then the highest possible mean of the medians of these 3 groups is-
- (1) 16 (2) 12.5
(3) 11 (4) 14
- 55.** On dividing 2272 as well as 875 by a 3-digit number N , we get the same remainder in each case. The sum of the digits of N is-
- (1) 10 (2) 11
(3) 12 (4) 13
- 56.** A line l passing through the origin makes an angle θ with positive direction of x -axis such that $\sin \theta = \frac{3}{5}$. The coordinates of the point, which lies in the fourth quadrant at a unit distance from the origin and on perpendicular to l , are
- (1) $\left(\frac{3}{5}, -\frac{4}{5}\right)$ (2) $\left(\frac{4}{5}, -\frac{3}{5}\right)$
(3) $(3, -4)$ (4) $(4, -3)$
- 57.** The value(s) of k for which $x^2 + 5kx + k^2 + 5$ is exactly divisible by $x + 2$ but not by $x + 3$ is (are)
- (1) 1
(2) 5
(3) 1, 9
(4) 9
- 58.** If $\cos^4\theta + \sin^2\theta = m$, then-
- (1) $1 \leq m \leq 2$
(2) $\frac{1}{2} \leq m \leq 1$
(3) $\frac{3}{4} \leq m \leq 1$
(4) $\frac{3}{4} \leq m \leq \frac{13}{16}$
- 59.** Cost of 2 apples, 3 bananas and one coconut is ₹ 26. Also the cost of 3 apples, 2 bananas and two coconuts is ₹ 35. Then the cost of 12 apples, 13 bananas and 7 coconuts is-
- (1) ₹ 172 (2) ₹ 148
(3) ₹ 143 (4) ₹ 126
- 60.** ABC is a field in the form of an equilateral triangle. Two vertical poles of heights 45m and 20m are erected at A and B respectively. The angles of elevation of the tops of the two poles from C are complementary to each other. There is a point D on AB such that from it, the angles of elevation of the tops of the two poles are equal. Then AD is equal to-
- (1) $17\frac{5}{12}$ m (2) $20\frac{10}{13}$ m
(3) $20\frac{5}{13}$ m (4) $17\frac{10}{12}$ m
- 61.** Arrange the developments related to European history in a chronological sequence.
- I. Napoleon invaded Italy.
II. Unification of Italy.
III. Unification of Germany.
IV. Vienna Settlement.
- (1) I, III, II and IV
(2) I, II, IV and III
(3) I, IV, II and III
(4) I, II, III and IV
- 62.** Which of the following statements about Liberals in 19th century Europe are correct?
- I. They favoured the Catholic Church.
II. They opposed dynastic rule with unlimited power.
III. They were democrats.
IV. They did not want any voting rights for women.
- (1) I, II and III (2) I, II and IV
(3) II and IV (4) III and IV

63. Which of the following statements are correct?

- I. In the beginning Bombay was under the Portuguese control.
- II. Control of Bombay passed onto the French in the 17th century.
- III. The Marathas replaced the French in Bombay.
- IV. Bombay became the capital of the Presidency in early 19th century.

- (1) I, II and IV (2) I and IV
- (3) I, II and III (4) II, III and IV

64. Which of the following statements are correct?

- I. The Chinese introduced printing.
- II. The Buddhist missionaries introduced printing in Japan.
- III. The Chinese developed printing to facilitate their expanding trade.
- IV. Printing reached Europe through Italy.

- (1) I, II and III (2) I, II and IV
- (3) II, III and IV (4) I and IV

Directions (Q. 65-72) : Read the statements and select the correct answer from the options given below.

- 1. Statement I is true, Statement II is false.
- 2. Statement I is false, Statement II is true.
- 3. Both Statements are true, and Statement II provides explanation of Statement I.
- 4. Both Statements are true, but Statement II does not provide explanation of Statement I.

65. Statement I : During the years of the Great Depression the economic crisis was worse in Germany.

Statement II : The President of the Weimar Republic had the power to impose emergency.

66. Statement I : The Forest Act of 1878 categorized some forests as 'reserved forests'.

Statement II : They were considered the best forests for people's use.

67. Statement I : Shifting cultivation was widely prevalent in different parts of India in the 19th century.

Statement II : More and more people took to shifting cultivation when forest laws were enacted.

68. Statement I : Cricket emerged as a colonial game.

Statement II : Cricket was started in England. Ans. (3) Sol. Cricket came to India from England as India was a colony

69. Statement I: Mahatma Gandhi wished everyone had clothes to wear.

Statement II: He wanted everyone to wear the single loin cloth as he did.

70. Statement I: The Spanish conquest of America was not a conventional military conquest.

Statement II: One of the most powerful weapon was the spread of smallpox.

71. Statement I: The silk routes led to trade and cultural links between distant parts of the world.

Statement II: Early Christian missionaries travelled to Asia through this route.

72. Statement I: The French used forced labour in Indo-China for building canals.

Statement II : Vietnam became a major exporter of rice in the world.

73. Match List I (Layers of Atmosphere) and List II (Characteristics) and select the correct answer using the code given below.

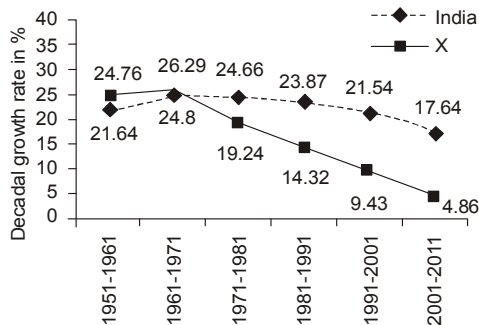
List I (Layer of Atmosphere)	List II (Characteristics)
A. Ionosphere	I. Contains Ozone
B. Stratosphere	II. Reflects radio Waves
C. Exosphere	III. Fall in Temperature
D. Troposphere	IV. Extremely low air density
(1) A-II, B-III, C-IV, D-I	
(2) A-II, B-I, C-IV, D-III	
(3) A-II, B-III, C-I, D-IV	
(4) A-III, B-I, C-IV, D-II	

74. Which of the following statements are correct?

- I. Rann of Kachchh is formed by the recession of the sea.
- II. Kuchaman, Sambhar and Didwana are salt water lakes.
- III. The land to the east of Aravallis is known as Bagar.
- IV. The fertile flood plains formed by small streams in Rajasthan are known as Rohi.

- (1) I, II and IV (2) I, III and IV
(3) II, III and IV (4) I, II, III and IV

75. Observe the graph given below:



Identify the state with population growth rate marked by 'X' in the given graph.

- (1) Goa (2) Kerala
(3) Sikkim (4) Nagaland

76. River Alaknanda forms confluences (Prayags) in Uttarakhand. Match the codes given in Figure with Table (Prayags) and select the correct answer using the code given below.

Figure

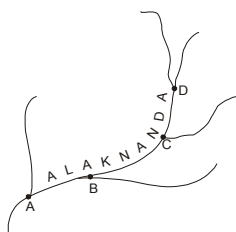


Table (Prayags)

- I. Karn Prayag
- II. Rudra Prayag
- III. Nand Prayag
- IV. Vishnu Prayag

- (1) A-II, B-I, C-III, D-IV
(2) A-II, B-III, C-I, D-IV
(3) A-III, B-II, C-I, D-IV
(4) A-III, B-I, C-II, D-IV

77. Match List I (Original Rock) with List II (Metamorphic Rock) and select the correct answer using the code given below:

List I (Original Rock)	List II (Metamorphic Rock)

A. Granite	I. Diamond
B. Coal	II. Marble
C. Limestone	III. Slate
D. Shale	IV. Gneiss

- (1) A-III, B-IV, C-II, D-I
(2) A-III, B-II, C-IV, D-I
(3) A-IV, B-II, C-I, D-III
(4) A-IV, B-I, C-II, D-III

78. Observe the given map.

Which one of the following statement is NOT true about the shaded state indicated on the map?

- (1) Society predominantly follows right of female ultimogeniture
(2) The state is an example of areas with karst topography



- (3) The state is a major producer of potatoes in India
(4) Some parts of the state receive extremely high rainfall

79. Match List I (Mineral Oil Refineries) with List II (States) and select the correct answer using the code given below :

List I (Mineral Oil Refineries)	List II (States)
A. Numaligarh	I. Punjab
B. Bathinda	II. Andhra Pradesh
C. Tatipaka	III. Madhya Pradesh
D. Bina	IV. Assam

- (1) A-IV, B-II, C-III, D-I
(2) A-IV, B-I, C-II, D-III
(3) A-II, B-I, C-IV, D-III
(4) A-IV, B-III, C-II, D-I

80. 'Slash and Burn Agriculture' is known by specific name in different states of India. Match the shaded states marked in the given map with codes given in the table (Different names of Slash and Burn Agriculture) and select the correct answer using the code given below.



Table (Different Names of Slash and Burn Agriculture)

I. Bringa	II. Waltre
III. Dahiya	IV. Kuruwa

- (1) A-III, B-IV, C-II, D-I
(2) A-III, B-II, C-IV, D-I
(3) A-I, B-IV, C-II, D-III
(4) A-I, B-II, C-IV, D-III

81. Match List I (Industries) with List II (Important Centers) and select the correct answer using the code given below :

List I (Industries)	List II (Important Centers)

A. Cotton textile	I. Ludhiana
B. Hosiery	II. Rishra
C. Jute	III. Coimbatore
D. Silk textile	IV. Mysuru

- (1) A-I, B-III, C-IV, D-II
(2) A-IV, B-I, C-II, D-III
(3) A-III, B-II, C-I, D-IV
(4) A-III, B-I, C-II, D-IV

82. Which one of the following island is closest to the equator?

- (1) Minicoy
(2) Car Nicobar
(3) Little Nicobar
(4) Great Nicobar

83. Which of the following characteristics are true about plantation agriculture?

- I. Generally plantation agriculture is considered as an example of subsistence farming.
II. Generally single crop is grown on a large area in plantation agriculture.
III. It has an interface of agriculture and industry.
IV. It uses capital intensive inputs.
(1) I and IV
(2) III and IV
(3) I, II and III
(4) II, III and IV

84. Match List I (Vegetation zones) with List II (Mean Annual Temperature Range) and select the correct answer using the code given below:

List I (Vegetation Zones)	List II (Mean Annual Temperature Range)
A. Alpine	I. Above 24°C
B. Temperate	II. 17° to 24°C
C. Tropical	III. Below 7°C
D. Sub-tropical	IV. 7°C to 17°C

- (1) A-III, B-I, C-II, D-IV
 (2) A-III, B-I, C-IV, D-II
 (3) A-III, B-IV, C-I, D-II
 (4) A-I, B-II, C-III, D-IV
- 85.** 'In a democracy, the will of the people is supreme.' Which of the following statement concerning democracy in India best reflects this?
- (1) The President appoints the Prime Minister who is the leader of the political party possessing a majority in the Lok Sabha.
 (2) An assembly of elected representatives exercises political authority on behalf of the people.
 (3) In case of a difference between the two Houses of Parliament, the final decision is taken in a joint session of the two Houses.
 (4) The permanent executive has more powers than the political executive.
- 86.** Which of the following statements about the Panchayati Raj Institutions after the Constitutional Amendment in 1992 are false?
- I. Seats are reserved for the Scheduled Castes, Scheduled Tribes, and Other Backward Classes in the elected bodies of the Panchayati Raj Institutions.
 II. Elections to the Panchayati Raj Institutions are supervised by the Election Commission of India.
 III. Elections to the Panchayati Raj Institutions are held regularly after every five years.
 IV. Half of the seats in all the States are reserved for women.
- (1) I and III
 (2) I and II
 (3) III and IV
 (4) II and IV
- 87.** Match List I (Political Systems) with List II (Nations) and select the correct answer using the code given below:
- List I : (Political Systems)**
- A. Federal, Presidential, Republic
 B. Federal, Parliamentary, Republic
 C. Unitary, Parliamentary, Monarchy
 D. Presidential cum Parliamentary, Republic
- List II : (Nations)**
- I. India
 II. United Kingdom
 III. Germany
 IV. United States of America
 V. France
- (1) A-IV, B-I, C-II, D-V
 (2) A-IV, B-I, C-II, D-III
 (3) A-V, B-IV, C-II, D-III
 (4) A-V, B-II, C-III, D-IV
- 88.** Which of the following statements about the federal system in India are true?
- I. The Constitution of India provides for a three-fold distribution of legislative powers between the Union and the State Government.
 II. Both the Union and the State Governments can legislate on residuary subjects.
 III. The Parliament cannot on its own change the power-sharing arrangement between the Union and the State Governments.
 IV. The High Courts have no role in resolving disputes about the division of powers between the Union and the State Governments.
- (1) I and III
 (2) II, III and IV
 (3) I, III and IV
 (4) I, II and IV

89. Which of the following group of States/ Union Territories have only one Lok Sabha constituency?
- Arunachal Pradesh, Sikkim, Lakshadweep
 - Goa, Meghalaya, Andaman and Nicobar Islands
 - Chandigarh, Sikkim, Mizoram
 - Manipur, Dadra and Nagar Haveli, Puducherry
90. Which of the following statements best reflects the "socialist" feature of the Preamble to the Constitution of India?
- There are no unreasonable restrictions on how the citizens express their thoughts
 - The traditional social inequalities have to be abolished
 - Government should regulate the ownership of land and industry to reduce socio-economic inequalities
 - No one should treat a fellow citizen as inferior
91. Which of the following statements about the Indian judiciary is true?
- India has an integrated judiciary
 - The Judiciary in India is subordinate to the Executive
 - The Supreme Court is more powerful than Parliament
 - The Chief Justice of India appointed by the Prime Minister
92. Which of the following Fundamental Rights includes the Right to Education?
- Right to Equality
 - Right to Freedom
 - Cultural and Educational Rights
 - Right to Constitutional Remedies
93. Which of the following is NOT an indicator of economic development?
- Increased per capita income
 - Decreased infant mortality
 - Increased life expectancy at birth
 - Decreased women participation in job market
94. The poverty line in Dinanagar is set at Rs. 100 per capita per day. Five Hundred people live in Dinanagar of whom 50 earn Rs. 30 per capita per day and another 25 earn Rs. 80 per capita per day each. Everybody else earn more than Rs. 100 per day per capita. What is the minimum amount that the government of Dinanagar will have to spend to completely eradicate poverty?
- Rs. 3000
 - Rs. 3500
 - Rs. 4000
 - Rs. 4500
95. The local telephone company sells me a landline connection only if I purchase a handset from them as well. Which of the following rights does this practice violate under the Consumer Protection Act 1986?
- Right to represent
 - Right to information
 - Right to choose
 - Right to seek redressal
96. Match List-I (Type of Unemployment) with List-II (Characteristics) and select the correct answer using the codes given below:
- | List-I
(Type of Unemployment) | List-II
(Characteristics) |
|--|---|
| A. Seasonal | I. Occurs during boom or recession in the economy |
| B. Frictional | II. An absence of demand for a certain type of workers |
| C. Disguised | III. Occurs when moving from one job to another |
| D. Structural | IV. Actual contribution by the additional labour is nil |
| E. Cyclical | V. Job opportunities during certain months in the year |

- (1) A-V, B-III, C-IV, D-II, E-I
 (2) A-IV, B-V, C-III, D-I, E-II
 (3) A-I, B-II, C-III, D-IV, E-V
 (4) A-V, B-IV, C-III, D-II, E-I
- 97.** Suppose Indian Farmers sell wheat at Rs. 50 per kg and the international price of wheat is Rs.40 per kg. What is the minimum rate of import duty Government of India must impose on imported wheat so that it does not adversely affect Indian farmers in the domestic market?
- (1) 10% (2) 20%
 (3) 25% (4) 30%
- 98.** The wage rate of a worker in a country is Rs. 300 per day. Which of these person(s) would you consider unemployed?
- (1) Ramu is willing to work at Rs. 300 a day, but cannot find work.
 (2) Suresh is willing to work only at Rs. 400 a day or more, and cannot find work.
 (3) Shanti stays at home because she has young children to look after.
- (1) Ramu
 (2) Suresh
 (3) Ramu and Suresh
 (4) Ramu and Shanti
- 99.** Which of the following can be used as collateral in Indian banks to borrow money?
- (1) Bank Passbook
 (2) Credit Card
 (3) Own House
 (4) Passport
- 100.** The total agricultural land in a village is 1200 hectares. This is distributed among 320 families who form four groups in the following pattern. It is assumed that the land is distributed equally within each group. Identify the group of small farmers.
- | Group | Number of Families | Total amount of land owned and operated by each group (in hectares) |
|-------|--------------------|---|
| A | 100 | 300 |
| B | 180 | 300 |
| C | 30 | 300 |
| D | 10 | 300 |
- (1) A
 (2) B
 (3) C
 (4) D

4. From the given question

$$\begin{array}{ccc} 12^2 - 8^2 & 16^2 - 7^2 & 25^2 - 21^2 \\ 144 - 64 & 256 - 49 & 625 - 441 \\ = 80 & = 207 & = 184 \end{array}$$

5. From the given question

$$\begin{array}{rcl} A & 4 & B & C \\ \times C & \Rightarrow & B = 3 \\ \hline 1 & A & 1 & D & C \\ \hline \end{array} \quad \begin{array}{l} A = 2 \\ B = 3 \\ C = 5 \\ D = 7 \end{array}$$

$$\begin{array}{r} 2 & 4 & 3 & 5 \\ \times 5 & & & \\ \hline 1 & 2 & 1 & 7 & 5 \end{array}$$

6. From the given question

$$\begin{array}{ll} 4 = \triangle \bigcirc & \dots(i) \\ 7 = \square \triangle & \dots(ii) \\ 9 = \square \bigcirc & \dots(iii) \end{array}$$

From (i) & (ii)

$$9 = \square + \bigcirc$$

$$3 = \square - \bigcirc$$

$$12 = 2 \square$$

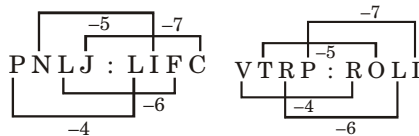
$$\square = 6$$

$$\triangle = 1$$

$$\bigcirc = 3$$

So the answer figure (3) will represent the correct balance.

7. From the given question



8. According to given question the point of contact no. both the stationary coin and the rotating coin must move in the same distance, so half the circumference of the coin.

9. From given question

South-East becomes North →

Changes by 135° (ACW)

West becomes → South east

10. From the given question

$$\sqrt[3]{216} = 6$$

Number of small cubes have no face painted

$$= (6 - 2)^3 = (4)^3 = 64$$

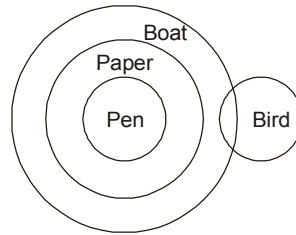
So the number of small cubes have no face painted is 64.

11. According to given question

Sum of positions value of alphabets $\times 2$
= Given number

$$EF \ 22 \rightarrow 5 + 6 = 11 \times 2 \Rightarrow 22$$

12. Statement :

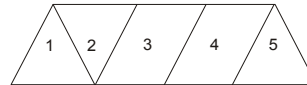


Conclusions :

I → ✓

II → ×

- 13.



From the given figure

Quadrilateral are 12, 123, 1234, 12345

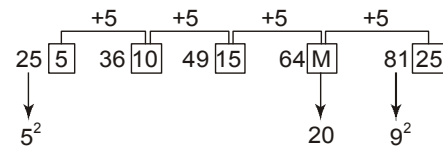
23, 234, 2345

3, 34, 345

4, 45

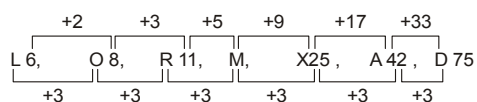
= 12

- 14.



So from given alternative we will fit 20 in place of 20.

- 15.



16. From the given question

Column-1

$$7 + 2 + 1 + 4 = 14$$

Column-2

$$3 + 8 + 1 + 2 = 14$$

Similarly

Column-3

$$2 + 4 + 4 + M = 14$$

$$\boxed{M = 4}$$

17. According to given question

$$56 \div (6 + 8) \times 4 - 1$$

$$56 \div 14 \times 4 - 1$$

$$4 \times 4 - 1$$

$$16 - 1 = 15$$

18. L.H.S. = $100 - 81 \div 27 @ 3 < 6 = 115$

$$\Rightarrow 100 - 81 \div 27 @ 3 \times 6 \Rightarrow 100 - 3 + 18$$

$$\Rightarrow 100 + 18 - 3 \Rightarrow 118 - 3 \Rightarrow 115 = \text{RHS}$$

19. According to the given questions, the number is

$$x = 3P_1 + 2$$

$$\text{Also, } x = 5P_2 + 3$$

$$\text{and } x = 7P_3 + 5$$

From above

$$x = 3P_1 + 2 = 5P_2 + 3 = 7P_3 + 5$$

$$\Rightarrow \text{On solving we get } P_1 = 22, P_2 = 13, P_3 = ?$$

so the solution is $x = 68$.

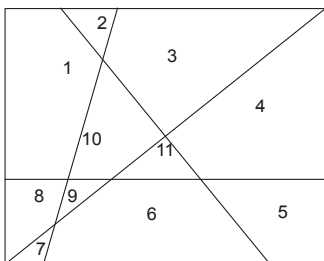
- 20.

Row 1	9	8	7	6	5	4	3	2	1
Row 2	1	2	3	4	5	6	7	8	9

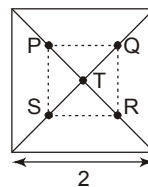
From the given boxes, it is clear that

Total number of ways are 9.

- 21.



- 22.



From the above figure it is clear that minimum number of points inside a square of side 2 cm are P, Q, R, S, T whose pairwise distance is not more than $\sqrt{2}$.

23. Sum of digit's is divisible by 3 and unit digit is even $\rightarrow$ number is divisible by 6 and sum of digit is not divisible by 9.

So 'X' is divisible by 6 and sum of digit is also not divisible by 9.

24. According to the question

Average age of A, B and C is

$$\frac{A + B + C}{3} = 43$$

$$\therefore A + B + C = 129$$

$$\text{Now } C = 65$$

$$\therefore A + B = 64$$

Since sum of ages of A + B is less than age of C, therefore statement I alone is sufficient.

(Questions 25-26)

	A	B	C	D	E
Physics	x	x	x	2	x
Chemistry	x	x	3	x	x
Biology	x	x	x	x	1
Maths	4	x	x	x	x
Hindi	x	5	x	x	x

27. From given question

$$\text{Here } r_1 = 12 \text{ cm}$$

$$h_1 = 175 \text{ cm}$$

$$r_2 = ?$$

$$h_2 = 63 \text{ cm}$$

$$\text{Volume of } c_1 = \text{Volume of } c_2$$

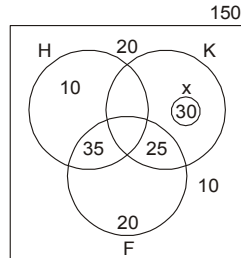
$$\pi r_1^2 h_1 = \pi r_2^2 h_2$$

$$12^2 \times 175 = r_2^2 \times 63$$

$$\therefore r_2 = 20$$

So the radius of new cylinder is 20 cm.

28. The given observation is
DIAEBJLQ†12VTE
(Questions 29-30)



Here K = Number of players who play Kabaddi
H = Number of players who play Hockey
F = Number of players who play Football.

31. From the given question
 $1^2 + 2^2 + 3^2 = 1 + 4 + 9 = 14$
 $4^2 + 5^2 + 6^2 = 16 + 25 + 36 = 77$
 $\therefore 7^2 + 8^2 + 9^2 = 49 + 64 + 81 = 194$
33. Let total quantity in the mixture be a litre

$$\therefore \text{Water} = \frac{3a}{8} \text{ litre, Milk} = \frac{5a}{8} \text{ litre}$$

$\therefore$ Let 'b' litre mixture is removed

$$\text{then, water removed} = \frac{3b}{8},$$

$$\text{milk removed} = \frac{5b}{8}$$

$\therefore$ According to question.

$$\frac{3a}{8} - \frac{3b}{8} + b = \frac{5a}{8} - \frac{5b}{8}$$

$$\frac{3a}{8} - \frac{5a}{8} = \frac{3b}{8} - b - \frac{5b}{8}$$

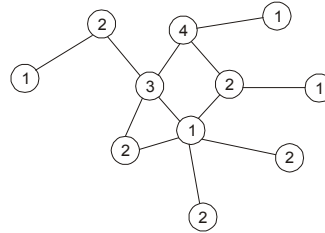
$$-\frac{2}{8}a = \frac{3b - 8b - 5b}{8}$$

$$-\frac{2a}{8} = -\frac{10b}{8}$$

$$a = 5b$$

$$\text{on solving we get } \boxed{\frac{b}{a} = \frac{1}{5}}.$$

34.



So from the figure the minimum number of distinct colours to colour all the circles in the figure is 4.

35.

	0	5	12
1	3	5	7
1	2	2	2
S	1	0	

So from above it is clear that there are 12 ways to move from box marked S to the box marked D.

36. From the given question

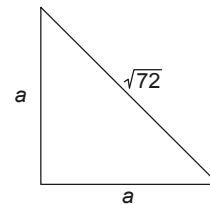
$$\sqrt{16} \times (7 - 2) = 4 \times 5 = 20$$

$$\sqrt{25} \times (8 - 2) = 5 \times 6 = 30$$

$$\sqrt{36} \times (9 - 5) = 6 \times 4 = 24$$

$$\sqrt{49} \times (10 - 7) = 7 \times 3 = 21$$

37.



From the given question

Area of right triangle is maximum, when base is equal to perpendicular.

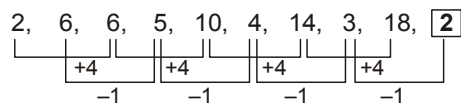
$$a^2 + a^2 = (\sqrt{72})^2$$

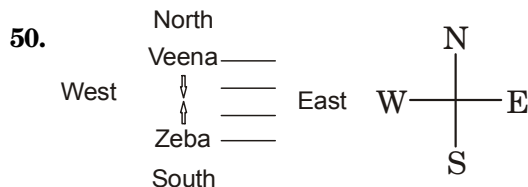
$$a = 6 \text{ cm}$$

$$\therefore \text{Area} = \frac{1}{2} \times 6 \times 6 = 18 \text{ cm}^2$$

So the maximum possible area of the triangle formed by rod is 18 cm^2 .

38. Given series





So from above it is clear that, Veena is facing South direction.

ENGLISH LANGUAGE

1. Option (3) is the correct answer as described in the passage. The passage opens on the note that the advocates of oriental learning have highly irrational views about English education in India.
2. Option (2) is the correct answer as the author has no problem with the other stated options. In fact he sides with them. Option (2) can be inferred from the author's views.
3. Clearly, option (4), 'Englishman' is the correct answer.
4. Option (3) is the correct answer as the first line of the passage and this option; both indicate the main reason behind this passage. Option (4) is also stated in the passage but is not the main argument of the passage.
5. The passage states- "We know that foreigners of all nations do learn our language sufficiently to have access to all the most abstruse knowledge which it contains sufficiently to relish even the more delicate graces of our most idiomatic writers." This makes option (3) correct.
6. 3rd paragraph contains the answer. Other options are not even close, hence incorrect.
7. This is the best summary possible. Other options are vague and do not bring out the essence of the given passage.
8. It has been explained in the 4th paragraph. Other options are factually incorrect.
9. Option (4) is the correct answer since it is clearly mentioned in the 2nd paragraph. Other options therefore are factually incorrect.
10. It can be concluded that the passage focuses on our abilities, strengths and weaknesses that help us succeed in our career. Therefore option (2) is the correct answer.
11. The narrator throughout the passage describes the effect of the blast on the guests. The other options are factually incorrect.
12. The narrator describes how the suddenness of the blast left the guests dazed and confused. The other options are factually incorrect.
13. These words can be directly found in the passage to describe the blast.
14. The option can be deducted, since very little language has been changed.
15. Altruism means the belief in or practice of disinterested and selfless concern for the well-being of others.
16. RPQ is the correct series. Statement R follows S1 as it talks about 'difficulties' stated in S1. Hence, they form a mandatory pair. P follows R as 'such a man' used in P refers to 'him' stated in R. P,Q is a mandatory pair as- "even if he fails, he is never downcast" (stated in P) is continued in Q as- "in fact failures make him all the more determined."
17. PRQ is the correct series. Statement P follows S1 as both of them talk about Film theory. Q follows R as R starts the topic of film analyzing and Q talks about one way analyzing films.
18. Other options do not reciprocate to the given blank. Since sentence C talks about the author waking up from sleep and receiving the replies from the students, it is obvious that the only option (3) will be the best fit for B. It talks about sending emails to students before going to sleep.

19. As far as the given context is concerned, sentence B should represent something contrary to sentence C. Therefore option (4) is the best fit. Other options thereby can be rejected.
20. 'Disseminate' is the best fit as no other option would fit in. It means to distribute or spread. Only if the correct information is spread, then only the wrong information can be removed.
21. A 'ledge' is a shelf like projection on a wall which is usually used to keep potted plants. 'Balcony' is itself a place, and hence it can't fit into the blank.
22. Mellowed means to be calm and relaxed. This option best completes the given sentence. Other options are logically irrelevant to the passage.
23. The option that best completes the sentence is 'influenced'. 'Influenced' means shaped or formed. Other options are logically irrelevant to the passage.
24. 'Consensus' means to have a general agreement about something that is shared by all the people in a group. Other options are logically irrelevant to the passage.
25. Punitive means 'intended as punishment'. This option best completes the given sentence. Other options are logically irrelevant.
26. The blank should represent a word which means evidently or apparently. Option 1 is the best option.
27. The word excavation means to dig something from under the ground. Therefore option 2 'subterranean' is the best option which means 'under the earth surface'.
28. The blank should respond to a word meaning 'in addition to'. Therefore 'Moreover' is the best fit.
29. The blank should respond to something which means 'despite of'. Therefore 'though' is the best choice for the given blank.
30. The meaning of the given idiom 'after the feast comes the reckoning' is that every action has a resulting consequence. No other option explains this.
31. The meaning of the given idiom 'as the crow flies' is the measurement of distance in a straightline. Hence option (1) is the correct answer.
32. The meaning of the given idiom 'twisted arm' is to get someone to do what you want by making it very difficult for him or her to refuse, that is by forcing him. This makes option (1) correct.
33. The meaning of the given idiom 'big picture' is a complete view of something. This makes option (2) correct.
34. The meaning of the given idiom 'falling foul' is to come in conflict due to one's actions. This makes option (2) correct.
35. The meaning of the given idiom 'giving a cold shoulder' refers to the act of ignoring someone. This makes option (3) correct.
36. This is the most apt option. The other options have different meaning and will not fit the context.
37. This is the most apt option. The other options have different meaning and will not fit the context.
38. This is the most apt option. The other options have different meaning and will not fit the context.
39. This is the most apt option. The other options have different meaning and will not fit the context.
40. This is the most apt option. The other options have different meaning and will not fit the context.
41. This is the most apt option. The other options have different meaning and will not fit the context.
42. This is the most apt option. The other options have different meaning and will not fit the context.

43. This is the most apt option. The other options have different meaning and will not fit the context.
44. It is the only possible answer. Other options are grammatically incorrect.
45. When two actions take place one after the other, the action which happened first is always in past perfect tense.
46. Here the tense should be in past perfect tense to denote a time earlier than before.
47. 'So that' is the required conjunction for the blank. Other options are grammatically incorrect.
48. Commence means to begin. So it is opposite to 'conclude'.
49. Typical is opposite to 'unique'. Other options are incorrect.
50. Guarded is the ideal antonym of 'candid'. Other options are all incorrect.

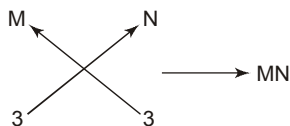
SCHOLASTIC APTITUDE TEST

1. Absciscic acid is a growth inhibitor hence the combination will show slowest growth. Absciscic acid causes bud dormancy, it also inhibits seed germination.
2. Cardiac muscles are involuntary, branched, cylindrical and uninucleated. They have alternate light and dark bands just like skeletal muscles.
3. Involuntary activities are controlled by mid brain and hind brain. C and D are parts of Hind brain and Mid brain respectively. Mid brain controls certain visual & audio reflexes. Hind brain which includes medulla controls involuntary activities like peristalsis, heart beat, vomiting etc.
4. Arthropoda involves animal with bilateral symmetry, coelomic cavity, segmented body and jointed appendages. *eg.* Insects, spiders, prawn etc. Their coelom is filled with blood (haemocoel) arthro means **jointed**, poda means **appendages**.
5. Spirogyra is an Algae. Where as Penicillium is fungi. Both Nostoc and Bacteria lack well defined nucleus and

membrane bound cell organelles hence are prokaryotes.

6. The given characters in the question match with monocot which does not show secondary vascular tissues, and flower has three sepals. (Flowers are trimerous): Tap roots and presence of 2 cotyledons are the features of dicots. Dicots have reticulate venation.
7. This is a type of divergent evolution performed by human. Farmers cultivated numerous popular crops from wild cabbage by artificial selection.
8. Analogous organs are organs with different structure and same function. Wings of bat are skin folds stretched between elongated fingers, wings of bird are a feathery covering all along the arm, wings of a butterfly are covered with scales.
9. Trichoderma is a fungicide and rest three are biofertilizers. It is used as biocontrol agent against fungal diseases in plants.
10. Test cross is a cross performed between hybrid of F_1 generation with recessive parent. Test cross is a way to explore the genotype of the organism in question.
11. Wuchereria bancrofti is a Nematoda which causes Elephantiasis. Staphylococcus bacteria causes Acne.
12. Pancreatic juice is an universal juice having Trypsin and Lipase. It is released by pancreas. It also contains Pancreatic Amylase. Pancreatic juice works effectively in alkaline medium.
13. Pteridophyte is a Cryptogamiae having motile sperms and dominant generations has diploid cells.
14. Given time $\rightarrow$ 120 minutes
Given number of bacteria $\rightarrow$ 10
Shows divisions after $\rightarrow$ 20 minutes
So, $[20 \times 6 = 120 \text{ minutes}]$
Bacteria divides 6 times.
After 120 minutes we have $\rightarrow$
640 bacteria $[2^6 \times 10]$

15. As valency of metal M is 3 so



16. As we know that alloys are homogeneous mixture of two or more metals or non-metals. Hence Brass is a solution as it contains copper and zinc which are uniformly mixed.

17. As per unitary method

Number of oxygen atoms will be

$$\frac{6}{180} \times 1.8 = 0.06 \text{ NA}$$

$\therefore$ In 36.0 gm of water, number of oxygen atoms are

$$\frac{\text{NA}}{18} \times 36 = 2\text{NA}$$

$\Rightarrow$ total number of oxygen atoms

$$= (0.06 + 2) \text{ NA}$$

$$= 2.06 \text{ NA}$$

$$= 2.06 \times 6.022 \times 10^{23}$$

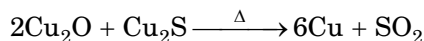
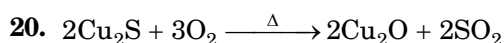
$$= 1.2405 \times 10^{24}$$

$$= 12.405 \times 10^{23}$$

$$\begin{aligned} 18. \text{ Average atomic mass} &= \frac{35 \times 1 + 37 \times 3}{4} \\ &= 36.5 \text{ u} \end{aligned}$$

19. The solution of Turmeric solution will become red because of an aqueous solution of CH_3COOK .

[Potassium acetate is basic salt]



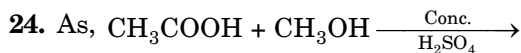
X $\rightarrow$ cuprous sulphide

Y $\rightarrow$ cuprous oxide

21. As physical properties and chemical properties of graphite and diamond are different. So statement is incorrect.

22. As it is clear that upper one is Carboxylic group and lower one is Ester group.

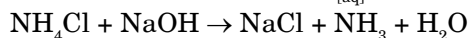
23. Covalent bond because R & Q both are non metal.



Hence 'X' is CH_3COOH or $\text{C}_2\text{H}_4\text{O}_2$

25. A $\rightarrow \text{NH}_4\text{Cl}$, B $\rightarrow \text{NH}_3$

When A reacts with $\text{NaOH}_{[\text{aq}]}$,



'C'

C $\rightarrow \text{NH}_3$ (gas)

When C reacts with conc. HCl it forms NH_4Cl (D)

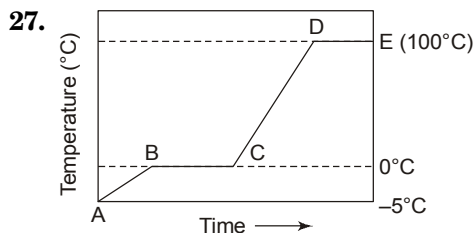
D $\rightarrow \text{NH}_4\text{Cl}$.

When NH_4Cl is shaken well with water, it dissociates to form NH_4OH and HCl.

So E is HCl.

Hence incorrect is that C & E are chemically same.

26. Reaction is feasible because zinc is more reactive than silver.



BC = Latent Heat of fusion.

DE = Latent Heat of vaporisation.

28. Uniform positive acceleration from 0 to 1 sec, zero acceleration (uniform velocity) from 1 to 2 sec and uniform negative acceleration from 2 to 3 second.

29. the person is myopic and the defective for point is $\rightarrow 0.4 \text{ m}$

$$u = -2m,$$

$$v = -0.4 \text{ m}$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\Rightarrow \frac{1}{f} = \frac{-5+1}{2}$$

$$= \frac{-4}{2} = -2$$

$$P = \frac{1}{f} = -2D$$

– ve power indicates concave lens.

30. t_1 = time of fall
 t_2 = time of going up
 S_1 = initial height of fall
 S_2 = height acquired on going up

$$S_2 = \frac{v^2 - u^2}{2a}$$

$$= \frac{0 - 25}{2 \times (-10)} = 1.25 \text{ m}$$

$$t_2 = \frac{0 - 5}{-10} = 0.5 \text{ s}$$

$$t_1 = 1.5 - 0.5 = 1 \text{ s}$$

$$s_1 = ut_1 + \frac{1}{2}at_1^2$$

$$= 0 + \frac{1}{2} \times 10 \times 1$$

$$= 5m$$

$$\text{displacement} = 5 - 1.25$$

$$= 3.75 \text{ m}$$

31.

$$F = \frac{p_2 - p_1}{t}$$

(as $v = 0$)

$$p_2 = mv = 0$$

$$p_1 = mu, u = v$$

$$m = \text{volume} \times \text{density}$$

$$= \frac{\pi d^2}{4} \times v \times t \times \rho$$

$$= \frac{\pi d^2 vt \rho}{4}$$

$$F = \frac{mu}{t}$$

$$= \frac{\pi d^2 vt \rho}{4 \times t}$$

$$= \frac{\pi d^2 v^2 \rho}{4}$$

32. acceleration of system = $\frac{F}{m}$

$$= \frac{15}{8+2} = \frac{15}{10}$$

$$= 1.5 \text{ m/s}^2$$

$$\text{Force exerted by A and B} = ma$$

$$= 2 \times 1.5 = 3 \text{ N}$$

As a reaction B exerts 3N on A.

33. Buoyant force = loss in weight

$$= 800 - 300 = 500 \text{ g}$$

Force exerted by water on submerged mass is action and as a reaction the submerged mass exerts same force of the water, which is measured by the platform balance.

34. $g = 10 \text{ m/s}^2$ on earth

$$= \frac{GM}{R^2}$$

$$g' = \frac{GM'}{R'^2} = \frac{2 \times GM}{4R^2}$$

$$= \frac{g}{2} = 5 \text{ m/s}^2$$

$$h = \frac{1}{2}gt^2 = \frac{1}{2}g't'^2$$

$$\Rightarrow t' = \sqrt{\frac{10 \times 50 \times 50}{5}}$$

$$= \sqrt{2} \times 50$$

$$= 70.7 \text{ s}$$

35. Frequency of sound remains same on change of medium. For sound, air is denser than water, so wavelength decreases as speed decreases.

36. $R = \frac{\rho L}{A},$

$$R' = \frac{\rho L'}{A'} = \frac{\rho \times 25L}{\pi \times \frac{d^2}{4 \times 5^2}}$$

[If A reduces by 25 times, length increases by 25 times]

$$= \frac{625 \times \rho L}{A}$$

$$= 625 \times R$$

37. By law of conservation of momentum

$$mu = (M + m) V$$

$$\Rightarrow v = \frac{mu}{M + m}$$

$$\text{Change in KE} = KE_f - KE_i$$

$$KE_i = \frac{1}{2} mu^2,$$

$$KE_f = \frac{1}{2} (M + m) v^2$$

$$= \frac{1}{2} \frac{m^2 u^2}{M + m}$$

$$\therefore \text{Change in KE} = \frac{1}{2} \frac{Mm}{(M + m)} u^2$$

38. R.I. of oil = $\frac{1}{\sin C}$

$$= \frac{1}{\frac{P}{H}} = \frac{H}{P}$$

$$= \frac{\sqrt{12^2 + 17^2}}{12}$$

$$= 1.73$$

39. On doubling the charge, to force doubles as

$$F = q E$$

also $F = m a$

$\therefore a$ doubles

$$h = \frac{1}{2} at^2$$

$$\Rightarrow t^2 = \frac{2h}{a}$$

$$t = \sqrt{\frac{2h}{a}},$$

$$t' = \sqrt{\frac{2h}{2a}}$$

$$= \frac{1}{\sqrt{2}} \times t$$

40. Currents in same direction attract each other Currents in opposite direction repel each other.

$$F \propto \frac{1}{d}$$

$\therefore$ Forces are unequal.

41. Reason:

(i) When 1^3 is divided by 9 then remainder is 1

(ii) When 2^3 is divided by 9 then remainder is 8

(iii) When 3^3 is divided by 9 then remainder is 0

(iv) After this same pattern will repeat

Hence sum of all possible remainders become $(1 + 8 + 0) = 9$. Hence 4th option is correct answer.

42. Reason :

Let $q_1(x)$ and $q_2(x)$ be the quotients when $p(x)$ is divided by $(x - 1)$ and $(x - 3)$ respectively.

Also assume that $q_3(x)$ is quotient when $p(x)$ is divided by $(x - 1)(x - 3)$.

Now A.G.C I, $p(x) = q_1(x) \times (x - 1) + 3$
...(1)

and A.G.C II, $p(x) = q_2(x) \times (x - 3) + 5$
...(2)

Also A.G.C III, $p(x) = q_3(x) \times (x - 1)(x - 3) + r(x)$
...(3)

Now at $x = 1$, from eqn no. (1), $p(1) = 3$
...(4)

at $x = 3$, from eqn no. (2), $p(3) = 5$
...(5)

Now put $x = 1$ in equation no. (3) we get
 $p(1) = r(1) \Rightarrow r(1) = 3$ [using equation (4)]
...(6)

Similarly from (3) & (5) we get $r(3) = 5$... (7)

from equation no.(3) it is clear that divisor $(x - 1)(x - 3)$ is of degree two so its remainder $r(x)$ will be of degree one or zero so

Let $r(x) = Ax + B$

put $r = 1$ & $r = 3$ is equation (8) we get

$$r(1) = A + B \Rightarrow A + B = 3 \text{ [using (6)]} \quad \dots(8)$$

$$\text{similarly } r(3) = 3A + B \Rightarrow 3A + B = 5 \quad \text{[using 7] } \dots(9)$$

on solving equation no.(8) & (9) we get

$$A = 1 \text{ \& } B = 2$$

$$\Rightarrow r(x) = 1x + 2 \quad \dots(10)$$

Now put $x = -2$ in equation no.(10) we get

$$r(-2) = -2 + 2 = 0$$

Hence option no.(3) is correct.

43. Reason :

We know that condition for infinitely many solutions is :

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$\Rightarrow \frac{p}{12} = \frac{3}{p} = \frac{p-3}{p}$$

$$\text{using } \frac{p}{12} = \frac{3}{p} \Rightarrow p = \pm 6 \quad \dots(1)$$

$$\text{using } \frac{3}{p} = \frac{p-3}{p} \Rightarrow p = +6 \quad \dots(2)$$

Hence from (1) & (2) $p = +6$ is a common solution. Hence option (1) is correct.

44. Reason :

Let roots of quadratic equation :

$$x^2 - bx + 6 = 0 \text{ are } \alpha \text{ \& } \gamma.$$

and roots of quadratic equation :

$$x^2 - bx + c = 0 \text{ are } \alpha \text{ \& } \beta.$$

$$\text{Then : } \alpha + \beta = b, \alpha\beta = 6, \alpha + \gamma = 6, \alpha\gamma = c \quad \dots(1)$$

$$\text{We have } \frac{\beta}{\gamma} = \frac{3}{4} \quad \dots(2)$$

Also from (1) we get

$$\frac{\alpha\beta}{\alpha\gamma} = \frac{6}{c} \Rightarrow \frac{\beta}{\gamma} = \frac{6}{c} \quad \dots(3)$$

$$\text{from (2) \& (3) we get } \frac{3}{4} = \frac{6}{c} \Rightarrow c = 8$$

Now using $c = 8$, second quadratic equation

$$x^2 - 6x + c = 0 \text{ become}$$

$$x^2 - 6x + 8 = 0$$

on solving $x^2 - 6x + 8 = 0$, we get $x = 2$ & 4 .

If common root is 2 then by putting $x = 2$ in equation

$$x^2 - bx + 6 = 0 \text{ we get}$$

$$(2)^2 - b \times 2 + 6 = 0 \Rightarrow b = 5$$

If common root is 4 then by putting $x = 4$ in equation

$$x^2 - bx + 6 = 0 \text{ we get}$$

$$(4)^2 - b \times 4 + 6 = 0 \Rightarrow b = \frac{11}{2}$$

But sum of roots $\alpha + \beta = 5$ & $\alpha \times \beta = 6$ is possible only if common root is 2.

Hence option (2) is correct.

$$45. \text{ We have } a = 2 \text{ \& } S_5 = \frac{1}{4}[S_{10} - S_5]$$

$$\text{Hence } 4S_5 = S_{10} - S_5$$

$$\Rightarrow 5S_5 = S_{10}$$

$$\Rightarrow 5 \times \left[\frac{5}{2} \{2 \times 2 + (5-1)d\} \right]$$

$$= \frac{10}{2} [2 \times 2 + (10-1) \times d]$$

$$\Rightarrow d = -6$$

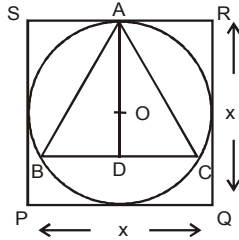
Hence

$$S_{30} = \frac{30}{2} [2 \times 2 + (30-1) \times (-6)]$$

$$= -2550$$

Hence option (4) is correct.

46.

**Reason :**

Let side of square be x units

so, diameter of circle is also x units

$$\Rightarrow OA = OB = OC$$

$$= \text{radius of circle} = \frac{x}{2} \text{ units}$$

$$\Rightarrow OD = \frac{1}{2}$$

[OA] by centroid properly that AO:OD
= 2:1

$$\Rightarrow OD = \frac{x}{4} \text{ units}$$

Now let side of this equilateral Δ by y so
by pythagoras theorem

$$AD^2 + DC^2 = AC^2$$

$$\Rightarrow \left(\frac{3x}{4}\right)^2 + \left(\frac{y}{2}\right)^2 = y^2$$

$$\Rightarrow x^2 = \frac{4}{3} \cdot \frac{4}{\sqrt{3}} \left(\frac{\sqrt{3}}{4} y^2\right)$$

That mean

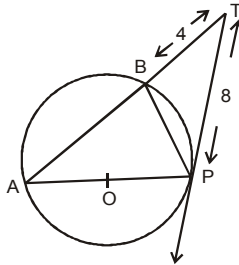
$$\text{area of square} = \frac{16}{3\sqrt{3}} \times \text{area of } \Delta$$

Now area of square = $K \times \text{area of } \Delta$

$$\text{means } K = \frac{16}{3\sqrt{3}}.$$

Hence option (1) is correct.

47.

**Reason :**

As TP is tangent and TBA is secant

$$\text{So } TP^2 = TA \times TB$$

$$\text{so, } 8^2 = TA \times 4 \Rightarrow TA = 16 \text{ units}$$

as TA = 16 units so BA = 12 units

Now in ΔBTP , $\angle PBT = 90^\circ$

so by pythagoras theorem

$$TP^2 = TB^2 + BP^2$$

$$\Rightarrow 8^2 = 4^2 + BP^2$$

$$\Rightarrow BP = 4\sqrt{3} \quad \dots(1)$$

Now in ΔABP , $\angle ABP = 90^\circ$, so by
pythagoras theorem

$$AP^2 = AB^2 + BP^2$$

$$\Rightarrow 12^2 + (4\sqrt{3})^2 = (2r)^2 \text{ [As } AP = 2r]$$

$$\Rightarrow r = 4\sqrt{3} \text{ units}$$

Hence option (1) is correct.

48. Reason :

For quadratic equation :

$$x^2 + bx + 72 = 0$$

$$\alpha \times \beta = 72 \text{ [using product of roots]}$$

Now, for $\alpha \times \beta = 72$, possible positive
values are

$$\begin{array}{l} \alpha = 1 \text{ \& } \beta = 72 \Rightarrow b = -73 \\ \alpha = 2 \text{ \& } \beta = 36 \Rightarrow b = -38 \\ \alpha = 3 \text{ \& } \beta = 24 \Rightarrow b = -27 \\ \alpha = 4 \text{ \& } \beta = 18 \Rightarrow b = -22 \\ \alpha = 6 \text{ \& } \beta = 12 \Rightarrow b = -18 \\ \alpha = 8 \text{ \& } \beta = 9 \Rightarrow b = -17 \end{array} \quad \left\{ \begin{array}{l} \text{using} \\ \text{sum} \\ \text{of} \\ \text{roots} \end{array} \right.$$

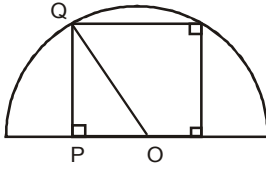
Nor for $\alpha\beta = 72$, possible negative values
are

$$\begin{array}{l} \alpha = -1 \text{ \& } \beta = -72 \Rightarrow b = 73 \\ \alpha = -2 \text{ \& } \beta = -36 \Rightarrow b = 38 \\ \alpha = -3 \text{ \& } \beta = -24 \Rightarrow b = 27 \\ \alpha = -4 \text{ \& } \beta = -18 \Rightarrow b = 22 \\ \alpha = -6 \text{ \& } \beta = -12 \Rightarrow b = 18 \\ \alpha = -8 \text{ \& } \beta = -9 \Rightarrow b = 17 \end{array}$$

hence total number of possible value of
 b are 12.

Hence option (1) is correct.

49.

**Reason :**Let $OQ = x$ cmGiven that the area of square is 2cm^2

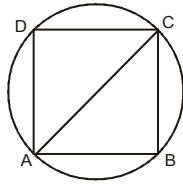
$$\Rightarrow \text{side of square} = \sqrt{2} \text{ cm}$$

$$\text{so } OP = \frac{\sqrt{2}}{2} \text{ cm}$$

so in ΔOPQ , by using pythagoras theorem, $OQ^2 = OP^2 + PQ^2$

$$\Rightarrow x^2 = (\sqrt{2})^2 + (\sqrt{2})^2$$

$$\Rightarrow x = \sqrt{\frac{5}{2}} \text{ cm}$$



Now,

$$\text{Diameter } AC = 2\sqrt{\frac{5}{2}} \text{ cm}$$

$$\text{Let } AB = BC = CD = DA = a \text{ cm}$$

$$\Rightarrow a^2 + a^2 = \left(2\sqrt{\frac{5}{2}}\right)^2$$

$$\Rightarrow a^2 = 5$$

$$\Rightarrow \text{area of square ABCD} = 5 \text{ cm}^2$$

Hence option (1) is correct.

50. Let $a_1x^2 + b_1x + c_1 = 0$ and $a_2x^2 + b_2x + c_2 = 0$

be the two quadratic equation

since 1 is a common root.

Then,

$$\Rightarrow a_1 + b_1 + c_1 = a_2 + b_2 + c_2 = 0$$

$$\Rightarrow b_1 = -(a_1 + c_1) \text{ and } b_2 = -(a_2 + c_2)$$

Also, the discriminants of two quadratic equations are equal

Then

$$\Rightarrow b_1^2 - 4a_1c_1 = b_2^2 - 4a_2c_2$$

$$\Rightarrow (a_1 + c_1)^2 - 4a_1c_1 = (a_2 + c_2)^2 - 4a_2c_2$$

$$\Rightarrow (a_1 - c_1)^2 = (a_2 - c_2)^2$$

$$\Rightarrow a_1 - c_1 = \pm(a_2 - c_2)$$

$$\Rightarrow \boxed{a_1 - a_2 = c_1 - c_2}$$

$$\text{or } \boxed{a_1 + a_2 = c_1 + c_2}$$

Now, the roots of equation,

$$x = \frac{-b_1 \pm \sqrt{D_1}}{2} = a_1 \text{ and } c_1$$

and the roots of equation 2,

$$x = \frac{-b_2 \pm \sqrt{D_2}}{2} = a_1 \text{ and } c_2$$

If $a_1 = a_2 = 1$ be the common rootsThen, other roots are c_1 and c_2

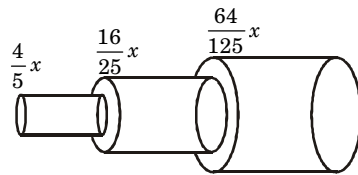
$$\Rightarrow c_1 - c_2 = a_1 - a_2 = 0$$

$$\text{or } c_1 + c_2 = a_1 + a_2$$

$$\Rightarrow \boxed{c_1 = c_2} \quad \boxed{c_1 + c_2 = 2}$$

Hence, roots are either equal or their sum is 2.

51.



$$D_1 N_1 = D_2 N_2$$

$$\frac{4}{5}x \times 32 = \frac{16}{25}x \times N_2$$

$$\boxed{N_2 = 40}$$

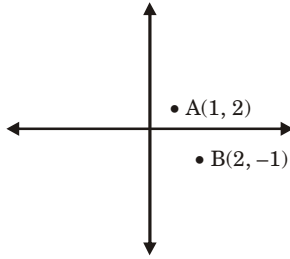
Now,

$$N_2 D_2 = N_3 D_3$$

$$40 \times \frac{16x}{25} = \frac{16x}{125} \times N_3$$

$$\boxed{N_3 = 50}$$

52.



Let the third point be $C(x, y)$

Then,

$$\Rightarrow CA = CB = AB$$

$$\Rightarrow CA^2 = CB^2 = AB^2$$

$$\Rightarrow (x-1)^2 + (y-2)^2 = (x-2)^2 + (y+1)^2 \\ = (1-2)^2 + (2+1)^2$$

$$\Rightarrow x^2 + 1 - 2x + y^2 + 4 - 4y \\ = x^2 + 4 - 4x + y^2 + 1 + 2y$$

$$\Rightarrow 2x - 6y = 0$$

$$\Rightarrow x = 3y \quad \dots(1)$$

$$\therefore (x-1)^2 + (y-2)^2 = 10$$

$$\Rightarrow (3y-1)^2 + (y-2)^2 = 10 \quad (\because x = 3y)$$

$$\Rightarrow 2y^2 - 2y - 1 = 0$$

On solving we get,

$$\Rightarrow y = 1 \pm \sqrt{3}$$

$$\therefore x = 3(1 \pm \sqrt{3})$$

Hence, $C(x, y)$ lies in either 1st quadrant or 3rd quadrant.

So, C cannot lie in the second quadrant

53. Let length, breadth and height of solid brick be x units, $2x$ units and $3x$ units.

$$\text{Volume} = \text{Number of brick}$$

$$= L \times B \times H$$

$$= x \times 2x \times 3x$$

$$= 6x^3$$

$$\text{Now let } x = 1, 6 \times (1)^3 = 6$$

$$\text{at } x = 2, 6 \times (2)^3 = 48$$

$$\text{at } x = 3, 6 \times (3)^3 = 222$$

$$\text{at } x = 4, 6 \times (4)^3 = 384$$

$$\text{at } x = 5, 6 \times (5)^3 = 750$$

Hence, at $x = 5$, number of cubes are going above 400.

54. Possible pattern are

1, 2, 3, 18, 19, 20, 21

4, 5, 6, 14, 15, 16, 17

7, 8, 9, 10, 11, 12, 13

Medians of above pattern are 18, 14 and 10.

$$\text{Hence, their mean} = \frac{18 + 14 + 10}{3} = 14$$

55. As : $2272 - 875 = 1397$, is exactly divisible by N [As given]

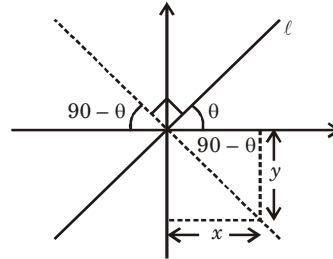
$$\text{Now } 1397 = 11 \times 127$$

Hence 3-digit number is 127

so the sum of digits = $1 + 2 + 7 = 10$

Hence option (1) is true.

56.



Given

$$\sin \theta = \frac{3}{5}$$

$$\cos \theta = \frac{4}{5}$$

$$\text{Now, } \sin(90 - \theta) = \frac{y}{1}$$

$$\Rightarrow y = \cos \theta$$

$$\Rightarrow y = \frac{4}{5}$$

$$\cos(90 - \theta) = \frac{x}{1}$$

$$\Rightarrow x = \sin \theta \quad x = \frac{3}{5}$$

Hence, option (1) is correct.

57. Here, $P(x) = x^2 + 5Kx + K^2 + 5$

$$\text{and } P(-2) = 0$$

$$P(-3) \neq 0$$

$$\begin{aligned}
 \therefore 4 - 10K + K^2 + 5 &= 0 \\
 \Rightarrow K^2 - 10K + 9 &= 0 \\
 \Rightarrow (K - 9)(K - 1) &= 0 \\
 \Rightarrow K &= 1, 9 \quad \dots(1)
 \end{aligned}$$

$$\begin{aligned}
 \text{Also } P(-3) &\neq 0 \\
 \Rightarrow 9 - 15K + K^2 + 5 &\neq 0 \\
 \Rightarrow K^2 - 15K + 14 &\neq 0 \\
 \Rightarrow (K - 14)(K - 1) &\neq 0 \\
 \Rightarrow K &\neq 14, 1 \quad \dots(2)
 \end{aligned}$$

From (1) and (2)

$$K = 9$$

Option (4) is correct.

58. As given that $\sin^2 \theta + \cos^4 \theta = m$

$$\Rightarrow \cos^4 \theta + 1 - \cos^2 \theta = m$$

$$\text{Let } \cos^2 \theta = x$$

then relation $\cos^4 \theta - \cos^2 \theta + 1 - m = 0$

become $x^2 - x + 1 = m$

$$\Rightarrow \left(x - \frac{1}{2}\right)^2 + \frac{3}{4} = m$$

$$\text{as, } 0 \leq \left(x - \frac{1}{2}\right)^2 \leq \frac{1}{4}$$

$$\text{so } \frac{3}{4} \leq \left(x - \frac{1}{2}\right)^2 + \frac{3}{4} \leq \frac{1}{4} + \frac{3}{4}$$

$$\Rightarrow \frac{3}{4} \leq m \leq 1$$

So option (3) is correct.

59. Let number of apples, bananas and coconut be x , y and z respectively.

So A.G.C.,

$$2x + 3y + z = 26 \quad \dots(1)$$

$$3x + 2y + 2z = 35 \quad \dots(2)$$

on multiplying equation number (1) by 3 and equation number (2) by 2 we get;

$$6x + 9y + 3z = 78$$

$$6x + 4y + 4z = 70$$

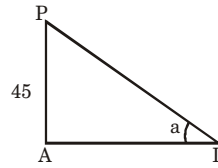
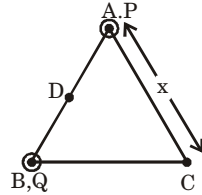
Now on adding we get

$$12x + 13y + 7z = 148.$$

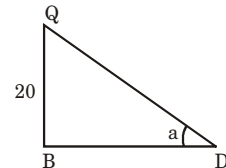
Hence cost of 12 Apples, 13 Bananas and 7 coconut is ₹ 148.

So option (2) is correct.

60.

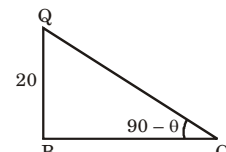
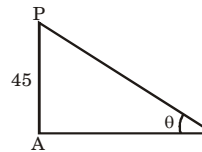


$$\frac{45}{AD} = \frac{20}{BD}$$



(tangent in both triangles)

$$\frac{AD}{BD} = \frac{9}{4}$$



$$\tan(90 - \theta) = \cot \theta$$

$$\frac{20}{BC} = \frac{AC}{45}$$

(let $AC = BC = x$)

$$x^2 = 900$$

$$x = 30$$

$$\text{Let } AD = 9y, BD = 4y$$

$$\therefore 9y + 4y = 30$$

$$y = \frac{30}{13}$$

$$\therefore AD = \frac{9 \times 30}{13}$$

$$= \frac{270}{13}$$

$$AD = 20 \left(\frac{10}{13} \right) \text{ m}$$

61. Napoleon invaded Italy in 1797, Vienna Peace Settlement (1814-1815), Unification of Italy (1859-1870) and Unification of Germany (1866-1871).

62. Liberals wanted a nation which tolerated all religions. Liberals also opposed the uncontrolled power of dynastic rulers.

Liberals argued for a representative, elected parliamentary government, subject to laws interpreted by a well-trained judiciary that was independent of rulers and officials. However, they were not democrats. They did not believe in universal adult franchise, that is, the right of every citizen to vote. They felt men of property mainly should have the vote. They also did not want the vote for women.

63. In the seventeenth century, Bombay was a group of seven islands under Portuguese control. In 1661, control of the islands passed into British hands after the marriage of Britain's King Charles II to the Portuguese princess. Bombay became the capital of the Bombay Presidency in 1819, after the Maratha defeat in the Anglo-Maratha war.
64. Buddhist missionaries from China introduced hand-printing technology into Japan around AD 768-770. For centuries, silk and spices from China flowed into Europe through the silk route. In the eleventh century, Chinese paper reached Europe via the same route.
65. The German economy was the worst hit by the economic crisis. By 1932, industrial production was reduced to 40 per cent of the 1929 level. Workers lost their jobs or were paid reduced wages. The number of unemployed touched an unprecedented 6 million. Politically, the Weimar Republic was fragile. Article 48, which gave the President the powers to impose emergency, suspend civil rights and rule by decree. Statement I is related to the economic crisis and Statement II is related to the Political. Both statements are correct, but Statement II does not explain the Statement I.
66. After the Forest Act was enacted in 1865, it was amended twice, once in 1878 and then in 1927. The 1878 Act divided forests into three categories: reserved, protected and village forests. The best forests were called 'reserved forests'. Villagers could not take anything from these forests, even for their own use. Statement I is correct, but Statement II is incorrect.
67. Shifting cultivation was widely prevalent in different parts of India in the 19th century. Shifting cultivation made it harder for the government to calculate taxes. Therefore, the government decided to ban shifting cultivation. As a result, many communities were forcibly displaced from their homes in the forests. Statement I is correct, but Statement II is incorrect.
68. Cricket grew out of many stick-and- ball games played in England 500 years ago. The word 'bat' is an old English word that simply means stick or club. By the seventeenth century, cricket had evolved enough to be recognisable as a distinct game. Both statements are correct, Statement II provide explanation the Statement I.
69. Gandhiji did not want everyone to follow his simplistic dress style. He wrote in Navajivan: "I do not want either my co-workers or readers to adopt the loin cloth. Mahatma Gandhi wanted everyone to have clothes to wear. Statement I is correct, but Statement II is incorrect.
70. The Portuguese and Spanish conquest and colonisation of America were decisively under way by the mid-sixteenth century. European conquest was not just a result of superior firepower. In fact, the most powerful weapon of the Spanish conquerors was not a conventional military weapon at all. It was the germs such as those of smallpox that they carried on their person. Both statements are correct, Statement II provide explanation the Statement I.
71. The silk routes are a good example of vibrant pre-modern trade and cultural

links between distant parts of the world. Early Christian missionaries almost certainly travelled this route to Asia, as did early Muslim preachers a few centuries later. Both statements are correct, Statement II provide explanation the Statement I.

72. The French began by building canals and draining lands in the Mekong delta to increase cultivation. The vast system of irrigation works – canals and earthworks – built mainly with forced labour. Vietnam exported two-thirds of its rice production and by 1931 had become the third largest exporter of rice in the world. Both statements are correct, but Statement II does not explain the Statement I.
73. Troposphere is the most important layer of the atmosphere, almost all the weather phenomena like rainfall, fog and hailstorm occur in this layer. One important feature of stratosphere is that it contains a layer of ozone gas. Exosphere has very thin air. Ionosphere is a part of thermosphere; radio waves transmitted from the earth are reflected back to the earth by this layer.
74. The land West of Aravalli is known as Bagar, The several salt lakes in the region such as the Sambhar, Degana, Kuchaman and Didwana.
75. The decadal growth of population in Kerala from 2001 to 2011 has been worked out as 4.91 per cent, almost half the growth of 9.43 per cent during the previous decade.
76. The Alaknanda meets Dhauti Ganga at Vishnu Prayag, Mandakini at Nand Prayag, Pindar at Karna Prayag, Mandakini again at Rudra Prayag and finally Bhagirathi at Dev Prayag.
77. Granite is converted into Gneiss, Coal is converted into Diamond, Limestone is converted into marble and Shale is converted into slate.
78. The state shaded in the given map is Meghalaya; Uttar Pradesh is the largest producer of potatoes in India.
79. Numaligarh Refinery Limited is a public sector oil company in Assam. HPCL-Mittal Energy Ltd (HREL) owns and operates the Guru Gobind Singh Refinery (GGSR) of 9 MMTPA capacity at Bathinda, Punjab. Tatipaka refinery is situated in Andhra Pradesh, Bina Refinery is an oil refinery located at Bina in Bina district of Madhya Pradesh state.
80. In India, this primitive form of cultivation is called 'Bewar' or 'Dahiya' in Madhya Pradesh, 'Podu' or 'Penda' in Andhra Pradesh, 'Pama Dabi' or 'Koman' or Bringa' in Odisha, 'Kumari' in Western Ghats, 'Valre' or 'Waltre' in South-eastern Rajasthan, 'Khil' in the Himalayan belt, 'Kuruwa' in Jharkhand, and 'Jhumming' in the North-eastern region.
81. Coimbatore is important centre for cotton textile, Ludhiana is important centre for hosiery, Risha is important centre for jute, Mysuru is important centre for silk textile.
82. Among the given options, Great Nicobar lies closest to the equator.
83. Plantation is also a type of commercial farming. In this type of farming, a single crop is grown on a large area.
84. The annual temperature range of alpine vegetation is below 7° C, the annual temperature range of temperate vegetation is varies from 7° C to 17° C, the annual temperature range of tropical vegetation is above 24° C, the annual temperature range of sub-tropical vegetation is varies from 17° C to 27° C.
85. In a democracy, the will of the people is supreme: It can be best explained by an assembly of elected representative's exercises political authority on behalf of the people.

- 86.** Elections to the Panchayati Raj Institutions are supervised by State Election Commission. One third of the positions in all panchayat institutions are reserved for women.
- 87.** Federal, Presidential, Republic are the features of USA, Federal, Parliamentary, Republic are the features of India, Unitary, Parliamentary, Monarchy are the features of United Kingdom, Presidential cum Parliamentary, Republic are the features of France.
- 88.** Under the Article 248 of the Indian Constitution, Parliament has exclusive power to make any law with respect to any matter not enumerated in the Concurrent List or State List.
- 89.** The following States and Union Territories have one seat each in the Lok Sabha: Mizoram, Nagaland, Sikkim, Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli, Daman and Diu, Lakshadweep and Pondicherry.
- 90.** Wealth is generated socially and should be shared equally by society. Government should regulate the ownership of land and industry to reduce socio-economic inequalities.
- 91.** The Constitution of India provides for a single integrated judicial system. This means that unlike some other federal countries of the world, India does not have separate State courts.
- 92.** Right to education is part of the Right to Freedom of the Indian Constitution inserted under the Article 21A.
- 93.** Increased per capita income, increased life expectancy at birth, decreased infant mortality Rate are an indicators of economic development, while decrease in the women participation in job market.
- 94.** The poverty line in Dinanagar is set at Rs.100 per capita per day. Out of 500 people, 50 people are earning 30 Rs, per day, In order to reach the set target, government must add 70 Rs per day to all 50 people (sum of 3500 Rs must be added) and 25 people are earning 80 Rs, per day, In order to reach the set target, government must add 20 Rs per day to all 25 people (sum of 500 Rs must be added). The total money must be spent by state government is 4000 Rs.
- 95.** Under the Consumer protection Act 1986, every consumer has the right to choose the goods or services of his or her likings. The local Telephone Company sells me a landline connection only if I purchase a handset from them is against my right to choose.
- 96.** Seasonal unemployment is the outcome of the job opportunities during certain months in the year; Frictional unemployment occurs when a person is out of one job and is searching for another. Disguised unemployment exists where actual contribution by the labour is nil. Structural unemployment occurs when an absence of demand for a certain type of workers. Cyclical unemployment occurs during the boom or recession in the economy.
- 97.** Government of India must impose 25% (is equal to Rs.10) import duty on imported wheat, so that it does not adversely affect Indian farmers in the domestic market.
- 98.** Even though ramu is willing to work at Rs. 300 a day, but he is not getting the work made him unemployed.
- 99.** Collateral is an asset that the borrower owns (such as land, building, vehicle, livestocks, deposits with banks) and uses this as a guarantee to a lender until the loan is repaid.
- 100.** B group farmers are the small farmers, if you divide the 300/180, each farmer in Group B will get 1.66 hectares. This makes the B group farmers are the smallest farmers among the given Groups. ■■

NTSE - 2016

NATIONAL LEVEL

PART I : MENTAL ABILITY TEST

1. Complete the series
D3Y104, G9U91, J27Q78, M8IM65, _____
(1) P243I39 (2) Q243I52
(3) P243I52 (4) Q162J39
2. Which of the following can replace the question mark ?

0.8	0.512
0.04	?

- (1) 0.0064 (2) 0.0016
(3) 0.000064 (4) 0.000016
- Direction (Q. 3-5) :** There are eight people A, B, C, D, E, F, G and H sitting around a circular table facing centre. B is sitting second to the left of G who is sitting third to the right of F. Only E is sitting between A and C. C is sitting third to the left of B. Only one person is sitting between E and H.
3. Which of the following is correct ?
(1) D is sitting third to the left of H
(2) F is sitting third to the left of G
(3) C is sitting third to the left of D
(4) H is sitting second to the right of C
4. Based on the given information, which of the following is the correct position ?
(1) A and C are sitting next to each other
(2) F and G are sitting next to each other
(3) H and F are sitting next to each other
(4) D is sitting next to H
5. Which of the following is the correct order of sitting of persons right of A ?
(1) E C H D G B F
(2) E C H F B D G
(3) E B H D C F G
(4) C H B E D G F

6. Amita is standing at Point A facing north direction. She walks for 5 kilometres in the north-east direction. Then she turns at an angle of 90° at her right and once again travels the same distance. She reaches at Point B. Now she takes a turn at 90° to her left and walks for 3 kilometres and once again takes right turn at 90° and travels 3 kilometres and reaches at Point C. What is the direction of Point B and C respectively with respect to Point A ?

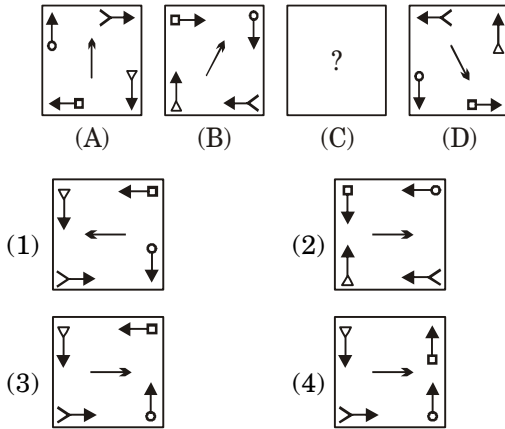
- (1) East, East
(2) East, North-East
(3) North-East, East
(4) North-East, North-East
7. In the question given below, there are three statements followed by three conclusions numbered I, II and III. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions, and then decide which of the given conclusion(s) logically follows from the given statements disregarding commonly known facts.

Statements : All teachers are professors
No Professor is male
Some males are designers

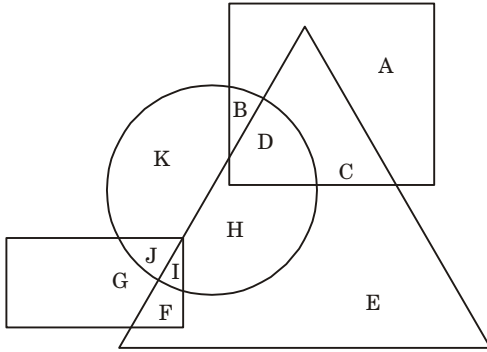
Conclusion : I. No designer is professor
II. Some designers are professors
III. No male is teacher

- (1) Only III follows
(2) Both I and II follows
(3) Either I or II follows
(4) Either I and III follows; or II and III follows

8. In the following question, there are four figure A, B, C and D called problem figures. A and B are related in the same way as C and D are related. Which figure out of four given options will come in place of figure C ?



9. In the following figure, square represents professors, circle represents males, triangle represents cricketers and rectangle represents trainers.



On the basis of information given in the above diagram, which of the following is correct ?

- (1) C represents male professors who are cricketers too
- (2) I represents male trainers who play cricket
- (3) B represents male professors who are trainers
- (4) F represents male trainers who are not cricketers

Direction (Q. 10-12) : Five periods of Hindi, English, Science, Mathematics and Sanskrit are to be taken by five different teachers A, B, C, D and E in five different periods 1, 2, 3, 4 and 5. Each teacher will teach only one subject and takes only one period.

Science is not the 3rd period. 5th period is taken by D who does not teach Hindi or Sanskrit. A takes 3rd period. The one who teaches Sanskrit takes 4th period. There are two periods after and two periods before Mathematics period. Hindi period is between Science and Mathematics period. B teaches Science. E takes period just before D's period.

After reading the above information, answer the following questions.

B	C	A	E	D
Science	Hindi	Maths	Sanskrit	English
1	2	3	4	5

10. Who teachers Hindi and in which period ?

- (1) C teachers Hindi in 2nd period
- (2) E teachers Hindi in 1st period
- (3) C teachers Hindi in 4th period
- (4) Data is inadequate

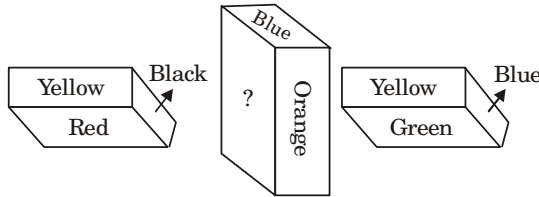
11. Which of the following is the correct sequence of subject-period-teacher ?

- (1) Mathematics – 3 – D
- (2) Sanskrit – 4 – E
- (3) Mathematics – 2 – A
- (4) Hindi – 2 – E

12. The subject taught by teachers A, B, C, D and E respectively are

- (1) Mathematics, Science, Hindi, Sanskrit, English
- (2) Mathematics, Science, English, Hindi, Sanskrit
- (3) Mathematics, Hindi, English, Sanskrit, Science
- (4) Mathematics, Science, Hindi, English, Sanskrit

13. A cuboid is painted in 6 colours, i.e. red, green, blue, yellow, orange and black, one colour on each side. Three position are shown below :



What is the colour of the side having question mark ?

- (1) Red (2) Yellow
(3) Green (4) Blue
14. If $\times$ stands for $+$, $\div$ stands for $-$, $+$ stands for $\div$ and $-$ stands for $\times$, then what is the value of the following expression ?
 $\div 33 \times 11 \div 9 \times 28 + 4 - 5$
 (1) 16 (2) 8
 (3) 4 (4) 2
15. If REASON is coded as PGYUMP, then DIRECT will be coded as ?
 (1) BKPGAV (2) FKTGEV
 (3) FGTCER (4) BGPCAR
16. Read the information carefully and answer the following question :

A family has husband, wife and three children A, B and C. The present age of husband is 5 years more than the wife's present age. Wife's present age is twice the present age of A. The present age of A is 12 years more than the present age of B.

B's present age is $1\frac{1}{2}$ time the present age of

C. If C is 12 years old at present, what is the present age of husband's friend Ram who is 15 years younger than husband (him)?

- (1) 30 years
(2) 50 years
(3) 60 years
(4) 80 years

Direction (Q. 17 – 18) : Pritam, Zeba, Joy and Anu were assigned duties in the English language alphabetical order of their names. Only one of them is assigned a duty on a day. This assignment is repeated in the same sequence. Working week starts from Monday and ends on Friday. Answer the following :

Anuj	Joy	Pritam	Zeba
Monday	Tuesday	Wednesday	Thursday
Friday	Monday	Tuesday	Wednesday
Thursday	Friday	Monday	Tuesday
Wednesday	Thursday	Friday	

And the pattern follows

17. Who worked for least number of days and for how many days if the duties are assigned for 3 weeks?
 (1) Anu, 3 days (2) Anu, 4 days
 (3) Zeba, 3 days (4) Zeba, 4 days
18. Who were assigned duties on Wednesday in 1st, 2nd and 3rd weeks respectively?
 (1) Pritam, Zeba, Anu
 (2) Pritam, Anu, Zeba
 (3) Pritam, Joy, Anu
 (4) Joy, Zeba, Anu
19. In a showroom, 60 per cent discount is given to everybody on all the articles. The successive discount of 40 per cent is offered to female students. If printed price of a article of Rs. 1000 is bought by a female student, how much she will have to pay for that article?
 (1) Inconclusive (2) Zero
 (3) Rs. 160 (4) Rs. 240
20. Form among the four alternatives given below, which number replaces the question mark?

$$\begin{array}{|c|c|} \hline 4 & 5 \\ \hline 2 & 5 \\ \hline \end{array} = 13$$

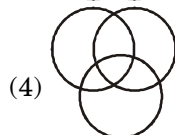
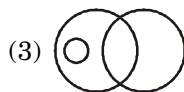
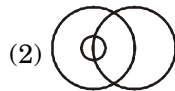
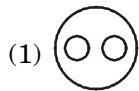
$$\begin{array}{|c|c|} \hline 6 & 4 \\ \hline 7 & 2 \\ \hline \end{array} = 15$$

$$\begin{array}{|c|c|} \hline 9 & 3 \\ \hline 4 & 5 \\ \hline \end{array} = 18$$

$$\begin{array}{|c|c|} \hline 8 & 3 \\ \hline 4 & 6 \\ \hline \end{array} = ?$$

- (1) 11 (2) 14
(3) 16 (4) 17

21. Which of the following diagrams indicates the best relation among men, fathers and teachers?



22. Guitar : Music :: Book : ?

- (1) Pages (2) Writer
(3) Publisher (4) Knowledge

23. Reena, Rita and Zoha are three friends. Reena is the eldest followed by Rita and Zoha. Reena is 2 years elder to Rita and 5 years elder to Zoha. The sum of the present age of Reena and Zoha is 3 times the age of Rita 5 years ago. What is the current age of Rita?

- (1) 12 years (2) 14 years
(3) 16 years (4) 18 years

Direction (Q. 24 – 26) : Lata was cutting a cuboid-shaped cake at her birthday party which has 12 inches length, 8 inches breadth and 2 inches height.

Two faces measuring 8 inches $\times$ 2 inches are coated with chocolate cream.

Two faces measuring 12 inches $\times$ 2 inches are coated with vanilla cream.

Two faces measuring 12 inches $\times$ 8 inches are coated with butter scotch cream.

The cake is cut into 24 cubes of size, 2 inches each sides.

24. How many cake pieces are there which have only two types of coating of cream (any two out of chocolate, vanilla and butter scotch)?

- (1) 4 (2) 8
(3) 12 (4) 16

25. How many cake pieces will have only one type of coating of cream?

- (1) 4 (2) 8
(3) 12 (4) 20

26. Kasim, Rajni, Pema and Gurpreet loved the chocolate cream and they decided to take all pieces with chocolate coating for them. How many cake pieces will be available for others?

- (1) 8 (2) 12
(3) 16 (4) 20

27. During her morning walk in the park, Tanya saw Monica coming from the opposite direction. They greeted each other and had a face-to-face chatting. If Monica's shadow was to the right of Tanya, then which direction was Monica facing ?

- (1) North
(2) East
(3) West
(4) South

28. Given below is a question and two statements I and II. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both statements carefully and give the answer.

Question : A, B, C, D and E are sitting in a row, not in that order. A is sitting next to E. Is E sitting between A and C?

Statements :

I. B and D are sitting at the two ends of the row.

II. C is not sitting next to A.

- (1) I alone is sufficient
(2) II alone is sufficient
(3) Both I and II together are sufficient
(4) Both I and II together are not sufficient.

29. A person needs to find the fastest two horses from 16 horses. Only a race of 4 horses can be conducted at a time. What is the minimum number of races to be conducted to determine the fastest two.

Assume that horses will not get tired at all, and time cannot be measured.

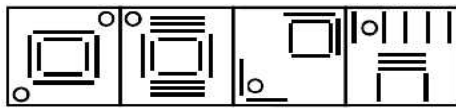
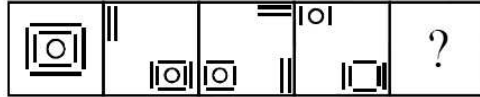
- (1) 6 (2) 7
(3) 8 (4) 15

30. Which letter replaces the question mark?

b, c, e, g, k, ?, q, s

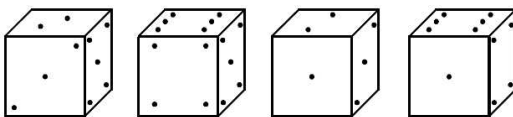
- (1) l (2) m
(3) n (4) o

31. From among the four alternatives given below, which figure replaces the question mark?



- (1) (2) (3) (4)

32. How many points will be on the face opposite to the face which contains 2 points?



- (1) 1 (2) 5
(3) 4 (4) 6

33. Identify the missing number in the following sequence

2, 10, 30, 68, ..., 222

- (1) 120 (2) 130
(3) 134 (4) 150

34. A + B means A is the daughter of B, $A \times B$ means A is the son of B and $A - B$ means A is the wife of B. If $T - S \times B - M$, which of the following is NOT true?

- (1) M is the husband of B
(2) B is the mother of S
(3) S is the daughter of B
(4) T is the wife of S

35. In the question below, there are three statements followed by four conclusions numbered I, II, III, and IV. You have to consider every given statement as true, even if it does not conform to the well-known facts. Read all the conclusions and

then decide which of the conclusions can be logically derived from the given statements.

Statements :

All frogs are snakes

Some snakes are birds

All birds are apples

Conclusions :

I Some apples are frogs

II No apple is a frog

III Some snakes are apples

IV All birds are snakes

(1) Either I or II; and III follows

(2) III and IV follows

(3) Either I or II follows

(4) Either I or II; and either III or IV follows

36. In the following sequence, one number is wrong. Find the wrong number

9, 23, 51, 106, 219, 643

- (1) 23
(2) 51
(3) 106
(4) 219

37. Which option shows the correct water image of the characters given below.

S U P E 2 5 4 7 D L R

- (1) 2 0 6 3 2 3 4 1 D 7 B
(2) 2 0 6 E 5 2 4 1 D 7 B
(3) 2 0 6 E 5 2 4 1 D 7 B
(4) 2 0 6 E 5 2 4 1 D 7 B

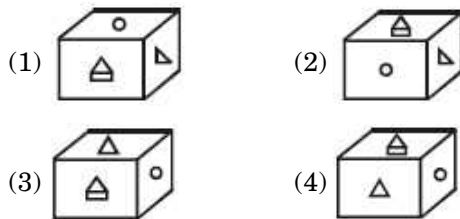
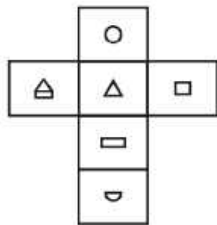
38. Ronald is elder to Veena while Amilia and Shree are elder to Parul who lies between Ronald and Amilia. If Amilia is elder to Veena, then which one of the following statements is necessarily true?

- (1) Ronald is elder to Amilia
(2) Amilia is elder to Shree
(3) Parul is elder to Shree
(4) Parul is elder to Veena

39. In the following question, a matrix of certain numbers is given. These numbers follow a certain trend, either row-wise or column-wise. Find this trend and choose the missing number from the given alternatives.

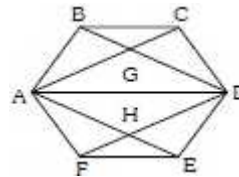
1	5	7	75
8	3	4	?
9	7	8	194

- (1) 20
(2) 43
(3) 89
(4) 96
40. The figure given below is the unfolded position of a cubical dice. Select the option figure which is same as the figure, when it is folded.



41. A wall clock is placed in a room. It chimes 8 times at 8'o clock. A person "X" present outside the room listens the 8 beats of chimes in 8 seconds. Assume that each chime of the wall clock takes equal time. To listen 11 chimes at 11'o clock how much time will be required by person "X".
- (1) 11 seconds
(2) 11.43 seconds
(3) 12 seconds
(4) 12.43 seconds

42. A geometrical design has been drawn below. Find out the total number of quadrilaterals.



- (1) 8
(2) 10
(3) 11
(4) 12

Direction (Q. 43-45) : Study the following information and answer the questions given below it:

Six boys Prem, Kamal, Ramesh, Shyam, Tarun and Umesh go to University Sports Centre and play a different game of football, cricket, tennis, kabaddi, squash and volleyball.

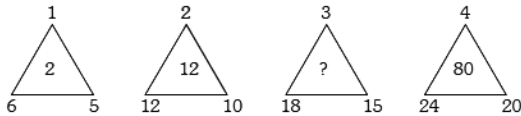
- A. Tarun is taller than Prem and Shyam
B. The tallest among them plays kabaddi
C. The shortest one plays volleyball
D. Kamal and Shyam neither play volleyball nor kabaddi
E. Ramesh plays volleyball
F. If all six boys stand in order of their height then Tarun is in between Kamal and Prem; and Tarun plays football.
43. Who among them plays kabaddi?
(1) Kamal
(2) Ramesh
(3) Shyam
(4) Umesh
44. Who will be at fourth place if they are arranged in the descending order of their heights?
(1) Prem
(2) Kamal
(3) Tarun
(4) Shyam
45. Who plays tennis?
(1) Kamal
(2) Prem
(3) Tarun
(4) Information insufficient

46. What comes next in the following sequence of codes ?

1218199, 1006480, 814963, 643648,

- (1) 366478 (2) 1442560
(3) 492535 (4) 253634

47. What value replaces the question mark ?



- (1) 18 (2) 24
(3) 36 (4) 45

48. A coding language writes English words in the coded form as :

S T A T	$\theta \delta \theta \gamma$
R A T	$\delta \theta \beta$
S A Y	$\epsilon \gamma \delta$

The code does not appear in the same order of the letters in the English words. On this basis, which of the following will be the code of the word T R A Y?

- (1) $\epsilon \beta \theta \gamma$ (2) $\beta \gamma \delta \epsilon$
(3) $\beta \theta \delta \epsilon$ (4) $\theta \delta \gamma \epsilon$

49. A work is expected to be completed by 20 workers in 25 days. The work is started by 10 workers. Then, after every 5 days, 5 more workers join the work. Then how many days the work will be completed?

- (1) 20 (2) 25
(3) 30 (4) 35

50. Find the maximum length of a rod with negligible thickness which can be fitted into a cubical box of a meter length of each side.

- (1) $\sqrt{2}$
(2) $\sqrt{2.25}$
(3) $\sqrt{3}$
(4) 2

PART II : ENGLISH LANGUAGE

Directions (Q. 1-5) : Read the following passage and answer the questions based on it.

Those with green fingers can always create their little haven, be it on the ground or atop a multi-storey house. The pressure of burgeoning population has forced cities to adopt vertical development. But that does not mean that people living in higher storeys are deprived of the pleasures of their own gardens and so the terrace garden culture is catching the imagination of gardening freaks.

For a terrace garden, leakage below and seepage through walls are the biggest apprehensions. Exposure to the vagaries of weather is another hurdle. Thus, creating and maintaining a terrace garden is certainly a challenge. It needs immaculate planning regarding leakages below, the weight the roof can take, the selection of plants, the planting material, the medium in which the plants are planted, garden decoration, garden furniture and above all your own imagination.

Try to provide the garden with a bamboo fence as a wind barrier. This is also useful as a shade and you could keep shade-loving plants under it. Net shades are available in different colours; these cut light to different intensities and can be used overhead by fastening with hooks. You could remove these shades in winter. Winter is a special time for such gardens: the sun is mild and the range of flowers tremendous.

1. A person with 'green fingers' is one who

- (1) lives in a multi-storey building.
(2) has grown a terrace garden.
(3) has a talent for growing plants.
(4) designs and plants gardens.

2. People have to live in multi-storey buildings due to

- (1) popularity of terrace gardens.
(2) growing population.
(3) fondness for gardening.
(4) development in the city.

3. Damage to the building due to terrace gardens can be minimised by
 - (1) reducing variations in weather.
 - (2) selecting plants and planting medium with care.
 - (3) reducing the planted area on the terrace.
 - (4) accepting the challenges.
4. Plants in a terrace garden need to be protected from
 - (1) leaking of water and seepage.
 - (2) poor material used for roofing
 - (3) shades of different colours.
 - (4) harsh sunlight and strong wind.
5. The passage primarily deals with
 - (1) pleasures of having a terrace garden.
 - (2) importance of keeping a terrace garden.
 - (3) maintenance of a terrace garden.
 - (4) problems of garden lovers.

Directions (Q. 6-10) : Read the passage given below and answer the questions based on it.

Understanding Pain

Pleasure and pain are inseparable facets of human existence. While the experience of our well-being is rather vague and intangible, the experience of pain is real, and affects our body, mind and spirit, altering our lives in more ways than one. Pain is an unpleasant sensory and emotional experience caused by tissue damage that results from physical trauma, burns, illness, injury or surgery. Despite the agony caused by pain, it is essential for our survival. If you don't feel pain, you could cause great harm to your body by inadvertently touching a hot iron or jamming your finger in the drawer and not even know it. Or you could rupture the appendix and be unaware of what was going on inside your body. Pain rings an alarm bell, alerting you to pay immediate attention and take quick action.

Have you ever wondered why a severely wounded soldier continues to battle on so defiantly or an athlete injured during a race

goes on to win it? It happens so because the brain does not react immediately to the pain signals, the sufferer just ignores them because there are more important tasks to attend to. The pain registers only after the task or event is over. The perception of pain has been studied extensively by psychologists who suggest that there is a "gating system" in the central nervous system that opens and closes to let pain pass through to the brain or block it. Psychological factors such as attention to pain, emotional state of a person, anticipation of pain and the way that a person interprets a situation can both open and close the "gates". This is why when you are depressed or anxious your pain seems worse and intolerable—because your feelings can open the pain gate.

6. The statement 'Pleasure and pain are the inseparable facets of human existence,' may be replaced with —
 - (1) All human beings experience pleasure and pain together.
 - (2) Both pleasure and pain are two sides of the same coin.
 - (3) Pleasure and pain may be a part of an individual's life.
 - (4) Human beings experience both pleasure and pain in their lives.
7. Pain is important for our survival as it.
 - (1) makes other people attend to us.
 - (2) makes us scream if we suffer an injury.
 - (3) informs us if we have an internal injury.
 - (4) alerts us to take action promptly.
8. Sometimes people carry on despite suffering an injury as
 - (1) they cannot notice the pain.
 - (2) being involved in a crucial task, they ignore the pain signals.
 - (3) they feel pleasure more acutely than the pain signals.
 - (4) pain, being an unpleasant feeling, is ignored by them.

9. A person who is depressed or anxious may feel pain more acutely as unhappiness
- (1) blocks the pain gate.
 - (2) diverts our mind away from pain.
 - (3) makes our feelings intolerable.
 - (4) makes pain seem worse.
10. The 'gating system' in the passage refers to
- (1) a device that controls the sensation of pain.
 - (2) psychological factors which contribute to pain.
 - (3) a person's interpretation of a situation.
 - (4) feelings of anxiety or depression.

Directions (Q. 11-15) : Read the following passage and answer the questions based on it.

Persuasion is the art of convincing someone to agree with your point of view. According to the ancient Greek philosopher Aristotle, there are three basic tools of persuasion: ethos, pathos, and logos.

Ethos is a speaker's way of convincing the audience that he is a credible source. The audience will consider a speaker credible if he seems trustworthy, reliable, and sincere. This can be done in many ways. For example, a speaker can develop ethos by explaining how much experience or education he has in the field. After all, you would be more likely to listen to advice about how to take care of your teeth from a dentist than a fire fighter.

Pathos is a speaker's way of connecting with an audience's emotions. For example, a speaker who is trying to convince an audience to vote for him might say that he alone can save the country from a terrible war. These words are intended to fill the audience with fear, thus making them want to vote for him. Similarly, a charity organization that helps animals might show an audience pictures of injured dogs and cats. These images are intended to fill the viewers with pity.

Logos is the use of facts, information, statistics, or other evidence to make your argument more convincing. An audience will be more likely to believe you if you have data to back up your claims. For example, a commercial for soap might tell you that laboratory tests have shown that their soap kills all 7,000,000 of the bacteria living on your hands right now. This piece of information might make you more likely to buy their brand of soap. Use of logos can also increase a speaker's ethos; the more facts a speaker includes in his argument, the more likely you are to think that he is educated and trustworthy.

Although ethos, pathos, and logos all have their strengths, they are often most effective when they are used together. Indeed, most speakers use a combination of ethos, pathos, and logos to persuade their audiences.

11. The main idea of the passage is to
- (1) describe the virtues of sincerity and reliability in persuasion.
 - (2) explain the elements of persuasion.
 - (3) show that persuasion is an ancient Greek art.
 - (4) illustrate how data-based arguments are convincing.
12. Lavina is trying to convince her mother to buy her a pair of shoes for Rs. 1,200. She says, "Mom, the shoes I have are really old and ugly. If I don't get these new shoes, everyone at school is going to laugh at me. I will be so embarrassed that I will want to die." What form of persuasion is Lavina using here?
- (1) pathos
 - (2) ethos
 - (3) logos and ethos
 - (4) pathos and logos

R – Moreover, students enjoy working on projects, such as decorating for dances or working on social campaigns. Choose from the options given below.

- (1) RPQ (2) QRP
(3) PRQ (4) RQP

Directions (Q. 18-19) : The following questions have the second sentence missing. Choose the appropriate sentence from the given options to complete it.

18. A. The local market is a place for social interaction for people of that area.

B.

C. Without these markets, life could be dull and boring.

- (1) They are noisy, crowded and sometimes full of litter.
(2) Vendors occupy even the pavements and corridors.
(3) They offer an opportunity to exchange a greeting with a friend or a neighbour.
(4) These markets have a limited variety and range of items.

19. A. Parachuting from an airplane for the first time feels like falling out of a tree.

B.

C. The main difference is that the jumper at least is prepared for the sensation and knows what to do.

- (1) It is an activity involving a preplanned drop from a height using an aerial platform.
(2) It is becoming a popular activity amongst adventure enthusiasts.
(3) One type of parachuting is skydiving parachute.
(4) You feel the same rush of wind, the same flip of stomach, the same sudden fear.

Directions (Q. 20-29) : Fill in the blank with the most appropriate option from given alternatives.

20. They received a lot of _____ publicity about the cages.

- (1) adverse (2) averse
(3) addictive (4) adorable

21. Man-drawn rickshaws were replaced by cycle-rickshaws as rickshaw-pulling came to be seen as a _____ occupation.

- (1) depressing (2) degrading
(3) desperate (4) deteriorating

22. This movie on education has been _____ the best children's movie of the year.

- (1) priced (2) valued
(3) examined (4) rated

23. The Republic of South Africa, with its _____ reserves of gold and diamonds is the richest country in Africa.

- (1) abundant (2) profuse
(3) lavish (4) excessive

24. The judge gave his _____ decision after listening to both the parties.

- (1) thoughtful (2) faithful
(3) impartial (4) sincere

25. A rail accident occurred yesterday at 4.30 a.m. when a goods train _____ with a mail train at Rahia Mandi near Biasa.

- (1) collided (2) hit
(3) crashed (4) struck

26. Dieticians are of the _____ that milk is beneficial for children because it contains calcium, protein and vitamin A.

- (1) ideas (2) thought
(3) opinion (4) views

27. Radioactive nuclear waste is often stored in underground tanks or sealed in containers and dropped into deep ocean trenches. _____, both methods may lead to environmental pollution.

- (1) Although
(2) Because
(3) On the one hand
(4) However

28. Humayun's Tomb is closed to the public for a few months as some _____ work is going on.

- (1) reservation (2) rejuvenation
(3) restoration (4) recreation

29. _____ an accident takes place, injured persons are carried in an ambulance which has a siren to make its way to the hospital where the doctors and nurses take care of the injured immediately.

(1) As (2) When
(3) How (4) While

Directions (Q. 30-35) : Select the meaning of the underlined phrases/idioms.

30. I could not make head or tail of what he was telling me.

(1) hear (2) make sense
(3) agree with (4) argue over

31. Sheela got the wrong end of the stick.

(1) was unfairly accused of something
(2) took something by mistake
(3) misunderstood something
(4) got the answer correct

32. I wonder what's wrong with them; they are out to lunch these days.

(1) absent from work
(2) behaving in a strange way
(3) not found usually
(4) always quarrelling

33. He tried to put a spoke in their wheel.

(1) complete their plan
(2) to cause an accident
(3) help in the execution of their plan
(4) thwart the execution of their plan

34. She got hot under the collar when she was teased by her friends.

(1) felt miserable
(2) felt unhappy
(3) got into a fight
(4) got angry

35. He should be made to toe the line

(1) behave correctly
(2) walk properly
(3) follow the queue
(4) wait until further orders

Directions (Q. 36-43) : In the following passage there are some numbered blanks.

Fill in the blanks by selecting the most appropriate word for each blank from the given options.

Udaipur's romantic landscape and its beautiful monuments appeal to travellers from all _____ over the world. With its (36) _____ waters, gently gliding (37) _____, and graceful havelis, Udaipur (38) _____ a delicate water-colour painting.

It originally (39) _____ on the banks of the lovely lake Pichola, (40) _____ continues to dominate the south (41) _____ the City Palace (42) _____ the Fort that rises from its (43) _____ in breathtaking splendour.

36. (1) turbulent (2) placid
(3) aquatic (4) cascading

37. (1) boats (2) flowers
(3) flora (4) coral

38. (1) breathes like (2) perceives like
(3) treats like (4) looks like

39. (1) emerged (2) appeared
(3) developed (4) built

40. (1) which (2) where
(3) while (4) who

41. (1) off (2) in
(3) of (4) at

42. (1) as (2) where
(3) near (4) and

43. (1) fringe (2) edge
(3) rim (4) border

Directions (Q. 44-47) : Select the most appropriate option to fill in the blanks from the given alternatives.

44. Advertising is a close _____ of market economy as it boosts economy by encouraging buying. Yet it is an unpleasant features of modern life.

(1) companion (2) assistant
(3) attendant (4) enemy

45. During the Gulf War, a few years back, tens of thousands of sea birds were killed due to oil _____. Do you know what makes crude oil on ocean water so deadly ?
- (1) spilt (2) fall
 - (3) falling (4) spills
46. In spite of his fantastic English, for some reason Arun couldn't _____
- (1) make him understandable.
 - (2) have understood oneself.
 - (3) make him to understand.
 - (4) make himself understood.
47. The patient was suffering from _____ attacks of headache.
- (1) Periodical (2) period
 - (3) periodic (4) periodically
- Directions (Q. 48-50) :** Choose the antonym of the underlined word from the four alternatives given.
48. Some regions were unapproachable to the Romans.
- (1) casual (2) accessible
 - (3) unattainable (4) impenetrable
49. The media was biased in its news coverage.
- (1) inclined (2) unfair
 - (3) impartial (4) imperial
50. The expenditure on library books has been curtailed by the school authorities.
- (1) increased (2) limited
 - (3) penalized (4) expanded
2. Cow has a special stomach as compared to that of a lion in order to :
- (1) absorb food in better manner
 - (2) digest cellulose present in the food
 - (3) assimilate food in a better way
 - (4) absorb large amount of water
3. When touched, the leaflets of Touch-me-not plant are closed. Closing of leaflets starts from the point of contact to the leaflets away. The leaflets are closed due to :
- (1) change in turgor pressure
 - (2) specialized proteins
 - (3) growth hormone retardation
 - (4) capillary action
4. Pancreas is composed of :
- (1) Only exocrine cells
 - (2) Only endocrine cell
 - (3) Both endocrine and exocrine cells
 - (4) Nephrons
5. The human embryo gets nutrition from the mother blood with the help of a special organ called :
- (1) Zygote (2) Ovary
 - (3) Oviduct (4) Placenta
6. Hormones produced in one part of the organism reach the distantly located target via :
- (1) muscles (2) bone
 - (3) cartilage (4) blood
7. Which of the following are characteristic feature of cells of meristematic tissue ?
- (1) Actively dividing cells with dense cytoplasm thick cell wall and prominent nuclei
 - (2) Actively dividing cells with dense cytoplasm, thin cell wall and no vacuoles
 - (3) Actively dividing cells with little cytoplasm, thin cell wall and prominent nuclei
 - (4) Actively dividing cells with thin cytoplasm, thin cell wall and no vacuoles.

PART III

SCHOLASTIC APTITUDE TEST

1. Suppose a mutant of a photosynthetic alga has dysfunctional mitochondria. It would affect its ability to perform
- (1) glycolysis
 - (2) anaerobic respiration
 - (3) aerobic respiration
 - (4) photosynthesis

8. Which one of the following animals is different from other in not having the paired gill pouches ?
- Whale
 - Water snake
 - Star fish
 - Sea horse
9. In the symbiotic relationship between a bacterium and a root of legume the :
- bacteria provide N_2 and the plant roots provide Carbon
 - roots provide NH_4 and bacteria provide Carbon
 - bacteria provide NH_4 and the roots provide Carbon
 - bacteria provide N_2 and the roots provide NH_4
10. Which of the following is an result of biological magnification ?
- Top level predators may be harmed by toxic chemicals in environment.
 - Increase in carbon dioxide
 - The green-house effect will be most significance at the poles
 - Energy is lost at each tropic level of a food chain
11. Which one of the following signifies *ex situ* conservation ?
- National parks and Biosphere habitats
 - Wild animal in their natural habitats
 - Inhabitants of natural ecosystems
 - Conservation methods practiced in Zoo and Botanical garden
12. What is the main reason for increase in temperature in a glass house ?
- Sunlight is completely absorbed by plants in the glass house
 - Radiation fails to escape from the glass house completely
 - Plant do not utilize sunlight in a glass house
 - Plants produce heat inside the glass house
13. Match the items in column-I with those in column-II, and select the correct choice:
- | Column-I | Column-II |
|--------------|-----------------------------|
| A. Small pox | I. Bacteria |
| B. Cholera | II. Virus |
| C. Malaria | III. Deficiency of minerals |
| D. Anaemia | IV. Female mosquito |
- A-IV, B-II, C-III, D-I
 - A-II, B-I, C-IV, D-III
 - A-IV, B-III, C-II, D-I
 - A-III, B-IV, C-I, D-II
14. In the experiment conducted by Mendel, RRyy (round green) and rrYY (wrinkled, yellow) seeds of pea plant were used. In the F_2 generation 240 progeny were produced, out of which 15 progeny had specific characteristics. What were the characteristics ?
- round and green
 - round and yellow
 - wrinkle and yellow
 - wrinkle and green
15. Total number of neutrons in five moles of water molecules is :
- 3.011×10^{24}
 - 2.409×10^{25}
 - 3.111×10^{25}
 - 2.711×10^{25}
16. The metal used to recover copper from an aqueous solution of copper sulphate is :
- Na
 - Ag
 - Hg
 - Fe
17. Four substance were thoroughly mixed with water separately to obtain mixtures A, B, C and D. Some of their properties give below :
- Path of a beam of light passing through it was visible in A, B and D but invisible in C.
 - On leaving undisturbed, the particles of the substance settle down in A but not in B, C and D.

III. The solute particles are visible to naked eye in A but invisible in B, C and D.

Which of the following is correct about A, B, C and D ?

- (1) A, B and D are colloids. C is a solution
- (2) A is a suspension. B and D are colloids. C is a solution
- (3) A is a colloid. B, C and D are solutions.
- (4) A is a suspension B, C and D are colloids

18. Assertion (A) : Aluminium foil cannot be used in α -particle scattering experiment.

Reason (R) : Aluminium is highly malleable metal.

- (1) Both A and R are correct. R is the correct reason for A.
- (2) Both A and R are correct but R is not the correct reason for A.
- (3) A is correct and R is incorrect.
- (4) A is incorrect and R is correct.

19. Magnesium ribbon is rubbed with sand paper before making it to burn. The reason of rubbing the ribbon is to :

- (1) remove moisture condensed over the surface of ribbon.
- (2) generate heat due to exothermic reaction
- (3) remove magnesium oxide formed over the surface of magnesium.
- (4) mix silicon from sand paper (silicon dioxide) with magnesium for lowering ignition temperature of the ribbon.

20. The reaction that differs from the rest of the reactions given is :

- (1) formation of calcium oxide from limestone
- (2) formation of aluminium from aluminium oxide
- (3) formation of sodium carbonate from sodium hydrogen carbonate
- (4) formation of mercury from mercuric oxide

21. An element X reacts with dilute H_2SO_4 as well as with NaOH to produce salt and $\text{H}_2(\text{g})$. Hence, it may be concluded that :

- I. X is an electropositive element.
- II. oxide of X is basic in nature.
- III. oxide of X is acidic in nature.
- IV. X is an electronegative element.

- (1) I, II, III
- (2) IV, I, II
- (3) III, IV, I
- (4) II, III, IV

22. An element X has electronic configuration 2, 8, 1 and another element Y has electronic configuration 2, 8, 7. They form a compound Z. The property that is not exhibited by Z is

- (1) It has high melting point.
- (2) It is a good conductor of electricity in its pure solid state.
- (3) It breaks into pieces when beaten with hammer.
- (4) It is soluble in water

23. The compound containing both ionic and covalent bond is

- (1) AlBr_3
- (2) CaO
- (3) MgCl_2
- (4) NH_4Cl

24. The element that cannot be used as a reducing agent is

- (1) carbon
- (2) aluminium
- (3) sulphur
- (4) sodium

25. Somebody wanted to calculate the number of moles of oxygen atoms comprising of 9.033×10^{23} number of its atoms. The person further thought to calculate its mass and to find the number of moles of hydrogen atoms required to combine completely with this amount of oxygen to form water.

The number of moles of oxygen atoms, their mass (in grams) and the number of moles of hydrogen atoms are

- (1) 1.5, 3 and 24 respectively
- (2) 15, 18 and 3 respectively
- (3) 0.15, 27, 3 respectively
- (4) 1.5, 24 and 3 respectively

26. The molecular formula of carboxylic acid that differs from the rest is

(1) $C_{13}H_{26}O_2$ (2) $C_2H_4O_2$
(3) $C_9H_{18}O_2$ (4) $C_7H_{12}O_2$

27. Foam of soap always appears white as

(1) it contains large hydrocarbon chains.
(2) it absorbs red portion of the visible light
(3) it reflects light of all wavelengths.
(4) it has one hydrophobic end, which is insoluble in water.

28. In a neon gas discharge tube, every second 4.8×10^{18} Ne^+ ions move towards the right through a cross-section of the tube, while 'n' electrons move to the left in the same time. If the current in the tube is 1.12 amperes towards the right, n is equal to (given $e = 1.6 \times 10^{-19}$ coulomb)

(1) 1.8×10^{18} (2) 2.2×10^{18}
(3) 2.4×10^{19} (4) 2.8×10^{19}

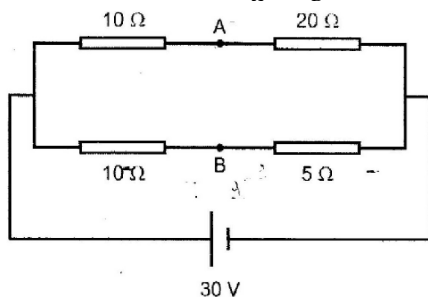
29. Four situations are given below-

I. An infinitely long wire carrying current
II. A rectangular loop carrying current
III. A solenoid of finite length carrying current
IV. A circular loop carrying current.

In which of the above cases will the magnetic field produced be like that of a bar magnet?

(1) I (2) I and III
(3) Only III (4) Only IV

30. In the circuit diagram shown below, V_A and V_B are the potentials at points A and B respectively. Then, $V_A - V_B$ is



(1) -10V (2) -20V
(3) 0V (4) 10V

31. **Assertion (A)** : Motion of a charged particle under the action of a magnetic field alone is always with constant speed.

Reason (R) : The magnetic force does not have any component either along or opposite to the direction of motion of the charged particle.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion.
(2) Both Assertion and Reason are true, but the reason is not the correct explanation of the assertion.
(3) Assertion is a true statement, but Reason is false.
(4) Both Assertion and Reason are false statements.

32. When a charged particle passes through an electric field, which among the following properties change?

I. mass II. charge
III. velocity IV. momentum
(1) II & III (2) Only III
(3) III & IV (4) I, III, & IV

33. A ray of light in air is incident on an equilateral glass prism at an angle θ_i to the normal. After refraction, the light travelled parallel to the base of prism and emerged in air at an angle θ_e to the normal. If the angle between the incident and the emergent rays is 60° , then the refractive index of glass with respect to air is

(1) 1.33 (2) 1.5
(3) 1.73 (4) 1.66

34. You are standing on the shore of a lake. You spot a fish swimming below the lake surface. You want to kill the fish first by throwing a spear and next, by pointing a high-power laser torch. How should you aim the spear and torch, respectively, from the options given below?

I. above the apparent position of the fish
II. below the apparent position of the fish
III. directly at the apparent position of the fish

- (1) SPEAR : II ; LASER : III
 (2) SPEAR : I ; LASER : II
 (3) SPEAR : II ; LASER : II
 (4) SPEAR : III ; LASER : III
- 35.** A beam of light coming from a rarer medium is partially reflected from the surface of a denser medium and partially refracted into the denser medium. If the reflected and the refracted rays are perpendicular to each other and the ratio of the refractive indices of denser and rarer medium is 3, the angle of refraction will be
 (1) 60° (2) 30°
 (3) 45° (4) 41.5°
- 36.** A person can see clearly only the objects situated in the range 50 cm to 300 cm. He went to an Optometrist who prescribed him a lens of certain power to increase the maximum distance of his vision to infinity, i.e., it corrected the near-sightedness. However, upon using the prescribed lens the person discovered that the near point of his vision has shifted from 50 cm to a distance "d" What is the value of d ?
 (1) 60 cm (2) 100 cm
 (3) 40 cm (4) 500 cm
- 37.** A ball of mass m is thrown from a height h with a speed v. For what initial direction of the ball will its speed on hitting the ground be maximum?
 (1) horizontally
 (2) vertically downwards
 (3) at an angle of 45° from the vertical in the downward direction
 (4) speed does not depend on the direction in which the ball is thrown
- 38.** A beaker is filled with two non-mixing liquids. The lower liquid has density twice that of the upper one. A cylinder of height h floats with one-fourth of its height submerged in the lower liquid and half of its height submerged in the upper liquid. Another beaker is filled with the denser of the two liquids alone. If the same cylinder is kept in the second beaker, the height of the submerged position would be.
- (1) h (2) $\frac{3h}{4}$
 (3) $\frac{h}{2}$ (4) $\frac{h}{4}$
- 39.** A spring-loaded toy sits at rest on horizontal frictionless surface. When the spring releases, the toy breaks into three equal-mass pieces A, B and C, which slide along the surface. Piece A moves off in the negative x-direction, while piece B moves off in the negative y-direction. Which of the three pieces is moving the fastest?
 (1) A
 (2) B
 (3) C
 (4) They move with identical speeds
- 40.** A truck and a car of masses m_1 and m_2 respectively are moving with equal kinetic energies. Equal stopping forces are applied and they come to a halt after travelling further distances x_1 and x_2 respectively.
 (1) $x_1 = x_2$ (2) $\frac{x_1}{x_2} = \frac{m_1}{m_2}$
 (3) $\frac{x_1}{x_2} = \sqrt{\frac{m_1}{m_2}}$ (4) $\frac{x_1}{x_2} = \sqrt{\frac{m_2}{m_1}}$
- 41.** On dividing a natural number by 13, the remainder is 3 and on dividing the same number by 21, the remainder is 11. If the number lies between 500 and 600, then the remainder on dividing the number by 19 is :
 (1) 4 (2) 6
 (3) 9 (4) 13
- 42.** Expressing $0.\overline{34} + 0.\overline{34}$ as a single decimal, we get
 (1) $0.\overline{6788}$ (2) $0.\overline{689}$
 (3) $0.\overline{6878}$ (4) $0.\overline{687}$
- 43.** If the value of a quadratic polynomial $p(x)$ is 0 only at $x = -1$ and $p(-2) = 2$, then the value of $p(2)$ is
 (1) 18 (2) 9
 (3) 6 (4) 3

44. The graphs of the equations $x - y = 2$ and $kx + y = 3$, where k is a constant, intersect at the point (x, y) in the first quadrant, if and only if k is
- equal to -1
 - greater than -1
 - less than $3/2$
 - lying between -1 and $3/2$
45. If α and β are the roots of the quadratic equation $x^2 - 6x - 2 = 0$ and if $a_n = \alpha^n - \beta^n$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$
- 6.0
 - 5.2
 - 5.0
 - 3.0
46. If $S_1, S_2, S_3, \dots, S_r$ are the sum of first n terms of r arithmetic progression whose first terms are $1, 2, 3, \dots$ and whose common differences are $1, 3, 5, \dots$ respectively, then the value of $S_1 + S_2 + S_3 + \dots + S_r$ is
- $\frac{(nr-1)(nr+1)}{2}$
 - $\frac{(nr+1)nr}{2}$
 - $\frac{(nr-1)nr}{2}$
 - $\frac{n(nr+1)}{2}$
47. A person walks towards a tower. Initially when he starts, angle of elevation of the top of tower is 30° . On travelling 20 metres towards the tower, the angle changes to 60° . How much more has he to travel to reach the tower?
- $10\sqrt{3}$ metres
 - 10 metres
 - 20 metres
 - $\frac{10}{\sqrt{3}}$ metres
48. If $\operatorname{cosec} x - \sin x = a$ and $\sec x - \cos x = b$, then :
- $(a^2b)^{\frac{2}{3}} + (ab^2)^{\frac{2}{3}} = 1$
 - $(ab^2)^{\frac{2}{3}} + (a^2b)^{\frac{2}{3}} = 1$
 - $a^2 + b^2 = 1$
 - $b^2 - a^2 = 1$
49. A calf is tied a rope of length 12m at a corner of a rectangular field of the dimensions $35\text{m} \times 25\text{m}$. If the length of the rope is increased to 23 m, then the additional grassy area in which the calf can graze is : $\left(\text{Take } \pi = \frac{22}{7} \right)$
- 280.0 m^2
 - 300.0 m^2
 - 302.5 m^2
 - 312.5 m^2
50. If Anish is moving along the boundary of a triangular field of sides 35 m, 53m and 66m and you are moving along the boundary of a circular field whose area is double the area of the triangular field, then the radius of the circular field is $\left(\text{Take } \pi = \frac{22}{7} \right)$
- $14\sqrt{3}$ m
 - $3\sqrt{14}$ m
 - $28\sqrt{3}$ m
 - $7\sqrt{3}$ m
51. A circular metallic sheet is divided into two parts in such a way that each part can be folded into a cone. If the ratio of their curved surface areas is $1 : 2$, the the ratio of their volumes is :
- $1 : 8$
 - $1 : \sqrt{16}$
 - $1 : \sqrt{10}$
 - $2 : 3$
52. A solid metallic block of volume one cubic metre is melted and recast into the form of a rectangular bar of length 9 metres having a square base. If the weight of the block is 90 kg and biggest cube is cut off from the bar, then the weight of the cube is :
- $6\frac{1}{3}$ kg
 - $5\frac{2}{3}$ kg
 - $4\frac{2}{3}$ kg
 - $3\frac{1}{3}$ kg

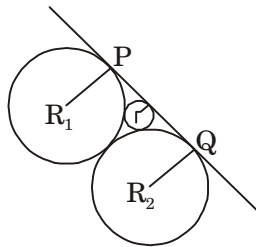
53. Two circles with centres P and R touch each other externally at O. A line passing through O cuts the circles at T and S respectively. Then,

(1) PT and RS are of equal length
 (2) PT and RS are perpendicular to each other
 (3) PT and RS are intersecting
 (4) PT and RS are parallel

54. If in a triangle ABC, D is the mid-point of side BC, $\angle ADB = 45^\circ$ and $\angle ACD = 30^\circ$ then $\angle BAD$ and $\angle ABC$ are respectively equal to :

(1) $15^\circ, 105^\circ$ (2) $30^\circ, 105^\circ$
 (3) $30^\circ, 100^\circ$ (4) $60^\circ, 100^\circ$

55. Three circles with radii R_1 , R_2 and r touch each other externally as shown in the adjoining figure. If PQ is their common tangent and $R_1 > R_2$, then which of the following relations is correct ?



(1) $R_1 - R_2 = r$
 (2) $R_1 + R_2 = 2r$
 (3) $\frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{r}$
 (4) $\frac{1}{\sqrt{R_1}} + \frac{1}{\sqrt{R_2}} = \frac{1}{\sqrt{r}}$

56. ABC is a triangle in which $AB = 4$ cm, $BC = 5$ cm and $AC = 6$ cm. A circle is drawn to touch side BC at P, side AB extended at Q and side AC extended at R. Then, AQ equals :

(1) 7.0 cm
 (2) 7.5 cm
 (3) 6.5 cm
 (4) 15.0 cm

57. The centre of the circle passing through the points $(6, -6)$, $(3, -7)$ and $(3, 3)$ is

(1) $(3, 2)$ (2) $(-3, -2)$
 (3) $(3, -2)$ (4) $(-3, 2)$

58. If the line segment joining $(2, 3)$ and $(-1, 2)$ is divided internally in the ratio $3 : 4$ by the graph of the equation $x + 2y = k$, the value of k is

(1) $\frac{5}{7}$ (2) $\frac{31}{7}$
 (3) $\frac{36}{7}$ (4) $\frac{41}{7}$

59. The mean of three positive numbers is 10 more than the smallest of the numbers and 15 less than the largest of the three. If the median of the three numbers is 5, then the mean of squares of the numbers is

(1) $108\frac{2}{3}$ (2) $116\frac{2}{3}$
 (3) $208\frac{1}{3}$ (4) $216\frac{2}{3}$

60. Three dice are thrown simultaneously. The probability of getting a total of at least 5 of the numbers appearing on their tops is :

(1) $\frac{5}{54}$ (2) $\frac{7}{54}$
 (3) $\frac{49}{54}$ (4) $\frac{53}{54}$

61. Match the following

A. Livre	I. A tax levied by the Church
B. Manor	II. An estate of Lord's lands and his mansion
C. Tithe	III. Tax to be paid directly to the state
D. Taille	IV. Unit of currency

(1) A-III, B-II, C-IV, D-I
 (2) A-II, B-IV, C-I, D-III
 (3) A-IV, B-II, C-III, D-I
 (4) A-IV, B-I, C-II, D-III

- 62. Assertion (A) :** After the 1905 revolution in Russia, Duma or the first elected consultative parliament came into existence.
Reason(R) : The power of Tsar was curbed by it
 (1) Both A and R are true and R is the correct explanation of A
 (2) Both A and R are true but R is not the correct explanation of A
 (3) A is true and R is false
 (4) A is false and R is true
- 63. Arrange in correct chronological order**
 I. Dawes Plan
 II. Crashing of the Wall Street Exchange
 III. Birth of Weimar Republic
 IV. Creation of Gestapo (Secret State Police)
 (1) I, II, III, IV (2) III, II, I, IV
 (3) IV, II, III, I (4) III, I, II, IV
- 64. Assertion (A):** Cricket as a game has, a long and strong rural connection.
Reason (R): The time limit of a match and vagueness about the size of Cricket ground is a result of the rhythms of village life.
 (1) Both A and R are true and R is the correct explanation of A
 (2) Both A and R are true but R is not the correct explanation of A
 (3) A is true and R is false
 (4) A is false and R is true
- 65. Assertion (A) :** In the 17th and 18th Century merchants from the towns in Europe started financing peasants and artisans in the country side for production for them.
Reason (R): In the urban centres powerful crafts and trade guilds with monopoly rights restricted the entry of new people into the trade.
 (1) Both A and R are True and R is correct explanation of A
 (2) Both A and R are True but R is not correct explanation of A
 (3) A is True and R is False
 (4) A is False and R is True
- 66. Assertion (A):** Colonial Forest Act changed the lives of villagers across the country
Reason (R): Now the villagers could comfortably make use of the forest resources for everyday needs
 (1) Both A and R are true and R is the correct explanation of A
 (2) Both A and R are true but R is not the correct explanation of A
 (3) A is true and R is false
 (4) A is false and R is true
- 67. Arrange the following events of nineteenth century Europe in ascending order.**
 I. Unification of Germany
 II. Beginning of Greek struggle for independence
 III. Unification of Italy
 IV. Vienna Peace Settlements
 (1) III, I, II, IV (2) IV, II, III, I
 (3) I, III, IV, II (4) IV, II, I, III
- 68. Arrange the following events in descending order with regard to Nationalist Movement in Indo-China.**
 I. Creation of Indo-China union,
 II. Formation of Communist Party in Vietnam
 III. Paris Peace Treaty
 IV. Declaration of independence by Ho Chi Minh
 (1) III, IV, II, I (2) III, IV, I, II
 (3) I, II, III, IV (4) I, II, IV, III
- 69. Find out the correct statements with regard to Rowlatt Act.**
 I. The Rowlatt Act was passed in 1919
 II. The Act was passed by Imperial Legislative Council
 III. The Act allowed detention of Political prisoners without trial for three years
 IV. Protests against the Act led to Jallianwalla Bagh massacre in April 1920.
 (1) Only II and III are correct
 (2) Only I and III are correct
 (3) Only III and IV are correct
 (4) Only I and II are correct

70. Assertion (A): Population growth from the late eighteenth century, increased the demand for food grains in Britain

Reason (R): 'Corn Laws' introduced by the government helped in reducing the food prices.

- (1) Both A and R are True and R is correct explanation of A
- (2) Both A and R are True but R is not correct explanation of A
- (3) A is True R is False
- (4) A is False R is True

71. Match the following

A. Galley	I. Old name of Tokyo
B. Edo	II. Contained six sheets of text and wood cut illustrations
C. Vellum	III. Metal Frame in which types are laid and the text composed
D. Diamond Sutra	IV. A parchment made from skin of animals

- (1) A-III, B-I, C-II, D-IV
- (2) A-I, B-III, C-II, D-IV
- (3) A-I, B-III, C-IV, D-II
- (4) A-III, B-I, C-IV, D-II

72. Given below are statements regarding the course of development of Socialism in Europe. Arrange them in chronological sequence.

- I. Socialists took over the government in Russia through the October Revolution.
- II. Socialists and trade unionists formed a labour party in Britain and Socialist party in France.
- III. The Russian Social Democratic Worker's Party was founded by Socialists who respected Marx's ideas.
- IV. Socialists could not succeed in forming a government in Europe and governments continued to be run by conservatives, liberals and radicals.

V. Second International was formed to coordinate the efforts of socialists throughout Europe.

- (1) V, III, II, IV, I
- (2) I, II, III, IV, V
- (3) V, II, III, I, IV
- (4) IV, V, III, I, II

73. Hitler's ideology related to the geopolitical concept of Lebensraum, or living space implied:

- (1) There was no equality between people, but only a racial hierarchy
- (2) Only those species survived on earth that could adapt themselves to changing climatic conditions.
- (3) New territories had to be acquired for settlement to increase the area of the mother country.
- (4) An exclusive racial community of pure Germans to be created by physically eliminating all those who were seen as undesirable.

74. During the mid-eighteenth century

Assertion (A) : Indian spinners and weavers were left without work and important centers of textile declined

Reason (R) : Large number of people began boycotting British cloth and started adopting khadi.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not the correct explanation of A.
- (3) A is true and R is false
- (4) A is false and R is true

75. Assertion (A) : Mahatma Gandhi called off the Civil Disobedience Movement and entered into a Pact with Irwin in 1931.

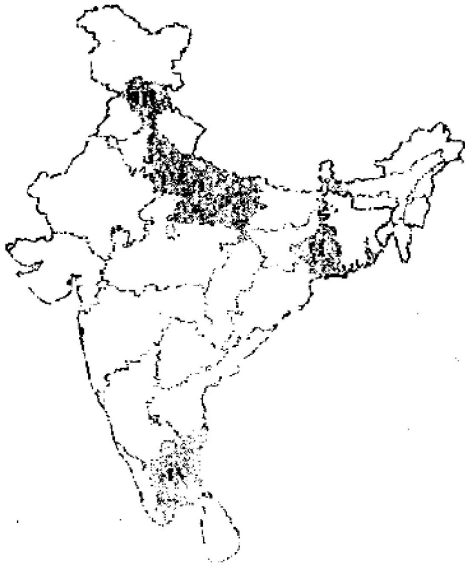
Reason (R) : Industrial workers in Sholapur attacked structures that symbolized British rule.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not the correct explanation of A.
- (3) A is true and R is false
- (4) A is false and R is true

- 76. Assertion (A) :** The latitudinal extent influences the duration of day and night, as one moves from south to north of India.

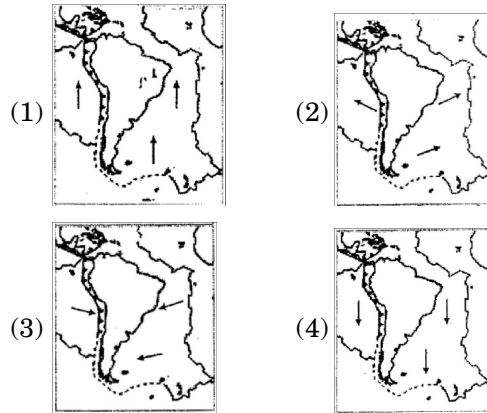
Reason (R) : From Gujarat to Arunachal Pradesh there is a time lag of two hours.

- (1) Both A and R are true and R explains A
 (2) Both A and R are true but R does not explain A
 (3) A is true and R is false
 (4) A is false and R is true
- 77. Assertion (A) :** Kharif crops are grown, with the onset of monsoon in different parts of India and harvested September-October.
- Reason (R) :** Availability of precipitation due to the western temperate cyclones helps in growing of these crops.
- (1) Both A and R are true and R explains A
 (2) Both A and R are true but R does not explain A
 (3) A is true and R is false
 (4) A is false and R is true
- 78. Arrange the shaded states shown on the map of India in descending order of population density and select the right code.**



- (1) II, I, IV, III (2) I, II, III, IV
 (3) I, II, IV, III (4) I, IV, II, III

- 79. Which one of the following figure is showing the correct direction of movement of the South America plate?**



- 80. Based on the data (elevation and latitude) provided below which of the following tourist center is most probably indicated?**

Elevation: 3500 meters -

Latitude: 34°N

- (1) Shillong
 (2) Mussoorie
 (3) Kodaikanal
 (4) Leh
- 81. Keeping in mind the location of the following sanctuaries/national parks of India, arrange them from south to north:**
- (1) Periyar, (2) Dachigam,
 (3) Garhaski, (4) Kanha
- 82. Match list I (Revolution) with list II (Area) and select the correct answer using the codes given below :**

List I (Revolution)	List II (Area)
A. Blue	I. Dairy development
B. Green	II. Fisheries development
C. White	III. Food production
D. Yellow	IV. Silk production
(1) A-II, B-III, C-IV, D-I	
(2) A-III, B-IV, C-II, D-I	
(3) A-IV, B-II, C-I, D-III	
(4) A-II, B-III, C-I, D-IV	

- 83. Assertion (A) :** The availability of water resources varies over space and time in India

Reason (R) : Water availability is governed by variations in seasonal annual precipitation although water scarcity is aggravated by over-exploitation and unequal access to water among different social groups.

- (1) Both A and R are true and R explains A
 - (2) Both A and R are true but R does not explain A
 - (3) A is true and R is false
 - (4) A is false and R is true
- 84. Match list I (Type of Resources) with list II (Basis of Classification) and select the codes given below :**

List I (Type of Resources)

- A. Biotic and abiotic
- B. Renewable and non-renewable
- C. Individual, community, national and international
- D. Potential, developed, stock and reserves

List II (Basis of Classification)

- I. Status of development
- II. Origin
- III. Ownership
- IV. Exhaustibility

- (1) A-II, B-I, C-III, D-IV
 - (2) A-II, B-III, C-IV, D-I
 - (3) A-II, B-IV, C-III, D-I
 - (4) A-IV, B-II, C-III, D-I
- 85. Which one of the following is the correct order of rivers from north to south ?**
- (1) Ravi, Chenab, Jhelum, Indus
 - (2) Indus, Jhelum, Chenab, Ravi
 - (3) Jhelum, Indus, Ravi, Chenab
 - (4) Chenab, Ravi, Indus, Jhelum
- 86. Match list I (national Highways of India) with list II (Description) and select the codes given below :**

List I (National Highways of India)

- A. National Highway Number 1
- B. National Highway Number 15
- C. National Highway Number 7
- D. National Highway Number 8

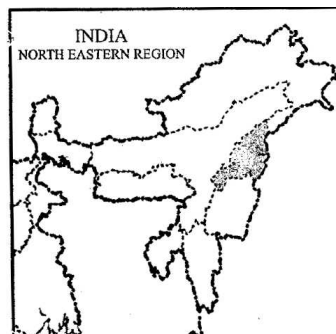
List II (Description)

- I. Covers most of Rajasthan
 - II. Known as Sher Shah Suri Marg
 - III. Connects Delhi and Mumbai
 - IV. Is the longest National Highway
- (1) A-IV, B-III, C-I, D-II
 - (2) A-I, B-II, C-IV, D-III
 - (3) A-II, B-I, C-IV, D-III
 - (4) A-I, B-III, C-II, D-IV

- 87. Which of the following statement is not true to the context of Mawsynram ?**

- (1) It is considered as the wettest place on the earth
- (2) It possesses caves with stalagmites and stalactites
- (3) It is located very close to Cherrapunji
- (4) It is located very close to the Myanmar border

- 88. Which one of the following facts about the shaded state shown below is incorrect ?**



- (1) Terrace cultivation is widespread in the hill areas
- (2) The state is a major producer of uranium
- (3) Population density is well below the national average
- (4) More than 80 per cent of the area has forest as the land cover

89. The Tropic of Cancer passes through which of the following plateau ?
 (1) Only Malwa
 (2) Only Chotanagpur
 (3) Only Meghalaya
 (4) Both Malwa and Chotanagpur
90. **Assertion (A) :** The Coriolis force is responsible for deflecting winds towards the right in the northern hemisphere and towards the left in the southern hemisphere.
Reason (R) : The pressure and wind system of any area depend on the latitude and altitude of the place.
 (1) Both A and R are true and R explains A
 (2) Both A and R are true but R does not explain A
 (3) A is true and R is false
 (4) A is false and R is true
91. Which of the following arguments against prescribing educational qualification for elected representatives are true?
 I. Educational qualification will deprive illiterate citizens of the right to contest elections.
 II. Relevant qualification for being elected representatives is not education but ability to address people's problems.
 III. Educated elected representatives keep distance from the common people.
 IV. It is easier for the educated elected representatives to use power for personal gains.
 V. It should be left to the voters to decide how much importance is to be given to educational qualification of a candidate.
 (1) I, II and IV only
 (2) I, III and V only
 (3) I, IV and V only
 (4) I, II and V only
92. Which of the following terms were inserted in the Preamble to the Indian Constitution by the 42nd Amendment Act, 1976 ?
 I. Integrity II. Secular
 III. Socialist IV. Unity
 (1) I, III and IV (2) II and III
 (3) I, II and III (4) I, II and IV
93. Which of the following international institutions has a more democratic way of decision -making on matters of global importance ?
 (1) General Assembly of the United Nations
 (2) International Monetary Fund
 (3) Security Council of the United Nations
 (4) World Bank
94. Which of the following factors have contributed to changes in the caste system?
 I. Economic development II. Language
 III. Education IV. Elections
 V. Region
 (1) I, III, and IV (2) II, IV and V
 (3) II, III and IV (4) I, III and V
95. Match List I with List II and select the answer using the codes given below.
- List I**
- A. Supervises the overall functioning of all the political institutions in the country
 B. Distributes and redistributes work to the ministers
 C. Ministers may have different views but have to own up every decision
 D. Determines the constitutionality of any contentious action
- List II**
- I. The Supreme Court
 II. The President
 III. The Prime Minister
 IV. The Cabinet
 (1) A-IV, B-III, C-II, D-I
 (2) A-II, B-III, C-IV, D-I
 (3) A-II, B-IV, C-III, D-I
 (4) A-III, B-IV, C-I, D-II

96. Calculate the female literacy rate from the given data.

Gender	Total Persons	Literate Persons
Males	1200	1050
Females	580	340
Total	1780	1390

- (1) 32.5 (2) 19.1
(3) 58.6 (4) 28.3

97. Which of these activities contributes to India's national income?

- I. Cooking at home
II. A teacher teaching his children at home
III. A doctor prescribing medicines in a clinic
IV. Cooking in a restaurant

- (1) I and II
(2) II and III
(3) III and IV
(4) I and IV

98. In an imaginary economy the monetary value of contributions of primary sector, public sector, secondary sector and service sector are Rs.100, Rs.25, Rs. 28 and Rs. 77 respectively. The gross domestic product of the economy is

- (1) Rs. 100 (2) Rs. 205
(3) Rs. 153 (4) Rs. 230

99. Four families in a village, which has only a ration shop, have access to foodgrains as shown in the table. Identify the families that lack food security.

Family	Food requirement in kg	Food grain price /kg	Money available to each family for buying food grains	Possessing Ration card
A	50	10	600	Yes
B	30	10	330	No
C	20	10	180	Yes
D	40	10	400	Yes

- (1) A and B (2) B and C
(3) C and D (4) D and A

100. Robinson Crusoe goes to sea with a net for fishing. Classify the factors of production and choose the appropriate option given below.

Item		Classification	
A.	Knowledge of fishing	I.	Physical Capital
B.	Net	II.	Labour
C.	Sea	III.	Human Capital
D.	Swimming	IV.	Land

- (1) A-III, B-IV, C-II, D-I
(2) A-IV, B-III, C-I, D-II
(3) A-III, B-I, C-IV, D-II
(4) A-II, B-I, C-III, D-IV

ANSWERS

MENTAL ABILITY TEST

1. (3) 2. (3) 3. (2) 4. (3) 5. (2) 6. (1) 7. (4) 8. (4) 9. (2) 10. (1)
11. (2) 12. (4) 13. (3) 14. (3) 15. (1) 16. (2) 17. (3) 18. (1) 19. (4) 20. (2)
21. (2) 22. (4) 23. (2) 24. (3) 25. (2) 26. (3) 27. (1) 28. (3) 29. (1, 2) 30. (2)
31. (3) 32. (4) 33. (2) 34. (3) 35. (1) 36. (3) 37. (4) 38. (4) 39. (3) 40. (1)
41. (2) 42. (3) 43. (4) 44. (1) 45. (4) 46. (3) 47. (3) 48. (3) 49. (2) 50. (3)

ENGLISH LANGUAGE

1. (3) 2. (2) 3. (2) 4. (4) 5. (3) 6. (2) 7. (4) 8. (2) 9. (4) 10. (3)
11. (2) 12. (1) 13. (2) 14. (1) 15. (4) 16. (3) 17. (3) 18. (3) 19. (4) 20. (1)
21. (2) 22. (4) 23. (1) 24. (3) 25. (1) 26. (3) 27. (4) 28. (3) 29. (2) 30. (2)
31. (3) 32. (2) 33. (4) 34. (4) 35. (4) 36. (2) 37. (1) 38. (4) 39. (3) 40. (1)
41. (3) 42. (3) 43. (1) 44. (1) 45. (4) 46. (4) 47. (3) 48. (2) 49. (3) 50. (1)

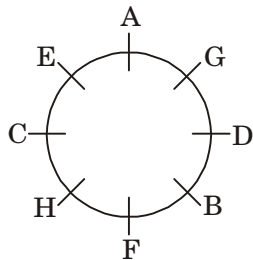
SCHOLASTIC APTITUDE TEST

1. (3) 2. (2) 3. (1) 4. (3) 5. (4) 6. (4) 7. (2) 8. (3) 9. (3) 10. (1)
11. (4) 12. (2) 13. (2) 14. (4) 15. (2) 16. (4) 17. (2) 18. (2) 19. (3) 20. (2)
21. (1) 22. (2) 23. (4) 24. (3) 25. (4) 26. (4) 27. (3) 28. (2) 29. (3) 30. (4)
31. (1) 32. (3) 33. (3) 34. (1) 35. (2) 36. (1) 37. (4) 38. (3) 39. (3) 40. (1)
41. (1) 42. (4) 43. (1) 44. (4) 45. (4) 46. (2) 47. (2) 48. (1) 49. (3) 50. (1)
51. (3) 52. (4) 53. (4) 54. (2) 55. (4) 56. (2) 57. (3) 58. (4) 59. (4) 60. (4)
61. (bouns) 62. (3) 63. (4) 64. (1) 65. (1) 66. (3) 67. (2) 68. (4) 69. (4) 70. (3)
71. (4) 72. (1) 73. (3) 74. (2) 75. (1) 76. (2) 77. (3) 78. (3) 79. (3) 80. (4)
81. (4) 82. (4) 83. (1) 84. (3) 85. (2) 86. (3) 87. (4) 88. (2) 89. (4) 90. (2)
91. (4) 92. (3) 93. (1) 94. (1) 95. (2) 96. (3) 97. (3) 98. (2) 99. (2, 3) 100. (3)

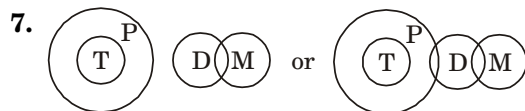
EXPLANATIONS

MENTAL ABILITY TEST

1. D, G, J, M : +3 each
 3, 9, 27, 81 : $\times 3$ each
 Y, U, Q, M : -4 each
 104, 91, 78, 65 : -13 each
 So the correct answer is P243I52
2. Cube of 0.8 is 0.512
 Cube of 0.04 is 0.000064
- (Q. 3-5) :



6.
 B and C both are towards East of A.

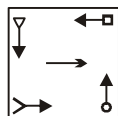


Conclusion III is always true.

Conclusion I or II follows.

Hence, option (4) Says either I and III follows: or Option II or III follows.

8. Every arrow is moving one arm and rotating 180° .



9. I comes in common area of Circle (males), Triangle (cricketers) and Rectangle (Trainers).

14. $-33 + 11 - 9 + 28 \div 4 \times 5 = 4$ on solving this equation by BODMAS rule.

15. Alternatively : - 2 and + 2 and so on.

16. C = 12 yrs

B = 18 yrs

A = 30 yrs

Wife = 60 yrs

Husband = 65 yrs

Therefore : Ram = 50 years

17. Zeba works for 3 days only.

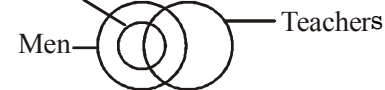
18. Pritam, Zeba, Anu works on Wednesday.

19. She will have to pay :

$$1000(1-0.6)(1-0.4) = 240$$

20. $8 \times 3 - (4 + 6) = 14$

21. Fathers



22. Guitar : Music : : Book : Knowledge

23. Let Zoha's Age : x

Rita's Age = x + 3

Reena's Age = x + 5

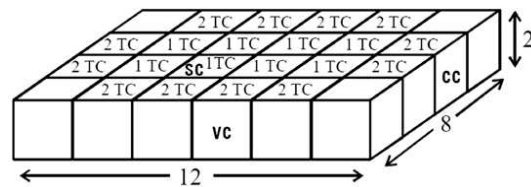
According to question :

$$x + 5 + x = 3(x + 3 - 5)$$

$$x = 11$$

Therefore Rita's Age = 14 yrs

- (Q. 24 - 26) :

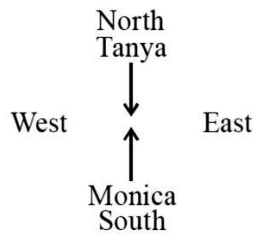


2 TC = 2 Types of coating of cream

1 TC = 1 Type of coating of cream

26. $24 - 8 = 16$ (Available for others)

27.



28.



With the help of statement I two possibilities (1) and (2) are there

With help of statement II in combination with statement I we have unique solution and E is sitting between A and C.

29. By English language of question (Only a race of 4 horses can be conducted at a time.)

16 Horses will run in 4 races – we select first 2 of each race (remaining horses 8)

8 Horses will run in 2 races – we select first 2 of each race (remaining horses 4)

4 Horses will run in 1 race – we select first 2 horses

Total number of races required = 7

By Hindi language of question (Maximum a race of 4 horses can be conducted at a time.)

$A_1 \quad B_1 \quad C_1 \quad D_1$

$A_2 \quad B_2 \quad C_2 \quad D_2$

$A_3 \quad B_3 \quad C_3 \quad D_3$

$A_4 \quad B_4 \quad C_4 \quad D_4$

Race between A's, B's, C's, D's group [4 races]

Let Say A_1, B_1, C_1, D_1 are fastest in the group. [1 race] ×

Let Say A_1 – 1st fastest

$B_1 \rightarrow 2^{\text{nd}}$

Then A_3, A_4, B_2, B_3, B_4

$C_2, C_3, C_4, D_2, D_3, D_4$ Can not be first fast runner.

Only possibility for second fast runner be A_2, B_1 [1 race]

Total races = $4 + 1 + 1 = 6$

30. Letters are prime position letters, hence answer is m.

32. By observation 5 is common in dice first and second

By observation from first dice in clockwise direction

5 3 2

By observation from second dice in clockwise direction

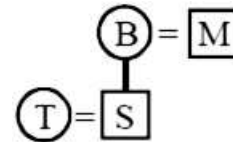
5 4 6

So opposite of 2 is 6

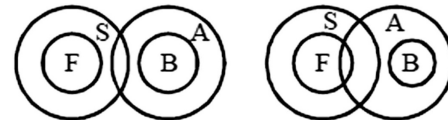
33. $1^3 + 1, 2^3 + 2, 3^3 + 3, 4^3 + 4, 5^3 + 5$

Therefore answer is 130

34.



35.



Conclusion I or II follows.

Conclusion III is definitely true.

Hence, option (1) is true

36. Given series is following $\times 2 + 5$ pattern.

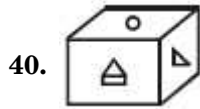
Hence, by options, 106 is the wrong term. (3)

38. Shree > Amilia > Paral > Ronald > Veena

39. $1^2 + 5^2 + 7^2 = 75,$

$8^2 + 3^2 + 4^2 = 89,$

$9^2 + 7^2 + 8^2 = 194$



41. 8 Beats = 7 intervals.

7 Intervals cover in 8 seconds,

1 interval cover in $8/7$ seconds,

So, 11 Beats = 10 Intervals are covered in $(8/7) \times 10 = 11.428$ seconds.

Approx. 11.43 seconds.

42. ABCD, ADEF, AGDH, ABDF, ACDH, AGDF, ABDF, ACDE, ABDH, ABDE, AFCD

(Q. 43-45)

Umesh > Kamal > Tarun > Prem > Shyam > Ramesh

Umesh → Kabaddi

Ramesh → Volleyball

Tarun → Football

46. 121/81/99, 100/64/80, 81/49/63, 64/36/48, 49/25/35

I. TERMS 121, 100, 81, 64, 49
 $11^2, 10^2, 9^2, 8^2, 7^2$

II. TERMS 81, 64, 49, 36, 25
 $9^2, 8^2, 7^2, 6^2, 5^2$

III. TERMS

99, 80, 63, 48, 35
 $(10^2 - 1), (9^2 - 1), (8^2 - 1), (7^2 - 1), (6^2 - 1)$

47. $6 - 5 = 1, 1^2 + 1^3 = 2,$

$12 - 10 = 2, 2^2 + 2^3 = 12,$

$24 - 20 = 4, 4^2 + 4^3 = 80,$

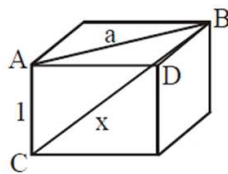
$18 - 15 = 1, 3^2 + 3^3 = 36$

48. $T = \theta, R = \beta, A = \delta, Y = \epsilon$

49. Total work = 20×25

$= 10 \times 5 + 15 \times 5 + 20 \times 5 + 25 \times 5 + 30 \times 5$

50.



Maximum length of rod which can be fitted in cubical box in Diagonal of cubical box.

∴ Let the diagonal of cubical box is x

To find value x , first we have to calculate diagonal length of any face of box.

In $\triangle ABD$ $a = \sqrt{1^2 + 1^2}$

$a = \sqrt{2} \text{ m}$

In $\triangle ABC$ $a^2 + 1^2 = x^2$

∴ $x = \sqrt{(\sqrt{2})^2 + (1)^2}$

$x = \sqrt{3} \text{ m}$

ENGLISH LANGUAGE

1. The idiom 'having green fingers' refers to 'the unique talent to grow or maintain plants'.
2. Based on the reading of the first paragraph of the passage.
3. Based on the reading of the second paragraph of the passage.
4. Based on the reading of the last paragraph of the passage.
5. The theme of the passage is clearly defined from the reading of the passage.
6. As defined from the meaning of the phrase "Inseparable facets" Which refers to two faces of something which cannot be separated.
7. Based on the last line of the first paragraph 'Pain rings an alarm bell, alerting you to pay immediate attention and take quick action.'
8. As stated in the reading of the line " the sufferer just ignores them" of the second paragraph.
9. Based on the inference drawn from the reading of the last two lines of the second paragraph.

10. Based on sentence from second program “the way that a person interprets a situation can both open and close the gates”.
11. This option suggests the pre-dominant theme of the passage.
12. As per paragraph 3, the author explains that pathos: “is a speaker’s way of connecting with an audience’s emotions.” Further the author then gives two examples: a candidate who uses fear to gain votes and a charity that makes you feel pity to get money. The second example is same as to the situation in the question. Lavina wants new shoes. She tries to convince her mother by saying that if she does not get them, everyone will laugh at her. She says that she will be “so embarrassed” that she “want to die.” Here, Lavina is trying to make her mother feel pity for her. If her mother feels bad enough for her, she will buy her the new shoes. Lavina has thus used pathos to convince her mother to buy her shoes. Therefore (1) is correct.
13. As mentioned in paragraph 4, the author writes: “use of logos can also increase a Speaker’s value the more facts a speaker includes in his argument, or the speech more likely you are to think that he is educated and trustworthy.” In other words, the audience are more likely to trust a speaker who uses facts, information, or other evidence in his argument. Hence (2) is correct.
14. The most supportive and the most inclusive option from the given choices as it impromises that the speaker is trying to gain trust by appealing to the voter’s emotions like fear.
15. Based on the definition of ‘Logos’ as given in the line “Logos is the use of facts, information, statistics, or other evidence to make your argument more convincing.” of paragraph 4 in the passage.
16. The most appropriate sequence in accordance with the theme and coherence of the given lines.
17. The most suggestive sequence in accordance with the theme and coherence of the given lines.
18. The most suitable option for coherence of the sentences given.
19. The most suitable option for coherence of the sentences given.
20. The most appropriate adjective from the given options for the noun ‘Publicity’ in the given context.
21. The most suitable adjective from the given options for the noun ‘Occupation’ in the given context.
22. The Present Perfect Passive form of the most suitable verb is used in the given context.
23. The most appropriate adjective from the given choices as generally used in the given context.
24. The most appropriate adjective from the given choices as generally used in the given context.
25. The most appropriate verb from the given options which corresponds to the preposition that follows it in the given context ‘collides with’.
26. The phrase ‘of the opinion’ is a common way of state opinions as expressed by third parties.
27. The most appropriate conjunction that expresses contrast with the previous statement as required in the given context.
28. The most suitable word used in the context of the given statement.
29. The most appropriate conjunctive’adverb to be used in the context of the given statement.
30. Refers the idiom ‘make heads or tails of something’ to understanding something or making sense out of a conversation.

31. Idiom 'get the wrong end of the stick' refers to misunderstand something or same situation.
32. The idiom 'Out to lunch' to act absentminded or behave in a strange way.
33. The idiom 'Put a spoke in wheel' refers to spoil someone else's plans and stop them from doing something.
34. The idiom 'got hot under the collar' refers to get extremely angry.
35. The idiom 'toe the line' is to wait/ hold action until further orders.
36. The most suitable word which means (of a body of water) free from disturbance by heavy waves' as required in this context.
37. The most suitable word that can be used in the given context.
38. 'look like something' means to give the appearance of predicting (something) as referred in the context of the given statement.
39. The most suitable verb that can be used to complete the paragraph meaningfully.
40. The most suitable relative pronoun that can be used to complete the paragraph meaningfully.
41. The most suitable preposition that can be used to complete the paragraph meaningfully.
42. The most suitable word that can be used to complete the paragraph meaningfully.
43. The most suitable word is 'Fringe' which means 'the outside boundary or surface of something' to be used to complete the paragraph meaningfully.
44. The most suitable word that can be used to complete the statement meaningfully.
45. "Oil - Spills" refers to a layer of oil floating on water or covering the body of water.
46. In a sentence structure like the one of the given statement, the most suitable form of verb to be used is 'make oneself understood.'
47. Here the term 'attacks' serves as a noun which would take the adjective 'Periodic'.

48. The most suitable antonym of the underlined word 'unapproachable' is 'accessible'.
49. The most suitable antonym of the underlined word 'biased' is 'impartial'.
50. The most suitable antonym of the underlined word 'curtailed' is 'increased'.

SCHOLASTIC APTITUDE TEST

CHEMISTRY

15. Neutrons present in one molecule of water = 8



Since

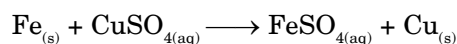
$$\begin{aligned} A &= Z + N_A \\ \therefore N_A &= A - Z \\ &= 16 - 8 = 8 \end{aligned}$$

One mole of water contains = $8 N_A$ neutrons

$$\therefore 5 \text{ moles of water} = 5 \times 8 \times N_A = 5 \times 8 \times 6.022 \times 10^{23}$$

$$\begin{aligned} (N_A = \text{Avogadro constant} = 6.022 \times 10^{23}) \\ = 2.409 \times 10^{25} \end{aligned}$$

16. Since Na & Fe both are more reactive than Cu but Fe is having more affinity to form sulphates so, Fe is used to recover copper from an aqueous solution of copper sulphate solution.



17. In solution A path of light is visible and particles settle down at bottom, so it is **suspension**.

In solution B & D light path is visible and particles do not settle at bottom, so these are **colloids**.

In solution C light path is invisible and particles do not settle down at bottom, so it is a **true solution**.

18. Both (A) & (R) are correct statement but as Gold is most malleable, so it is used in α -particle scattering experiment.
19. Magnesium gets corrode with the layer of oxide.

In order to remove the layer of oxide, it is rubbed with sand paper

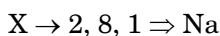


20. (i) $\text{CaCO}_3 \xrightarrow{\Delta \text{ (Heating)}} \text{CaO} + \text{CO}_2$
 (ii) $2\text{Al}_2\text{O}_3 \xrightarrow{\text{electrolysis}} 4\text{Al} + 3\text{O}_2$
 (iii) $2\text{NaHCO}_3 \xrightarrow{\Delta \text{ (Heating)}} \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$
 (iv) $2\text{HgO} \xrightarrow{\Delta \text{ (Heating)}} 2\text{Hg} + \text{O}_2$

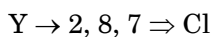
Equations (i), (iii), (iv) are example of thermal decomposition but equation (ii) is an example of electrolytic decomposition.

21. Oxide of X is amphoteric in nature so it can react with acids & bases both. Only metals can form amphoteric oxides, so X is electropositive element in nature.

22. The electronic configuration of

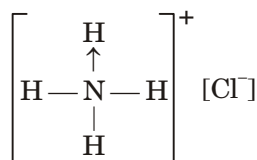


And the electronic configuration of



Compound (Z) $\Rightarrow \text{NaCl} \Rightarrow$ It is good conductor of electricity in molten and fused state but not in solid state.

23. Structure of NH_4Cl is



NH_4Cl contains, ionic, covalent & coordinate bond.

24. As we know that sulphur is a non metal so it does not have tendency to lose electrons, so it cannot be used as reducing agent.

25. Given no. of oxygen atoms = 9.033×10^{23}

- (i) moles of oxygen atoms

$$= \frac{9.033 \times 10^{23}}{6.023 \times 10^{23}}$$

(Since number of atoms

= number of moles $\times$ Avogadro number)

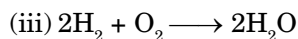
$$= 1.499 \text{ moles} \approx 1.5 \text{ moles}$$

- (ii) mass of oxygen atoms

$$= 1.5 \text{ moles} \times 16 \text{ gm}$$

$$= 24 \text{ grams}$$

(since molecular mass of oxygen atom = 16)



2 moles of oxygen atoms requires

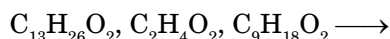
$$= 4 \text{ gm of } \text{H}_2$$

1.5 moles of oxygen atoms requires

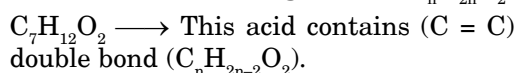
$$= \frac{1.5 \times 4}{2}$$

$$= 3 \text{ moles of Hydrogen atom}$$

26. The molecular formula of carboxylic acid is



Acids Contain (C-C) Single Bond ($\text{C}_n\text{H}_{2n}\text{O}_2$)



PHYSICS

28. $(4.8 \times 10^{18} + n)1.6 \times 10^{-19} = 1.12$

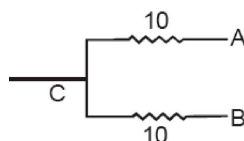
$$(4.8 \times 10^{18} + n) = \frac{1.12}{1.6 \times 10^{-19}}$$

$$4.8 \times 10^{18} + n = 7 \times 10^{18}$$

$$n = 7 \times 10^{18} - 4.8 \times 10^{18} = 2.2 \times 10^{18}$$

So, n is equal to 2.2×10^{18}

- 30.



From the given circuit diagram

$$R_{\text{eff}} = \frac{30 \times 15}{3 \times 15} = \frac{30 \times 15}{45} = 10\Omega$$

$$i = 3\text{A}$$

In branch CA current = 1A

In branch CB current = 2A

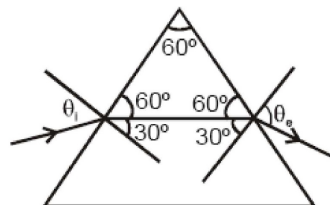
$$\therefore V_C - V_A = 10\text{V} \quad \dots(i)$$

$$\text{and } V_C - V_B = 20\text{V} \quad \dots(ii)$$

Solving equation (i) and (ii) we get

$$V_A - V_B = 10\text{V}$$

- 33.



$$r_1 = r_2$$

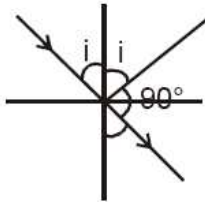
For minimum deviation condition

$$\mu = \frac{\sin\left(\frac{A(\delta_m)}{2}\right)}{\sin\frac{A}{2}}$$

$$\mu = \frac{\sin\left(\frac{60+60}{2}\right)}{\sin\frac{60}{2}} = \frac{\sin 60}{\sin 30} = \sqrt{3} = 1.73 \quad 38.$$

So the refractive index of glass w.r.t air is 1.73.

35.



$$i + r = 90^\circ$$

$$\frac{\mu_d}{\mu_r} = \frac{\sin i}{\sin r}$$

$$\sqrt{3} = \frac{\mu_d}{\mu_r} = \frac{\sin i}{\sin(90-i)}$$

$$\sqrt{3} = \tan i$$

$$i = 60^\circ$$

$$\therefore r = 30^\circ$$

So the angle of refraction is 30°

36.

$$v = -300 \text{ cm}$$

Case : I

$$u = -\infty$$

$$f = ?$$

Now using formula

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{f} = -\frac{1}{300} - 0$$

$$f = -300 \text{ cm}$$

Case : II

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

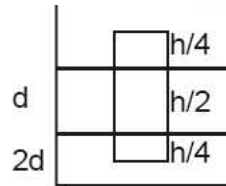
$$-\frac{1}{300} = \frac{-1}{50} - \frac{1}{u}$$

$$\frac{1}{u} = \frac{-1}{50} + \frac{1}{300}$$

$$\frac{1}{u} = \left(\frac{-6+1}{300}\right)$$

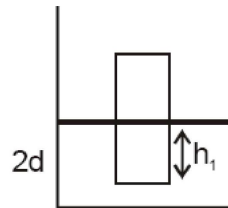
$$\frac{1}{u} = -\frac{1}{60}$$

$$u = -60 \text{ cm}$$



$$Vd_{\text{Solid}} g = \frac{V}{4} 2dg + \frac{V}{2} dg$$

$$d_{\text{solid}} = d$$



$$Vd_{\text{Solid}} g = V_1 2dg$$

$$Ah dg = Ah_1 2dg$$

$$\therefore h_1 = \frac{h}{2}$$

So the height of the submerged position would be $\frac{h}{2}$

40.

$$W = K_f - K_i = Fx$$

$$K_f = \text{Final kinetic energy}$$

$$K_i = \text{Initial kinetic energy}$$

since K_f and K_i are same in both case and stopping force is also so x will be same for both.

MATHEMATICS

41. When Divided by 13 leaves remainder 3

When Divided by 21 leaves remainder 3

$$13 - 3 = 21 - 11 = 10 = k$$

$$\text{LCM}(13, 21) - k = 546 - 10 = 536$$

$$536 = 19 \times 28 + 4$$

$$\therefore \text{remainder} = 4$$

So the remainder is 4.

42. $0.\overline{34} + 0.3\overline{4}$

$$0.343434... + 0.34444... ..$$

$$0.6878787... ..$$

$$0.6\overline{87}$$

43. Quadratic polynomial $p(-2) = k(x+1)^2$

$$p(-2) = k(-2+1)^2$$

$$= 2$$

$$k = 2$$

$$p(x) = 2(x+1)^2$$

$$p(2) = 2(2+1)^2$$

$$= 2 \times 3 \times 3$$

$$= 18$$

44. $x - y = 2$... (1)

$kx + y = 3$... (2)

by adding (1) and (2)

$$kx + x = 5$$

$$x(k+1) = 5$$

$$x = \frac{5}{k+1}$$

putting value of x in equation (1), we get

$$\frac{5}{k+1} - y = 2$$

$$\frac{5}{k+1} - 2 = y$$

$$\frac{5-2k-2}{k+1} = y$$

$$y = \frac{3-2k}{k+1}$$

y should be positive as they intersect in 1st quadrant therefore

$$y > 0$$

$$\frac{3-2k}{k+1} > 0 \Rightarrow \frac{2k-3}{k+1} < 0$$

$$+ \quad - \quad +$$

$\therefore$ k should lie between -1 and 3/2

45. $x^2 - 6x - 2 = 0$

$$\alpha^2 - 2 = 6\alpha$$

$$\beta^2 - 2 = 6\beta$$

$$\alpha + \beta = 6, \alpha\beta = -2$$

$$d_n = \alpha^n - \beta^n$$

$$\frac{a_{10} - 2a_8}{2a_9} = \frac{\alpha^{10} - \beta^{10} - 2(\alpha^8 - \beta^8)}{2(\alpha^9 - \beta^9)}$$

$$\frac{\alpha^{10} - \beta^{10} + \alpha\beta(\alpha^8 - \beta^8)}{2(\alpha^9 - \beta^9)}$$

$$\frac{\alpha^{10} + \alpha^9\beta - (\alpha\beta^9 + \beta^{10})}{2(\alpha^9 - \beta^9)}$$

$$\frac{\alpha^9(\alpha + \beta) - \beta^9(\alpha + \beta)}{2(\alpha^9 - \beta^9)}$$

$$\frac{(\alpha + \beta)(\alpha^9 - \beta^9)}{2(\alpha^9 - \beta^9)}$$

$$\frac{6}{2} = 3$$

46. $S_1 = \frac{n}{2}[2(1) + (n-1)(1)]$

$$S_2 = \frac{n}{2}[2(2) + (n-1)(3)]$$

$$S_3 = \frac{n}{2}[2(3) + (n-1)(5)]$$

$$\vdots \quad \quad \quad \vdots$$

$$S_r = \frac{n}{2}[2(r) + (n-1)(2r-1)]$$

$$(+)\quad (+)$$

$$S_1 + S_2 + \dots + S_r = \frac{n}{2}$$

$$\left[(2) \frac{r(r+1)}{2} + (n-1) \frac{r}{2} [1 + 2r - 1] \right]$$

$$= \frac{n}{2}[r(r+1) + (n-1)r^2]$$

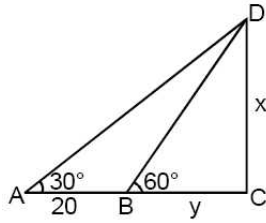
$$= \frac{nr}{2}[r+1 + nr - r]$$

$$= \frac{nr}{2}[nr+1]$$

So the value of $S_1 + S_2 + \dots + S_r$ is

$$\frac{nr}{2}[nr+1]$$

47.

In $\triangle DBC$

$$\tan 60^\circ = \frac{x}{y}$$

$$x = \sqrt{3} y \quad \dots(1)$$

Again in $\triangle ADC$

$$\tan 30^\circ = \frac{x}{20 + y}$$

$$\frac{1}{\sqrt{3}} = \frac{\sqrt{3}y}{20 + y}$$

$$y + 20 = 3y$$

$$2y = 20$$

$$y = 10 \text{ m}$$

48. $\operatorname{cosec} x - \sin x = a$; $\sec x - \cos x = b$

$$\operatorname{cosec} x - \frac{1}{\operatorname{cosec} x} = a; \sec x - \frac{1}{\sec x} = b$$

$$\Rightarrow \frac{\operatorname{cosec}^2 x - 1}{\operatorname{cosec} x} = a; \frac{\sec^2 x - 1}{\sec x} = b$$

$$\Rightarrow \frac{\cot^2 x}{\operatorname{cosec} x} = a; \frac{\tan^2 x}{\sec x} = b$$

$$\frac{\cos^2 x}{\sin x} = a; \frac{\sin^2 x}{\cos x} = b$$

$$a^2 b = \frac{\cos^4 x}{\sin^2 x} \cdot \frac{\sin^2 x}{\cos x} = \cos^3 x$$

$$\Rightarrow \cos x = (a^2 b)^{1/2}$$

$$\cos^2 x = (a^2 b)^{2/3}$$

$$\text{Similarly, } \sin^2 x = (ab^2)^{2/3}$$

$$\therefore \sin^2 x + \cos^2 x = 1$$

$$\Rightarrow (ab^2)^{2/3} + (a^2 b)^{2/3} = 1$$

49. Increase in area

$$\frac{\theta}{360^\circ} \times \pi(23)^2 - \frac{\theta}{360^\circ} \times \pi(12)^2$$

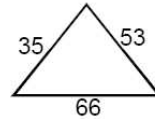
Given $\theta = 90^\circ$

$$= \frac{90^\circ}{360^\circ} \times \pi[(23)^2 - (12)^2]$$

$$= \frac{121 \times 5}{2}$$

$$= \frac{605}{2} = 302.5 \text{ m}^2$$

50.



$$\text{Area of } \Delta = \sqrt{s(s-a)(s-b)(s-c)}$$

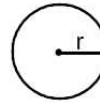
$$\text{Here } s = \frac{a+b+c}{2}$$

$$= \frac{66+53+35}{2} = \frac{154}{2} = 77 \text{ m}$$

$$= \sqrt{77(77-66)(77-53)(77-35)}$$

$$= \sqrt{77 \times 11 \times 24 \times 42}$$

$$= 924 \text{ m}^2$$



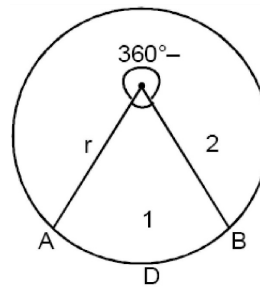
$$\pi r^2 = 2(924)$$

$$r^2 = \frac{2 \times 924 \times 7}{22}$$

$$r^2 = 588$$

$$r = 14\sqrt{3} \text{ m}$$

51.



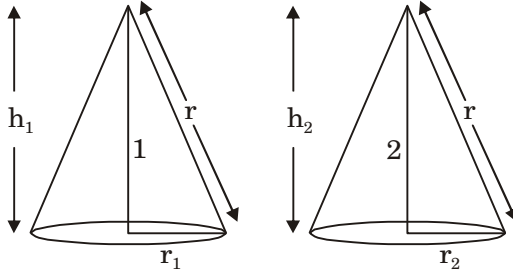
$$\frac{\text{Area of sector ADB}}{\text{Area of sector ACD}} = \frac{\frac{\theta}{360^\circ} \times \pi r^2}{\frac{360^\circ - \theta}{360^\circ} \times \pi r^2}$$

$$\Rightarrow \frac{1}{2} = \frac{\theta}{360^\circ - \theta}$$

$$\Rightarrow q = 120^\circ$$

$$\therefore \widehat{ADB} = \frac{\theta}{360^\circ} \times 2\pi r = \frac{2\pi r}{3}$$

$$\Rightarrow \widehat{ACB} = \frac{4\pi r}{3}$$



$$\widehat{ADB} = \text{circumference of base} = 2\pi r_1$$

$$\frac{2\pi r}{3} = 2\pi r_1$$

$$\Rightarrow r_1 = \frac{r}{3}$$

$$\text{Similarly } r_2 = \frac{2r}{3}$$

$$h_1 = \sqrt{r^2 - r_1^2}$$

$$= \sqrt{r^2 - \frac{r^2}{9}}$$

$$= \frac{2\sqrt{2}r}{3}$$

$$\text{Similarly, } h_2 = \frac{\sqrt{5}r}{3}$$

$$\frac{V_1}{V_2} = \frac{\frac{1}{3}\pi r_1^2 h_1}{\frac{1}{3}\pi r_2^2 h_2}$$

$$= \left(\frac{r_1}{r_2}\right)^2 \left(\frac{h_1}{h_2}\right)^2$$

$$= \frac{1}{4} \times \frac{2\sqrt{2}}{\sqrt{5}}$$

$$= \frac{1}{\sqrt{10}}$$

So the ratio of their volume is $1 : \sqrt{10}$.

$$52. \text{ Volume of metallic block} = 1 \text{ m}^3 \quad \dots(1)$$

let the each side of the square base is x m

$$\text{So, volume of the rectangular bar} = x^2 \times 9 \quad \dots(2)$$

$$9x^2 = 1$$

$$\Rightarrow x^2 = \frac{1}{9}$$

$$\Rightarrow x = \frac{1}{3} \text{ m}$$

$$\text{Side of cube possible} = \frac{1}{3} \text{ m}$$

So, weight of the cube

$$= \text{weight of block} \times \left(\frac{1}{3}\right)^3$$

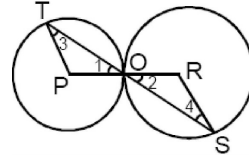
$$= 90 \times \frac{1}{27}$$

$$= \frac{10}{3} \text{ kg}$$

$$= 3\frac{1}{3} \text{ kg}$$

so the weight of a cube is $3\frac{1}{3} \text{ kg}$.

53.



$$\angle 1 = \angle 2 \quad (\text{V.O.A.})$$

$$\angle 1 = \angle 3 \quad (\text{Same radius})$$

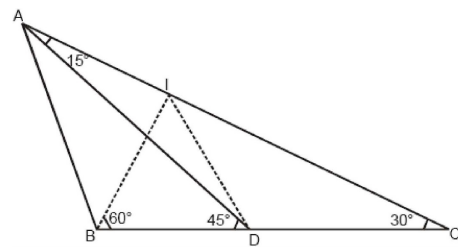
$$\angle 2 = \angle 4 \quad (\text{Same radius})$$

$$\therefore \angle 3 = \angle 4$$

As alternate interior angles are equal

$$\therefore PT \parallel RS$$

54.



Draw BL perpendicular to AC and join L to D.

Since $\angle BCL = 30^\circ$, we get $\angle CBL = 60^\circ$. Since BLC is a right triangle with $\angle BCL = 30^\circ$, we have $BL = BC/2 = BD$. Thus in triangle BLD , we observe that $BL = BD$ and $\angle DBL = 60^\circ$ and $\angle ADB = 45^\circ$, we get $\angle ADL = 15^\circ$

But $\angle DAL = 15^\circ$. Thus $LD = LA$. We hence have $LD = LA = LB$. This implies that L is the circumcentre of the triangle BDA .

$$\text{Thus } \angle BAD = \frac{1}{2} \angle BLD = \frac{1}{2} \times 60^\circ = 30^\circ$$

$$30^\circ + 45^\circ + \angle ABC = 180^\circ$$

$$\text{hence } \angle ABC = 105^\circ$$

So the value of $\angle BAD$ and $\angle ABC$ are 30° and 105° respectively.

$$55. \quad PR = \sqrt{(R_1 + r)^2 - (R_1 - r)^2}$$

$$= \sqrt{4R_1 r} \quad \dots(1)$$

$$RQ = \sqrt{4R_2 r} \quad \dots(2)$$

$$PQ = \sqrt{4R_1 R_2} \quad \dots(3)$$

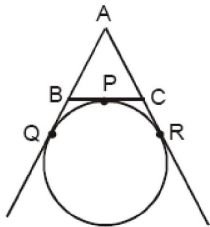
$$PQ = PR + RQ$$

$$\Rightarrow \sqrt{4R_1 R_2} = \sqrt{4R_1 r} + \sqrt{4R_2 r}$$

$$\sqrt{R_1 R_2} = \sqrt{R_1 r} + \sqrt{R_2 r}$$

$$\frac{1}{\sqrt{r}} = \frac{1}{\sqrt{R_2}} + \frac{1}{\sqrt{R_1}}$$

56.



Perimeter of triangle ABC

$$= AB + BC + CA$$

$$15 = (AQ - BQ) + (BP + PC)$$

$$+ (AR - CR)$$

$$15 = 2AQ$$

($BQ = BP$, $PC = RC$, $AQ = AR$ as tangent from external point to a circle are equal)

$$AQ = 7.5 \text{ cm}$$

So the value of AQ is 7.5 cm

$$57. \quad (x-6)^2 + (y+6)^2 = (x-3)^2 + (y+7)^2 \dots(1)$$

$$(x-3)^2 + (y-3)^2 = (x-3)^2 + (y+7)^2$$

$$y^2 - 6y + 9 = y^2 + 14y + 49$$

$$-20y = 40$$

$$\text{put } y = -2 \text{ in equation (1)}$$

$$(x-6)^2 + (4)^2 = (x-3)^2 + (5)^2$$

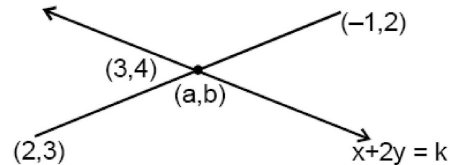
$$x^2 - 12x + 36 + 16 = x^2 - 6x + 9 + 25$$

$$-6x = -18$$

$$x = 3$$

So the centre of the circle is $(3, -2)$

58.



$$a = \frac{-3+8}{3+4}$$

$$= \frac{5}{7} \left(\frac{mx_2 + nx_1}{m+n} \right)$$

$$b = \frac{6+12}{7} = \frac{18}{7} \left(\frac{my_2 + ny_1}{m+n} \right)$$

$$x + 2y = k$$

$$\frac{5}{7} + 2 \times \frac{18}{7} = k$$

$$\frac{5}{7} + \frac{36}{7} = k$$

$$\frac{41}{7} = k$$

So the value of k is $\frac{41}{7}$.

59. $a > b > c$

$$\frac{a+b+c}{3} = c + 10 = a - 15 = k$$

$$b = 5$$

$$c = k - 10$$

$$a = k + 15$$

$$a + b + c = 3k$$

$$k + 15 + 5 + k - 10 = 3k$$

$$10 = k$$

$$\therefore a = 10 + 15 = 25$$

$$b = 5$$

$$\therefore c = 0$$

$$\begin{aligned}\text{mean} &= \frac{25^2 + 5^2 + 0^2}{3} \\ &= \frac{625 + 25 + 0}{3} \\ &= \frac{650}{3} = 216\frac{2}{3}\end{aligned}$$

$$\mathbf{60.} \quad P(\text{sum at least } 5) = 1 - P(\text{Getting sum } 3 \text{ or } 4)$$

no of ways getting sum 3 = 1 way i.e. (1, 1, 1)

no of ways getting sum 4 = 3 ways i.e.

(1, 1, 2), (1, 2, 1), (2, 1, 1)

$$\text{So } P(\text{sum at least } 5) = 1 - \frac{1+3}{216} = \frac{212}{216} = \frac{53}{54}$$

■ ■

NTSE SOLVED PAPER– 2015

NATIONAL LEVEL

PART I : MENTAL ABILITY TEST

1. If RESPOND is coded as EMPOTDS and SENSE is coded as FRODT, then CLARIFY will be coded as
(a) EDTJME (b) ZEJSBMD
(c) ZEJQBKD (d) ZDKSBKD
2. Madhu walks 15 metres towards north, then she turns left at 90° and walk 30 metres, then turns right at 90° and walks 25 metres. How far, she is from the starting point and in which direction?
(a) 55mt., north-east
(b) 50mt., north-west
(c) 60mt., north
(d) 50mt., west
3. Five friends A, B, C, D and E are standing in a row facing south but not necessarily in the same order. Only B is between A and E, C is immediate right to E and, D is immediate left to A. On the basis of above information, which of the following statements is definitely true?
(a) B is to the left of A
(b) B is to the right of E
(c) A is second to the left of C
(d) D is third to the left of E
4. Which of the following is a group of females?
(a) GCE (b) GEH
(c) GCH (d) GHB
5. In which department(s) do three people work?
(a) Operations
(b) Accounts
(c) Operations or Accounts
(d) Data inadequate
6. What will be the position of A from the top when they are arranged in descending order of their income?
(a) Second (b) Third
(c) Fourth (d) Fifth
7. In which of the following department does B work?
(a) Operations
(b) Accounts
(c) Administration
(d) Data inadequate
8. Which of the following statements is definitely true?
(a) B earns less than F and H
(b) F earns less than B and E
(c) B earns more than E and C
(d) B earns less than A and H

Directions(Q. 4 – 8) : A, B, C, D, E, F, G and H are seven employees in an organisation working in the departments of Administration, Accounts and operations. There are at least two employees in each department. There are three females, one in each department. Each of seven employees earns different amount. The only bearded employees F works in Administration and his only other colleague G earns the maximum. C, the least earner works in Accounts. B and E are brothers and do not work in the same department. A, husband of H, works in Accounts and earns more than each of F, B and E. The wife in the couple earns more than the husband.

Directions (Q. 9 –11) : Given an input, a machine generates pass codes for the six batches each day as follows:

Input : these icons were taken out from the sea.

Pass Codes

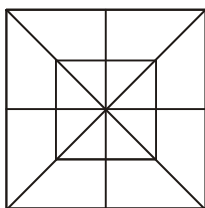
Batch I : from sea the out taken were icons these

Batch II : from icons these were taken out the sea

Batch III : from icons out sea the taken were these

Batch IV : from icons out sea these were taken the

9. What will be the pass code for the Batch V on a day, if the input is “four of the following five form a group”?
- (a) a five following form four group the of
(b) a five following form group the of four
(c) a five following form four of the group
(d) a five following form four group of the
10. If the pass code for the Batch IV on a day was ‘back go here people who settle want to’, what was the pass code for the Batch V on that day?
- (a) back go here people settle who want to
(b) back go here people to want settle who
(c) back go here people settle to want who
(d) cannot be determined
11. The pass code for the Batch I on a day was ‘he so used to sell the surplus items’. What was the input on the day?
- (a) items surplus the sell to used so he
(b) he items surplus the sell to used so
(c) so used to sell the surplus items he
(d) cannot be determined
12. What is the total number of triangles and total numbers of squares in the given figure?

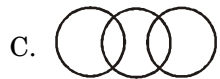
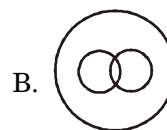
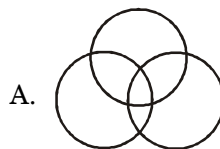


- (a) 28 triangles, 10 squares
(b) 28 triangles, 8 squares
(c) 32 triangles, 10 squares
(d) 32 triangles, 8 squares
13. A cube whose two adjacent faces are coloured is cut into 64 identical small cubes. How many of those small cubes are not coloured at all?
- (a) 24 (b) 32
(c) 36 (d) 48

14. If $\frac{54}{32} = 4$, $\frac{36}{42} = 3$, $\frac{92}{22} = 7$ then what is

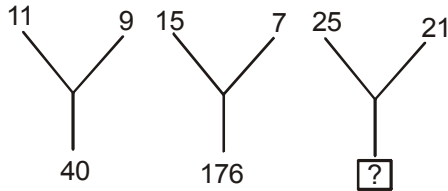
$$\frac{28}{33} = ?$$

- (a) 5 (b) 6
(c) 4 (d) 9
15. In a certain code language, ‘po ki top ma’ means ‘Usha is playing cards’; ‘Kop ja ki ma’ means ‘Asha is playing tennis’; ‘ki top sop ho’ means ‘they are playing football’; and ‘po sur kop’ means ‘cards and tennis’. Which word in this language means ‘Asha’?
- (a) ja (b) ma
(c) kop (d) top
16. A ship navigating in the Indian Ocean is hit by a sea storm and drifts as follows:
40 km north
28 km north-west
36 km west
52 km south and 29 km south-east.
The ship had finally drifted in direction from its original position.
- (a) South-West (b) South
(c) West (d) South-East
17. Four diagrams marked A, B, C and D are given below. The one that best illustrates the relationship among three given classes: Women, Teachers, Doctors

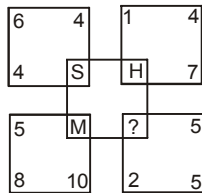


- (a) A (b) B
(c) C (d) D
18. Identify the missing number in the following sequence
2, 17, 52, ___, 206
- (a) 73 (b) 85
(c) 113 (d) 184

19. Select the missing number



- (a) 184 (b) 210
(c) 241 (d) 425
20. Select the missing numbers in the following sequence
3, 6, 24, 30, 63, 72, ?, ?, 195, 210
(a) 117, 123 (b) 120, 132
(c) 123, 135 (d) 135, 144
21. Find the number that does not belong to the group:
111, 331, 482, 551, 263, 383, 362, 284
(a) 263 (b) 331
(c) 383 (d) 551
22. Which letter replaces the question mark?



- (a) L (b) N
(c) P (d) R
23. Certain blank spaces are left in the following sequence. Which is the group of letters given below, will complete the sequence?
c_bba_cab_ac_ab_ac
(a) acbcb (b) bcacb
(c) babec (d) abebe
24. A boat starts with the speed of 1 km per hour. After every 1 km, the speed of boat becomes twice. How much will be the average speed of the boat at the end of journey of 2.5 km?

- (a) $\frac{2.5}{1.5125}$ (b) $\frac{2.5}{1.75}$
(c) $\frac{2.5}{1.625}$ (d) $\frac{2.5}{1.50}$

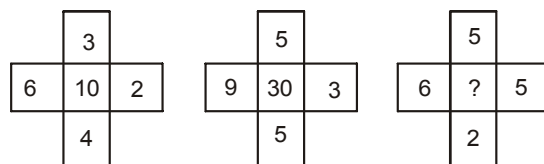
25. Using the total number of alphabets in your solution as a parameter, find the number that represents G if,
A-0, B-0, C-2, D-2, E-1, F-2, G-?

- (a) 2 (b) 3
(c) 4 (d) 5
26. ₹ 1000 is given to A, B and C in some ratio. A is wrongly given double and C is wrongly given half, which is ₹ 500 and ₹ 250 respectively. How much is given to B?
(a) 500 (b) 250
(c) 750 (d) None of these
27. Given that the total cost of 5 erasers, 7 sharpeners and 9 pencils is ₹ 100 and the total cost of 2 erasers, 6 sharpeners and 10 pencils is ₹ 80. What is the total cost (in ₹) of one erasers, one sharpener and one pencil?
(a) 10
(b) 15
(c) 20
(d) Data are not sufficient

28. Renu went to the market between 7 am and 8 am. The angle between the hour-hand and the minute-hand was 90° . She returned home between 7 am and 8 am. Then also the angle between the minute-hand and hour-hand was 90° . At what time (nearest to second) did Renu leave and return home?
(a) 7 h 18 m 35 s and 7 h 51 m 24 s
(b) 7 h 19 m 24 s and 7 h 52 m 14 s
(c) 7 h 20 m 42 s and 7 h 53 m 11 s
(d) 7 h 21 m 49 s and 7 h 54 m 33 s

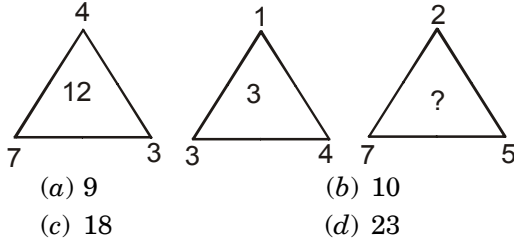
29. Stimulant : Activity :: ?

- (a) Symptom : Disease
(b) Food : Hunger
(c) Fertilizer : Growth
(d) Dignosis : Treatment
30. Choose the missing number from among the four alternatives :



- (a) 15 (b) 20
(c) 25 (d) 40

31. From among the four alternatives given below, which number replaces the question mark?



32. From among the four alternatives given below, which letter replaces the question mark?

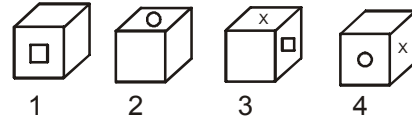
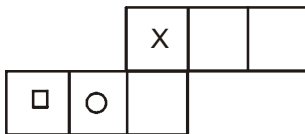
3	P	8
9	G	11
2	U	4
3	W	1
7	?	18

- (a) A (b) B
(c) S (d) Y
33. Choose the correct mirror-image most closely resembles the word source, from the four given alternatives.

source

- (a) ƎOꞤꞤꞤꞤ
(b) ƎOꞤꞤꞤꞤ
(c) ƎOꞤꞤꞤꞤ
(d) e c r u o s

34. In the problem figure a unfolded cuboid is given. Choose from the four given alternatives the box that will be formed when problem figure is folded.



- (a) 1 only (b) 1 and 2 only
(c) 1, 2 and 3 only (d) 2 and 3 only
35. A work can be completed by 40 workers in 40 days. If 5 workers leave every 10 days, in how many days work will be completed?
- (a) 55.66 (b) 56.44
(c) 56.66 (d) 58.66
36. From among the four alternatives given below, which figure replaces the question mark?



- (a) (b)
(c) (d)
37. Six persons A, B, C, D, E and F are sitting in two rows, three persons are sitting in each row
E is not at the end of any row
D is second to the left of F
C, the neighbour of E, is sitting diagonally opposite to D.
B is the neighbour of F. Who are sitting in each column?
- (a) A and D; E and F; and B and C
(b) A and F; D and E; and B and C
(c) B and D; A and C; and E and F
(d) A and D; B and E; and F and C

38. The sum of the incomes of A and B is more than that of C and D taken together. The sum of incomes of A and C is the same as that of B and D taken together. Moreover, A earns half as much as the sum of the incomes of B and D. Whose income is the highest?
- (a) A (b) B
(c) C (d) D

39. A letter number series is given with one or more terms missing as shown below. Choose the alternative next in the sequence.

A4X, D9U, G16R, ...

- (a) K25P (b) J25P
(c) J25O (d) J25C
40. Study the following information and answer the question given below it :
- Rohit, Kunal, Ashish and, Ramesh are students of a school. Three of them stay far from the school and one near it. Two studies in class IV. They study Hindi, Mathematics, Social Sciences and Science. One is good at all four subjects while another is weak in all these. Rohit stay far from the school and is good at mathematics only while Kunal is weak in mathematics only and stay close to the school. Neither of these two nor Ashish studies in class VI. One who is good at all the subjects study in class V. Name the boy who is good at all the subjects.

- (a) Rohit (b) Ramesh
(c) Kunal (d) Ashish
41. Half of the villagers of a certain village have their own houses. One-fifth of the villagers cultivate paddy. One-third of the villagers are literate. Four - fifth of the villagers are below twenty five. Then, which one of the following is certainly true?
- (a) At least 10 percent villagers who have their own houses are literate.
(b) At least 25 percent of the villagers who have their own houses cultivate paddy.
(c) At least 50 percent of the villagers who cultivate paddy are below twenty five.
(d) At least 13.33 percent literate must be below twenty five.
42. A tank is filled by three pipes with each pipe having uniform flow. The first two pipes operating simultaneously fill the tank in the same time during in which the tank is filled by the third pipe alone. The second pipe fills the tank 5 hours faster

than the first pipe and 4 hour slower than the third pipe. The time required by the first pipe to fill the tank is:

- (a) 6 hours (b) 10 hours
(c) 15 hours (d) 30 hours
43. If FEED is coded as 47 and TREE is coded as 91, then MEET will be coded as:
- (a) 110 (b) 114
(c) 118 (d) 122
44. One watch is 1 minute slow at 1 pm on Tuesday and 2 minutes fast at 1 am on Friday. When did it show the correct time?
- (a) 5.00 am on Wednesday
(b) 9.00 am on Wednesday
(c) 5.00 pm on Wednesday
(d) 9.00 pm on Wednesday

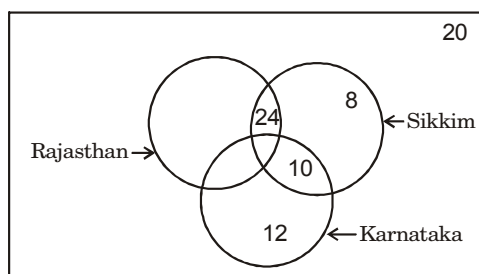
Directions (Q. 45–47) : A coding language is used to write English words in coded form given below:

TENNIS	% # \$ @ \$ &
TRUE	@ # *
PRIME	* ? # %
SPINE	# \$ % ? &

The codes do not appear in the same order of the letters in English words. Decode the language and based on these codes identify the code for English word given in each question from the alternatives provided.

45. MINT
- (a) % = & * (b) = # ? %
(c) @ % = \$ (d) * @ ? +
46. RINSE
- (a) = ? + * @ (b) % * \$ # &
(c) * \$ # @ + (d) \$ & # = ?
47. INTEREST
- (a) = ? * + % & = *
(b) ? # = ? + # * \$
(c) + \$ @ + \$ = * %
(d) @ # * # @ \$ % &

Directions (Q. 48–49) : There are three circles in the following diagram. A total number of 100 persons were surveyed and the number of tourists who visited different states. 46 tourists visited Sikkim and 42 tourists visited Karnataka.



48. How many tourists have visited at least two states?
- (a) 46 (b) 50
(c) 54 (d) 58
49. How many tourists have visited only two states?
- (a) 46 (b) 50
(c) 54 (d) 96
50. If BREAKTHROUGH is coded as EAOUHR- BRGHKT, then DISTRIBUTION will be coded as
- (a) STTIBUDIONRI
(b) TISTBUONDIRI
(c) STTIBUONRID I
(d) RISTTIBUDION

PART II : ENGLISH LANGUAGE

Directions(Q. 1 – 5) : Read the following passage and answer the questions given after it.

The loudest public food fight right now is about GMOs, or genetically modified organisms. Scientists add genes to corn, soya beans, and other plants, usually to protect the crops from insects or herbicides. Those who support this say that the genetic help makes crops easier to grow and cheaper. But many consumers and those who keep an eye on food-safety worry that GMOs pose an unnatural threat to our health and the environment. These opponents say that GMOs have been linked to depression, allergies and even cancer. Unless we have been

eating foods labelled 100 per cent organic- which means that it must be GMO-free - we probably have GMOs in our body system already!

- Adding genes to crops will
 - help in better crop-research.
 - make them resistant to insect attacks.
 - make the foods 'organic'.
 - give them a stable price in the markets.
- The "..... loudest public food fight...." suggests that
 - people do not like the Crop Scientists.
 - Crop Scientists are almost fighting in the streets.
 - there is a great competition in growing GMOs.
 - there are strong protests against GMOs.
- Those who support GMOs say that
 - growing the crops poses many challenges now.
 - they do not protect the fields from insect-attacks.
 - they bring down the prices of the crops.
 - they help in carrying out more experiments with better results.
- Those who are opposed to GMOs say that
 - the costs of the crops will not change much in the markets.
 - the pattern of growing and harvesting of crops will change.
 - such crop-research has been stopped.
 - these crops can cause serious harm to our health.
- 'Organic foods' according to the passage are those that are
 - already there in our bodies as GMOs.
 - grown in well-organised farms.
 - grown free from GMOs.
 - helpful to our body's various organs.

Directions (Q. 6 – 10) : Read the following passage and answer the questions given after it.

‘We are living in the golden age of answers’. Of course information is not knowledge or wisdom, and data can mislead. Profusion of online information can be distracting or even useless. Privacy can also be a problem in a digital world where everything you’ve clicked can be used to sell things to you, evaluate you or embarrass you. Your iphone or computer can provide information to others that you might prefer to keep to yourself. But revolutions always cause some damages. Things do get lost in the ocean of information. We no longer bother to remember stuff we can easily look up. We don’t search for addresses as we use the GPS. We spend more time connecting with friends on Facebook than connecting with real friends. Still, pop-up ads, Internet frauds and other inconveniences are a small price to pay for instant access to infinite information. Today, we have better tools for searching, analysing or evaluating through data than before. And what’s most exciting about our age of answers is, its potential to change the quality of our lives.

6. The passage primarily discusses
 - (a) the advantages of technology.
 - (b) criticism of technology.
 - (c) the age of technology.
 - (d) the evaluation of the pros and cons of technology.
7. ‘The golden age of answers implies that there are
 - (a) diverse technologies available in the present time.
 - (b) opportunities to connect with friends on Facebook.
 - (c) better tools for searching information.
 - (d) pop-up ads to provide information.
8. We pay a price for this revolution as we
 - (a) only receive useless information.
 - (b) forget our identities.
 - (c) get agitated.
 - (d) surrender our privacy.

9. This ‘revolution’ has brought
 - (a) radical changes to our lives.
 - (b) success in our lives.
 - (c) rotation in our lives.
 - (d) merely problems in our lives.
10. The author’s attitude to technology according to this passage is
 - (a) not clear.
 - (b) positive.
 - (c) negative.
 - (d) insignificant.

Directions (Q. 11 – 15) : Read the following passage and answer the questions given after it.

For Abid Surti, Sunday is no day of rest. He is busy going door to door volunteering with an assistant and a plumber. They are in an apartment building in Mumbai’s densely populated suburb filled with high rise buildings. He rings doorbells and asks residents the same question, ‘Any leaky taps? We are providing a free service.’

Surti is a multifaceted 79 year old man. A national award winning author, he has written some 80 books-novels, plays and collection of short stories and poems. He is also an artist and a cartoonist. In 2007, Surti started Drop Deal Foundation, his own water conservation NGO that caters to buildings in Mira Road, fixing leaky plumbing for free. With water shortages and the prospects of taps running dry in Mumbai, Surti’s work is vital. ‘Massive’ is how he describes water wastage in Mumbai. ‘In poor families, they can’t afford to pay a plumber but in most middle-class families, the problem is one of sheer indifference. ‘Indeed it was the apathy of a friend that first spurred Surti into action. While visiting a friend’s house, Surti saw a leaking tap and asked why it wasn’t fixed. His friend casually dismissed the query, saying it was hard to get a plumber ‘for something so trivial.’

11. Surti’s primary mission is to
 - (a) provide free plumbers.
 - (b) check wastage of water.
 - (c) supply free water.
 - (d) close running taps.

12. People may be more willing to accept Surti's services as he
 (a) provides services assisted by a plumber.
 (b) runs a water conservation NGO.
 (c) is a local person from Mumbai.
 (d) is on a mission.
13. Most middle-class families' attitude to water conservation is due to their
 (a) lack of knowledge.
 (b) lack of money.
 (c) lack of expertise.
 (d) lack of concern.
14. The work being done by Surti is significant because he
 (a) runs an NGO in Mumbai.
 (b) has several skills.
 (c) is providing plumbing services.
 (d) is solving social problems.
15. 'spurred into action' means
 (a) emboldened to act.
 (b) volunteered to act.
 (c) keen to act.
 (d) encouraged to act.

Directions (Q. 16 – 17) : The following five sentences come from a paragraph. The firsts and the last sentences are given. Choose the right order in which the three sentences (PQR) should appear to complete the paragraph.

16. S1. Normally ladybugs are sophisticated and voracious predators.
 S2. _____.
 S3. _____.
 S4. _____.
 S5. Then it creeps up and strikes, ripping the victim apart with its barbed mandibles.
- P - Once it has homed in on these signals, it switches its sensory scan to search for molecules released by the victim.
- Q - A single individual may devour several thousands of victims in a lifetime.
- R - To find a victim, it first waves its antennae to detect chemicals that plants release when they are under attack by herbivorous insects.

Choose from the options given below:

- (a) RPQ (b) PRQ
 (c) QRP (d) PQR

17. S1. Years ago, the kids were all keen on 'soda water powder', soft drink mix that made carbonated beverages.

S2. _____.

S3. _____.

S4. _____.

S5. They began calling them Popsicles instead, and the treat was patented as such.

P - Epperson cleverly sat on his invention, keeping it secret for 18 years, until he was in the position to make something of it.

Q - One night in 1905, Frank Epperson accidentally left his drink out on the porch, and as it froze overnight, it was absolutely delicious by the morning.

R - In 1923, he decided to patent his Epsicles ("Epp's Icicles"), but his children refused to use that name since none of them called their father Epp.

Choose from the options given below:

- (a) PRQ (b) RPQ
 (c) RQP (d) QPR

Directions (Q. 18 – 19) : The following questions have the second sentence missing. Choose the appropriate sentence from the given options to complete it.

18. A. I used to think that boiling an egg would be a simple job until I came to live in the Himalayas.
 B. _____.
 C. I don't know if it's the altitude or the destiny of the water, but it just won't come to a boil in time for breakfast.
 (a) I found that just getting the water to boil was an achievement.
 (b) Boiling an egg in the Himalayas was fascinating.
 (c) I could never find good eggs there.
 (d) "Were the eggs also too hard?" I wondered.

19. A. Imagine a five-year old composing music and playing on a child-size violin.
 B. _____.
 C. He was a young genius who grew up to be one of the most creative composers of all time.
 (a) This was something Mozart did.
 (b) It is strange to find such a phenomenon.
 (c) The child must have been some genius.
 (d) This is simply impossible for us to think of.

Directions (Q. 20 – 29) : Choose the word which best fills the blank from the four options given.

20. The journey in the run down bus over the pot-holed road felt almost like a ride.
 (a) train (b) boat
 (c) roller-coaster (d) bicycle
21. The good old Ambassador cars are now considered
 (a) obsolete (b) absolute
 (c) obscure (d) oblivious
22. The report has been prepared well and hopefully it will be at the next board meeting.
 (a) shelved (b) chaired
 (c) tabled (d) grounded
23. The Talent Search Examination is challenging but not frightening. Why don't you take a at it?
 (a) shot (b) trial
 (c) hit (d) swipe
24. Grandfather has always been a figure of in our large family.
 (a) authorised (b) authoritative
 (c) authoritarian (d) authority
25. She found Rashmi in the kitchen, looking old and
 (a) healthy (b) weary
 (c) busy (d) in a hurry
26. Tax offenders were refused to leave the country.
 (a) admission (b) submission
 (c) information (d) permission
27. A good driver will be very careful before carrying out a complex.....
 (a) movement (b) manoeuvre
 (c) motion (d) moment
28. With the new Management taking over, there's now a big hanging over the Company's future.
 (a) thought
 (b) gossip
 (c) discussion
 (d) question mark
29. The Coffee Room was into smoking and non-smoking areas.
 (a) amalgamated (b) considered
 (c) segregated (d) shared

Directions (Q. 30 – 35) : Select the meaning of the given phrases / idioms.

30. For want of
 (a) because of lack of
 (b) giving something wanted by another
 (c) desiring something
 (d) because of fulfilling needs
31. Clown around
 (a) make others feel silly and stupid
 (b) be an object of ridicule
 (c) join a Circus company
 (d) behave in a silly way
32. Talk back
 (a) answer rudely
 (b) talk behind a person's back
 (c) talk in a loud voice
 (d) reply to the questions asked
33. Run into
 (a) meet someone by chance
 (b) start quarrelling
 (c) make unexpected purchase
 (d) run from one place to another

34. blow one's own trumpet

- (a) to create music
- (b) to praise someone
- (c) to praise oneself
- (d) to feel happy

35. To see eye to eye

- (a) stare at someone
- (b) examine someone's eyes
- (c) have the same opinion
- (d) be cross-eyed

Directions (Q. 36 – 43) : In the following passage there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the given options.

At Sri Venkateswara Temple in Tirumala, better known as Tirupati, the *laddu* is next in popularity only to the Lord. The taste and aroma of (36) _____ *besan* (gram flour) confections - saturated (37) _____ ghee, raisin, nuts, cardamom, and (38) _____ camphor - draws millions of devotees (39) _____ this temple town in Andhra Pradesh, (40) _____ for a bite of this holy (41) _____. In 2009, it received international (42) _____ when it was given the unique global (43) _____ i.e. legal protection against imitation.

- 36. (a) this (b) these
- (c) those (d) their
- 37. (a) from (b) of
- (c) in (d) with
- 38. (a) edible (b) fine
- (c) light (d) pious
- 39. (a) with (b) to
- (c) for (d) from
- 40. (a) seen (b) look
- (c) eager (d) find

- 41. (a) dish (b) eat
- (c) taste (d) joy

- 42. (a) taste (b) fame
- (c) claim (d) love

- 43. (a) index (b) quality
- (c) patent (d) reward

Directions (Q. 44 – 47) : Select the most appropriate option to fill in the blanks from the given alternatives.

44. Located close to Charminar, the kilometre-long stretch of Laad Bazaar is _____ with shops selling bright bangles in every hue and colour.

- (a) came (b) dicovered
- (c) covered (d) filled

45. I suggest you should _____ yourself with the rules before you join the meeting.

- (a) familiar (b) familiarize
- (c) familiarly (d) familiarity

46. The child held the beg as tightly as if it were her most _____ possession.

- (a) prize (b) prizy
- (c) prized (d) prizely

47. The weakness in their defense has already cost them _____ this season.

- (a) dear (b) dearly
- (c) deary (d) dearness

Directions (Q. 48 – 50) : Select the word which means the opposite of the given word.

48. Undertake

- (a) recognise (b) begin
- (c) refuse (d) rejoice

49. Hefty

- (a) half-hearted (b) light
- (c) heavy (d) halved

50. Miniature

- (a) manicure (b) massive
- (c) missive (d) masculine

PART III :**SCHOLASTIC APTITUDE TEST**

- A segment of DNA contains 1200 nucleotides, of which 200 have adenine base. How many cytosine bases are present in this segment of DNA?
 (a) 100 (b) 200
 (c) 400 (d) 800
- You are observing a non-chlorophyllous, eukaryotic organism with chitinous cell wall under a microscope. You shall describe the organism as a
 (a) fungus. (b) alga.
 (c) protozoas. (d) bacterium.
- Match the items given in Column A and Column B, and identify the correct alternative listed below.
Column A
 1. Flying fish
 2. Flying lizard
 3. Egg laying mammal
 4. Flightless bird
Column B
 (i) *Draco*
 (ii) *Echidna*
 (iii) *Exocoetus*
 (iv) *Struthio*
 (a) (1)-(i), (2)-(iii), (3)-(ii), (4)-(iv)
 (b) (1)-(iii), (2)-(i), (3)-(ii), (4)-(iv)
 (c) (1)-(iii), (2)-(i), (3)-(iv), (4)-(ii)
 (d) (1)-(i), (2)-(iii), (3)-(iv), (4)-(ii)
- Which one of the following statements about cell organelles and their function is correct?
 (a) Mitochondria are associated with anaerobic respiration
 (b) Smooth endoplasmic reticulum is involved in protein syntheses.
 (c) Lysosomes are important in membrane biogenesis.
 (d) Golgi bodies are involved in packaging and dispatching of materials.
- A leguminous plant grown in an autoclaved, sterilized soil fails to produce root nodules because
 (a) autoclaved soil is not good for root growth.
 (b) autoclaved soil is devoid of bacteria.
 (c) autoclaving reduces N_2 content of soil.
 (d) plants cannot form root hairs in such a soil.
- The causative agent of the disease 'sleeping sickness' in human beings is an
 (a) intracellular parasite found in RBC.
 (b) extracellular parasite found in blood plasma.
 (c) intracellular parasite found in WBC.
 (d) extracellular parasite found on the surface of platelets.
- The gene for hemophilia is present on X chromosome. If a hemophilic male marries a normal female, the probability of their son being hemophilic is
 (a) nil. (b) 25%.
 (c) 50%. (d) 100%.
- Abundance of coliform bacteria in a water body is indicative of popution from
 (a) petroleum refinery.
 (b) metal smelter.
 (c) fertilizer factory.
 (d) domestic sewage.
- Prolonged exposure to the fumes released by incomplete combustion of coal may cause death of a human because of
 (a) inhalation of unburnt carbon particles
 (b) continuous exposure to high temperature.
 (c) increased level of carbon monoxide.
 (d) increased level of carbon dioxide.
- The phenomenon of normal breathing in a human being comprises
 (a) an active inspiratory and a passive expiratory phase.
 (b) a passive inspiratory and an active expiratory phase.

- (c) both active inspiratory and expiratory phases.
 (d) both passive inspiratory and expiratory phases.
11. Which one of the following statements is true with respect to photosynthesis?
 (a) Oxygen evolved during photosynthesis comes from CO_2 .
 (b) Chlorophyll 'a' is the only photosynthesis pigment in plants.
 (c) Photosynthesis occurs in stem of some plants.
 (d) Photosynthesis does not occur in red light.
12. The girth of stem increases due to the activity of
 (a) lateral meristem.
 (b) apical meristem.
 (c) intercalary meristem.
 (d) apical and intercalary meristem.
13. Which one of the following represents the correct sequence of reflex action?
 (a) Receptor $\rightarrow$ sensory nerve $\rightarrow$ motor nerve $\rightarrow$ spinal cord $\rightarrow$ muscle
 (b) Receptor $\rightarrow$ motor nerve $\rightarrow$ spinal cord $\rightarrow$ sensory nerve $\rightarrow$ muscle
 (c) Receptor $\rightarrow$ sensory nerve $\rightarrow$ spinal cord $\rightarrow$ muscle $\rightarrow$ motor nerve
 (d) Receptor $\rightarrow$ sensory nerve $\rightarrow$ spinal cord $\rightarrow$ motor nerve $\rightarrow$ muscle
14. In human female, immature eggs are for the first time seen in ovary
 (a) at puberty.
 (b) before birth, at the fetus stage.
 (c) during the first menstrual cycle.
 (d) after the first year of birth.
15. What happens when a fixed amount of oxygen gas is taken in a cylinder and compressed at constant temperature?
 (i) Number of collisions of oxygen molecules at per unit area of the wall of the cylinder increase.
 (ii) Oxygen ($\text{O}_{2\text{g}}$) gets converted into ozone (O_3).
 (iii) Kinetic energy of the molecules of oxygen gas increases.
- (a) (i) and (iii) (b) (ii) and (iii)
 (c) (iii) only (d) (i) only
16. The solubility of a substance S in water is 28.6% (mass by volume) at 50°C . When 50mL of its saturated solution at 50°C is cooled to 40°C , 2.4 g of solid S separates out. The solubility of S in water at 40°C (mass by volume) is :
 (a) 2.4% (b) 11.9%
 (c) 26.2% (d) 23.8%
17. What mass of CO_2 will be formed when 6 g of carbon is burnt in 32 g of oxygen?
 (a) 38 g (b) 12 g
 (c) 26 g (d) 22 g
18. The law of conservation of mass is valid for which of the following?
 (i) Reactions involving oxidation.
 (ii) Nuclear reactions.
 (iii) Endothermic reactions.
 (a) (i) and (iii) (b) (i) and (ii)
 (c) (ii) and (iii) (d) (ii) only
19. How many sub-atomic particles are present in an α -particle used in Rutherford's scattering experiment?
- | | No. of Protons | No. of Neutrons | No. of Electrons |
|-----|----------------|-----------------|------------------|
| (a) | 4 | 0 | 0 |
| (b) | 2 | 0 | 2 |
| (c) | 2 | 2 | 0 |
| (d) | 2 | 2 | 1 |
20. A certain sample of element Z contains 60% of ^{69}Z and 40% of ^{71}Z . What is the relative atomic mass of element Z in this sample?
 (a) 69.2 (b) 69.8
 (c) 70.0 (d) 70.2
21. Compound A on strong heating in a boiling tube gives off reddish brown fumes and a yellow residue. When the aqueous sodium of A treated with a few drops of sodium hydroxide solution, a white precipitate appeared. Identify the cation and anion present in the compound A.

- (a) Copper (II) and nitrate
(b) Lead (II) and chloride
(c) Zinc and sulphate
(d) Lead (II) and nitrate
- 22.** A substance A reacts with another substance B to produce C and a gas D. If a mixture of the gas D and ammonia is passed through an aqueous solution of C, baking soda is formed. The substance A and B are
(a) HCl and NaOH
(b) HCl and Na_2CO_3
(c) Na and HCl
(d) Na_2CO_3 and H_2O
- 23.** A metal occurs in nature as its ore X which on heating in air converts to Y, Y reacts with unreacted X to give the metal. The metal is:
(a) Hg (b) Cu
(c) Zn (d) Fe
- 24. Assertion (A) :** Nitrate ores are rarely available.
Reason (R) : Bond dissociation energy of nitrogen is very high.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are correct but R is not the correct explanation of A.
(c) A is correct and R is false.
(d) Both A and R are false.
- 25.** The number of structural isomers of the compound having molecular formula $\text{C}_4\text{H}_9\text{Br}$ is
(a) 3 (b) 5
(c) 4 (d) 2
- 26.** The total number of electrons and the number of electrons involved in the formation of various bonds present in one molecule of propanal ($\text{C}_2\text{H}_5\text{CHO}$) are respectively.
(a) 32 and 20 (b) 24 and 20
(c) 24 and 18 (d) 32 and 18
- 27.** Consider following as a portion of the periodic table from Group No. 13 to 17. Which of the following statements is/are true about the elements shown in it?
- I. V, W, Y and Z are less electropositive than X.
II. V, W, X and Y are more electronegative than Z.
III. Atomic size of Y is greater than that of W.
IV. Atomic size of W is smaller than that of X.
- | | | | | |
|---|--|--|---|---|
| | | | V | Z |
| W | | | | Y |
| | | | | |
| X | | | | |
- (a) I, II and III (b) II and III
(c) I and IV (d) III and IV
- 28.** A man running with a uniform speed ' u ' on a straight road observes a stationary bus at a distance ' d ' ahead of him. At that instant, the bus starts with an acceleration ' a '. The condition that he would be able to catch the bus is
(a) $d \geq \frac{u^2}{a}$ (b) $d \geq \frac{u^2}{2a}$
(c) $d \geq \frac{u^2}{3a}$ (d) $d \geq \frac{u^2}{4a}$
- 29.** A ball is thrown vertically with a given velocity ' v ' such that it rises for T seconds ($T > 1$). What is the distance traversed by the ball during the last one second of ascent (in meters)? (Acceleration due to gravity is $g \text{ m/s}^2$.)
(a) $\frac{1}{2}gT^2$
(b) $vT + \frac{1}{2}g[T^2 - (T-1)^2]$
(c) $\frac{g}{2}$
(d) $\frac{1}{2}g[T^2 - (T-1)^2]$

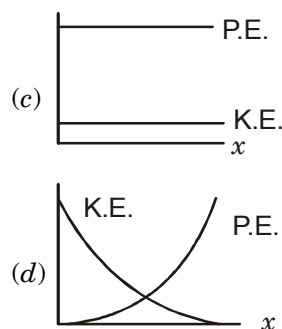
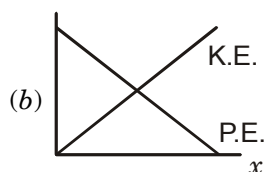
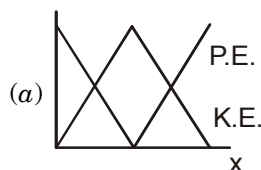
30. The radius of a planet A is twice that of planet B. The average density of the material of planet A is thrice that of planet B. The ratio between the values of acceleration due to gravity on the surface of planet A and that on the surface of planet B is

- (a) $\frac{2}{3}$ (b) $\frac{3}{2}$
(c) $\frac{4}{3}$ (d) 6

31. A small spherical ball of mass ' m ' is used as the bob of a pendulum. The work done by the force of tension on its displacement is W_1 . The same ball is made to roll on a frictionless table. The work done by the force of normal reaction is W_2 . Again the same ball is given a positive charge ' q ' and made to travel with a velocity ' v ' in a magnetic field B. The work done by the force experienced by the charge ball is W_3 . If the displacements in each case are the same, we have

- (a) $W_1 < W_2 < W_3$
(b) $W_1 > W_2 > W_3$
(c) $W_1 = W_2 = W_3$
(d) that W_1, W_2, W_3 cannot be related by any equation

32. The variation in the kinetic energy (K.E.) and the potential energy (P.E.) of a particle moving along the x -axis are shown in the graphs below. Which one of the following graphs violates the law of conservation of energy?



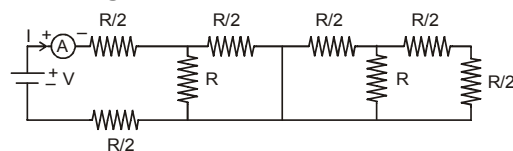
33. The disc of a siren containing 60 holes rotates at a constant speed of 360 rotations per minute. The emitted sound is in unison with a tuning fork of frequency

- (a) 270 Hz (b) 360 Hz
(c) 480 Hz (d) 540 Hz

34. A tuning fork is excited by striking it with a padded hammer. What would be the nature of the vibrations executed by the prongs as well as the stem of the fork respectively? (The reference direction is that of the propagation of the sound wave.)

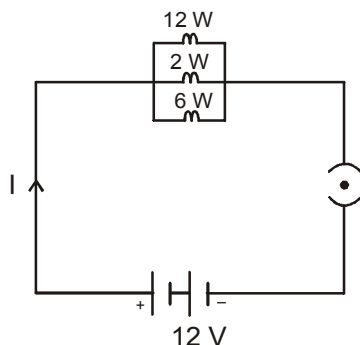
- (a) Both vibrate longitudinally
(b) Both vibrate transversely
(c) The prongs vibrate longitudinally whereas the stem vibrates transversely
(d) The prong vibrate transversely whereas the stem vibrates longitudinally

35. Find the reading of the ammeter in the circuit given below.

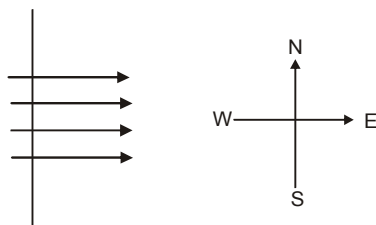


- (a) $\frac{V}{2R}$ (b) $\frac{3V}{4R}$
(c) $\frac{2V}{7R}$ (d) $\frac{11V}{R}$

36. Three bulbs with individual power ratings of 12 W, 2 W and 6 W respectively are connected as per the circuit diagram below. Find the amount of heat dissipated by each in 10 seconds.



- (a) 8 J, 1.33 J, 4 J
 (b) 120 J, 20 J, 60 J
 (c) 10 J, 0.277 J, 2.5 J
 (d) 12 J, 1.66 J, 5 J
37. Which of the following can produce a magnetic field?
- (a) Electric charges at rest
 (b) Electric charges in motion
 (c) Only by permanent magnets
 (d) Electric charges whether at rest or in motion
38. A wire is lying horizontally in the north-south direction and there is a horizontal magnetic field pointing towards the east. Some positive charges in the wire move north and an equal number of negative of the wire will be



- (a) east
 (b) down, into the page
 (c) up, out of the page
 (d) west

39. Match the following:

Phenomenon	Reason
(i) Rainbow	A. Scattering of light
(ii) Twinkling of stars	B. Dispersion of light
(iii) Blue colour of sky	C. Fluctuation of the refraction index in atmosphere layers
(iv) Advancement of sunrise and delay of sunset	D. Refraction of light

- (a) (i)-B, (ii)-D, (iii)-A, (iv)-C
 (b) (i)-B, (ii)-C, (iii)-A, (iv)-D
 (c) (i)-B, (ii)-A, (iii)-C, (iv)-D
 (d) (i)-D, (ii)-B, (iii)-A, (iv)-C
40. A person is suffering from both near sightedness and far sightedness. His spectacles would be made of
- (a) two convex lenses with the upper lens having a larger focal length than the lower lens.
 (b) two concave lenses with the upper lens having a smaller focal length than the lower lens.
 (c) a concave lens as the upper lens and a convex lens as the lower lens.
 (d) a convex lens as the upper lens and a concave lens as the lower lens.
41. LCM of two numbers x and y is 720 and the LCM of numbers $12x$ and $5y$ is also 720. The number y is
- (a) 180 (b) 144
 (c) 120 (d) 90
42. When a natural number x is divided by 5, the remainder is 2. When a natural number y is divided by 5, the remainder is 4. The remainder is z when $x + y$ is divided by 5.

The value of $\frac{2z-5}{3}$ is

- (a) -1 (b) 1
(c) -2 (d) 2

43. If the zeroes of the polynomial $64x^3 - 144x^2 + 92x - 15$ are in A.P, then the difference between the largest and the smallest zeroes of the polynomial is

- (a) 1 (b) $\frac{7}{8}$
(c) $\frac{3}{4}$ (d) $\frac{1}{2}$

44. x and y are two non-negative numbers such that $2x + y = 10$. The sum of the maximum and minimum values of $(x + y)$ is

- (a) 6 (b) 9
(c) 10 (d) 15

45. The number of integral solutions of the equation

$$7y - \frac{1}{y} = 2y^2 - \frac{1}{y^2} - 9$$
 is

- (a) 0 (b) 1
(c) 2 (d) 3

46. A circle with area $A \text{ cm}^2$ is contained in the interior of a larger circle with area $(A + B) \text{ cm}^2$ and the radius of the larger circle is 4 cm. If $A, B, A + B$ are in arithmetic progression, then the diameter (in cm) of the smaller circle is

- (a) $\frac{\sqrt{3}}{2}$
(b) $\frac{4\sqrt{3}}{3}$
(c) $\frac{8\sqrt{3}}{3}$
(d) $2\sqrt{3}$

47. Each of the sides of a triangle is 8cm less than the sum of its other two sides. Area of the triangle (in cm^2) is

- (a) 8 (b) $8\sqrt{3}$
(c) 16 (d) $16\sqrt{3}$

48. If $\operatorname{cosec} x - \cot x = \frac{1}{3}$, where $x > 0$, then

the value of $\cos^2 x - \sin^2 x$ is

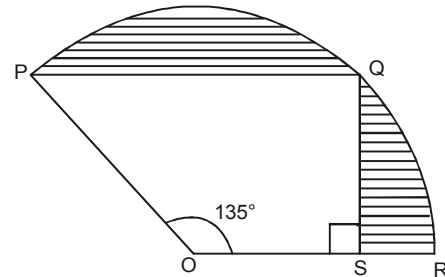
- (a) $\frac{16}{25}$ (b) $\frac{9}{25}$
(c) $\frac{8}{25}$ (d) $\frac{7}{25}$

49. A sector with acute central angle is cut from a circle of diameter 14cm. The area (in cm^2) of the circle circumscribing the sector is

- (a) $\frac{22}{7} \sec^2 \frac{\theta}{2}$ (b) $\frac{77}{2} \sec^2 \frac{\theta}{2}$
(c) $\frac{77}{2} \cos^2 \frac{\theta}{2}$ (d) $\frac{77}{2} \sec^2 \frac{\theta}{2}$

50. In the figure, PQSO is a trapezium in which $PQ \parallel OS$, $\angle POS = 135^\circ$ and

$\angle OQS = 90^\circ$. Points P, Q and R lie on a circle with centre O and radius 12cm. The area of the shaded part, in cm^2 , is



- (a) $61\frac{2}{7}$ (b) $61\frac{5}{7}$
(c) $73\frac{5}{7}$ (d) $73\frac{2}{7}$

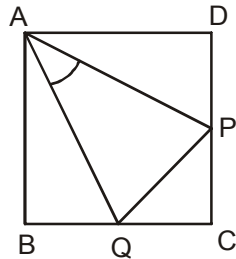
51. A solid sphere is cut into identical pieces by three mutually perpendicular planes passing through its centre. Increase in total surface area of all the pieces with respect to the total surface area of the original sphere is

- (a) 250% (b) 175%
(c) 150% (d) 125%

52. A right circular cylinder has its height equal to two times its radius. It is inscribed in a right circular cone having its diameter equal to 10cm and height 12cm, and the axes of both the cylinder and the cone coincide. Then, the volume (in cm^3) of the cylinder is approximately

(a) 107.5 (b) 118.6
(c) 127.5 (d) 128.7

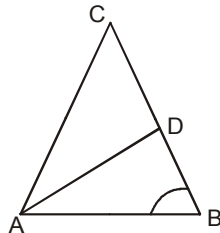
53. In the figure, ABCD is a square of side 1dm and $\angle PAQ = 45^\circ$. The perimeter (in dm) of the triangle PQC is.



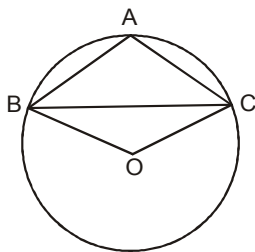
(a) 2 (b) $1 + \sqrt{2}$
(c) $2\sqrt{2} - 1$ (d) $1 + \sqrt{3}$

54. In the figure, ABC is a triangle in which AD bisects $\angle A$, $AC = BC$, $\angle B = 72^\circ$ and $CD = 1\text{cm}$. Length of BC (in cm) is

(a) 1
(b) $\frac{1}{2}$
(c) $\frac{\sqrt{5}-1}{2}$
(d) $\frac{\sqrt{3}-1}{2}$

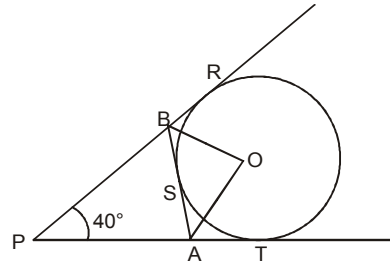


55. In the figure, BC is a chord of the circle with centre O and A is a point on the minor arc BC. Then, $\angle BAC + \angle OBC$ is equal to



(a) 30° (b) 60°
(c) 80° (d) 90°

56. In the figure, $\triangle APB$ is formed by three tangents to the circle with centre O. If $\angle APB = 40^\circ$, then the measure of $\angle BOA$ is



(a) 50° (b) 55°
(c) 60° (d) 70°

57. $(5, -10)$, $(-15, 15)$ and $(5, 5)$ are the coordinates of vertices A, B and C respectively of $\triangle ABC$ and P is a point on median AD such that $AP : PD = 2 : 3$. Ratio of the areas of the triangles PBC and ABC is

(a) $2 : 3$ (b) $3 : 4$
(c) $3 : 5$ (d) $4 : 5$

58. P is a point on the graph of $y = 5x + 3$. The coordinates of a point Q are $(3, -2)$. If M is the mid point of PQ, then M must lie on the line represented by

(a) $y = 5x + 1$ (b) $y = 5x - 7$
(c) $y = \frac{5}{2}x + \frac{7}{2}$ (d) $y = \frac{5}{2}x - \frac{1}{2}$

59. Three - digit numbers formed by using digits 0, 1, 2 and 5 (without repetition) are written on different slips with distinct number on each slip, and put in a bowl. One slip is drawn at random from the bowl. The probability that the slip bears a number divisible by 5 is

(a) $\frac{5}{9}$ (b) $\frac{4}{9}$
(c) $\frac{2}{3}$ (d) $\frac{1}{3}$

- 60.** The mean of fifteen different natural numbers is 13. The maximum value for the second largest of these numbers is
 (a) 46 (b) 51
 (c) 52 (d) 53
- 61. Assertion (A) :** During eighteenth century France witnessed the emergence of a middle class.
Reason (R) : The emergence of the middle class happened on account of royal patronage.
 (a) A is true, R is false.
 (b) A is false, R is true.
 (c) Both A and R are true but R is not the correct explanation of A.
 (d) Both A and R are true and R is the correct explanation of A.
- 62. Assertion (A) :** The lives of pastoralists in India underwent dramatic changes under colonial rule.
Reason (R) : In most areas the lands regularly used by pastoralists for grazing were taken over by the colonial state and given to select individuals for cultivation.
 (a) A is true, R is false.
 (b) A is false, R is true.
 (c) Both A and R are true but R is not the correct explanation of A.
 (d) Both A and R are true and R is the correct explanation of A.
- 63. Assertion (A) :** By the early twentieth century, America became the biggest supplier of wheat to Europe.
Reason (R) : The expansion of the railways during the period greatly facilitated the transport of grain.
 (a) A is true, R is false.
 (b) A is false, R is true.
 (c) Both A and R are true but R is not the correct explanation of A.
 (d) Both A and R are true and R is the correct explanation of A.
- 64.** Match the following table and choose the correct response from the options given thereafter.
- | Column-I | Column-II |
|----------|--|
| A. 1910 | I. Establishment of Tonkin Free School. |
| B. 1930 | II. Formation of French Indo-China. |
| C. 1907 | III. Completion of the trans-indo-China railnetwork. |
| D. 1887 | IV. Formation of the Vietnamese Communist Party. |
- (a) A-III, B-IV, C-I, D-II
 (b) A-IV, B-III, C-II, D-I
 (c) A-III, B-I, C-IV, D-II
 (d) A-IV, B-I, C-II, D-III
- 65.** Arrange the following Indian novels in accordance with their year of writing/publication
 1. Indulekha
 2. Rajasekhara Caritramu
 3. Yamuna Paryatan
 4. Pariksha-Guru
 (a) c, b, d, a
 (b) a, d, b, c
 (c) c, b, d, c
 (d) a, b, d, c
- 66.** The main tenets of *April Theses* during the Bolshevik Revolution were.
 (a) Closing the war, shifting of banks, land pooling by government.
 (b) Formation of labour government, bank nationalisation and land distribution.
 (c) Communist government, land fragmentation and merger of banks.
 (d) Ending the war, bank nationalisation and land transfer.

67. Mahatma Gandhi changed his dressing style from Western to Indian over a period of time. Match those changes as given in Column-I and Column-II and choose the correct response from the options given thereafter.

Column-I	Column-II
A. Suit	I. 1915
B. Lungi-Kurta	II. 1890
C. Peasant Dress	III. 1921
D. Short Dhoti	IV. 1913

Code :

A	B	C	D
(a) II	IV	I	III
(b) II	I	IV	III
(c) III	IV	I	II
(d) IV	III	I	II

68. In late 19th and early 20th centuries, nationalism captured the imagination of the Indian people through a variety of cultural processes. Which of the following was not a part of those processes?

- (a) Rewriting history to show India's continuous progress from the ancient to the modern times.
- (b) Creation of different images of Bharat Mata.
- (c) Recording, collection and publication of folk tales and folk songs.
- (d) Designing flags as inspiring symbols of nationalism.

69. Choose the correct response from the given options.

Nomadic people move over long distances because

- (a) By temperament they do not like to settle down in any one place.
- (b) They constantly look for good pastureland for their cattle.
- (c) They follow a life style which is very different from the settle communities.
- (d) Economically they are too poor to own land.

70. Choose the correct response from the given options.

In 19th century England grain production grew as quickly as the population because

- (a) Farmers used simple agricultural technology to greater effect.
- (b) Radical innovation were made in agricultural technology.
- (c) Larger and larger areas were brought under cultivation.
- (d) Increasing number of poor people found work as agricultural labourers.

71. Choose the correct response from the given options.

By the late 19th century Indians began searching for a national dress because they wanted to

- (a) Show that in terms of dress they were not inferior to the British.
- (b) Get rid of the blame of blindly aping the West.
- (c) Define the cultural identify of the nation.
- (d) Culturally synthesize the traditions of the East and the West.

72. Choose the correct response from the given options.

The unification of Germany in 1871, for a change, demonstrated

- (a) The triumph of the democratic aspirations of the German middle-class.
- (b) The fulfilment of the liberal initiative to nation-building.
- (c) The power of the common people, *das volk*.
- (d) The dominance of the state power and conservatives' success in mobilising nationalist sentiments.

- 73.** Choose the correct response from the given options.
The formation of the 'United Kingdom of Great Britain' in 1707 meant, in effect,
- Equal representation of all the British Isles in the British Parliament.
 - Recognition to the ethnic identities of the Welsh, the Scot and the Irish.
 - The cessation of conflicts between the Catholics and the Protestants.
 - The dominance of England on Scotland through the English supremacy in Parliament.
- 74.** Choose the correct response from the given options.
Many within the Congress were initially opposed to the idea of non-cooperation because
- They did not think that British rule in India would collapse if Indians refused to cooperate.
 - They were not yet sure of Gandhiji's ability to successfully lead a nationwide movement.
 - They were reluctant to boycott the council election scheduled for November 1920.
 - They did not agree with Gandhiji's proposal to carry the movement forward in stages.
- 75.** Choose the correct response from the given options.
The main reason why the Society of Revolutionary and Republican Women was set up during the French Revolution was because
- Women wanted laws that would help improve their lives.
 - Women wanted the same political rights as men
 - Women wanted their interests to be properly represented in the new government.
 - Women wanted access to education, training for jobs, and wages on par with men.
- 76. Assertion (A) :** The El Nino, a cold ocean current flows along the coast of Peru during Christmas.
Reason (R) : The presence of the El Nino leads to an increase in sea-surface temperatures and weakening of the trade winds in the region.
- Both A and R are true and R explains A.
 - Both A and R are true but R does not explain A.
 - A is true and R is false.
 - A is false and R is true.
- 77. Assertion (A) :** Air temperature decreases from the equator towards the poles.
Reason (R) : As one move from the sea level to higher altitudes, the atmosphere becomes less dense and temperature decreases.
- Both A and R are true and R explains A.
 - Both A and R are true but R does not explain A.
 - A is true and R is false.
 - A is false and R is true.
- 78.** Match List-I (local name of shifting cultivation) with List-II (States/Region) and select the correct answer using the code given below.
- | List-I
(local name of cultivation) | List-II
(States/
shifting
Region) |
|---|--|
| A. Dahiya | I. Jharkhand |
| B. Kumari | II. Madhya Pradesh |
| C. Bringa | III. Odisha |
| D. Kuruwa | IV. Western Ghats |
- Codes**
- | A | B | C | D |
|----------|----------|----------|----------|
| (a) III, | IV | II | I |
| (b) II | IV | III | I |
| (c) I | III | IV | II |
| (d) I | IV | III | II |

79. Assertion (A) : Most nuclear power stations in India have been constructed near sources of water

Reason (R) : Nuclear power stations require a 'great quantity of water for cooling purposes.

- (a) Both A and R are true and R explains A.
 (b) Both A and R are true but R does not explain A.
 (c) A is true and R is false.
 (d) A is false and R is true.

80. Assertion (A) : Peninsular rocks contain many reserves of coal, metallic minerals, mica and many other non-metallic minerals.

Reason (R) : Sedimentary rocks on the western and eastern flanks of the peninsula, in Gujrat and Assam have most of the ferrous minerals.

- (a) Both A and R are true and R explains A.
 (b) Both A and R are true but R does not explain A.
 (c) A is true and R is false.
 (d) A is false and R is true.

81. Which one of the following states has common borders with the least number of countries?

- (a) Uttrakhand (b) West Bangal
 (c) Arunachal Pradesh (d) Sikkim

82. Match List-I (Rivers) with List-II (National Waterways) and select the correct answer using the code given below:

List-I (Rivers)	List-II (National Waterways)
A. Ganga	I. National Waterway No. 4
B. Brahmaputra	II. National Waterway No. 1
C. Godavari and Krishna	III. National Waterway No. 5
D. Mahanadi and Brahmani	IV. National Waterway No. 2

Codes

A	B	C	D
(a) I	II	III	IV
(b) II	III	IV	I
(c) IV	III	II	I
(d) II	IV	I	III

83. Match List-I (Rivers) with List-II (Tributaries) and select the correct answer using the codes given below:

List-I (Rivers)	List-II (Tributaries)
A. Godavari	I. Lohit
B. Ganga	II. Koyana
C. Krishna	III. Wainganga
D. Brahmaputra	IV. Son

Codes

A	B	C	D
(a) II	III	IV	I
(b) II	I	III	IV
(c) III	IV	II	I
(d) I	III	IV	II

84. Arrange these hills/ranges from north to south direction

- I. Zaskar Range
 II. Shiwalik Range
 III. Karakoram Range
 IV. Ladakh Range

- (a) III, IV, I, II (b) III, I, IV, II
 (c) I, II, III, IV (d) IV, III, I, II

85. Match List-I (Rivers) with List-II (Origin) and select the correct answer using the codes given below:

List-I (Rivers)	List-II (Origin)
A. Godavari	I. Cardamom Hills
B. Krishna	II. Amarkantak Hills
C. Narmada	III. Nasik Hills
D. Vaigai	IV. Mahabaleshwar

Codes

A	B	C	D
(a) IV	III	I	II
(b) III	IV	II	I
(c) I	II	IV	III
(d) II	I	III	IV

86. Assertion (A) : In India, most migrations have been from rural to urban areas.

Reason (R) : The urban areas offer greater employment opportunities and better living conditions.

- (a) Both A and R are true and R explains A.
 (b) Both A and R are true but R does not explain A.
 (c) A is true and R is false.
 (d) A is false and R is true.

87. Arrange these hills from west to east direction.

- I. Khasi hills
 II. Garo hills
 III. Naga hills
 IV. Jaintia Range

- (a) III, I, II, IV (b) IV, II, I, III
 (c) I, II, III, IV (d) II, I, IV, III

88. Assertion (A) : The Earth does not receive an equal amount of solar energy at all latitudes.

Reason (R) : As one goes from low altitude to high altitude temperature decreases because atmosphere becomes less dense.

- (a) Both A and R are true and R explains A.
 (b) Both A and R are true but R does not explain A.
 (c) A is true and R is false.
 (d) A is false and R is true.

89. Match the vegetation zones in Column-I with the associated mean annual average temperature (in degree Celsius) in Column-II.

Column-I

- A. Tropical
 B. Sub-tropical
 C. Temperate
 D. Alpine

Column-II

- I. 17°C to 24°C
 II. Above 24°C
 III. 7°C to 17°C
 IV. Below 7°C

Codes

A B C D

- (a) II I III IV
 (b) II III IV I
 (c) II IV III I
 (d) IV II III I

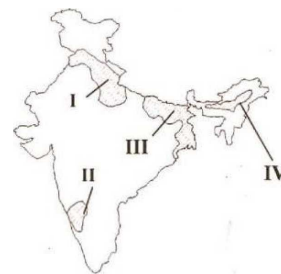
90. Match the given crops with their major producing areas shown on the map of India.

A. Wheat

B. Coffee

C. Rice

D. Tea



- (a) A-I, B-IV, C-III, D-II
 (b) A-I, B-II, C-III, D-IV
 (c) A-III, B-II, C-I, D-IV
 (d) A-IV, B-III, C-I, D-II

91. Which of the following statement/s is/are true about federal systems?

- I. All federations have a similar scheme of distribution of powers.
 II. The origins of different federations are dissimilar.
 III. Federalism promotes unity at the cost of diversity.
 IV. Federalism promotes unity in diversity.

- (a) Only II
 (b) I and III
 (c) II and IV
 (d) I, II and III

92. I do not contest elections, but I try to influence the political process. I have a specific policy agenda. I have no interest in seeking political power. Who am I?

- (a) Bureaucracy (b) Court
 (c) Pressure group (d) Media

- 93.** Which of the following statement/s is/are true?
- India is among the bottom group of nation in the world when it comes to the representation of women in legislatures.
 - Women in the Arab countries are most active in public life.
 - India has lesser representation of women in legislatures as compared to Sub-Saharan Africa.
 - The share of women in legislative assemblies in India is lower than that of their representation in Parliament.
- (a) I and II (b) II and III
(c) I, II and IV (d) I, III and IV
- 94.** Which of the following issues has been most successfully addressed by the Indian democracy?
- (a) Social inequality
(b) Economic inequality
(c) Political inequality
(d) Natural inequality
- 95.** Match List-I (Leaders) with List-II (Political parties) and select the answer using the codes given below.
- List-I**
- E.M.S. Namboodiripad
 - Sheikh Abdullah
 - N.T. Rama Rao
 - Kanshi Ram
- List-II**
- Bahujan Samaj Party
 - Telugu Desam
 - Communist Party of India (Marxist)
 - Jammu & Kashmir National Conference
- Codes**
- | | I | II | III | IV |
|-------|---|----|-----|----|
| (a) C | D | A | B | |
| (b) B | D | C | A | |
| (c) B | C | A | D | |
| (d) C | D | B | A | |
- 96.** Economic growth is growth in _____
- value of total output.
 - value of total investment.
 - value of industrial output.
 - value added of all sectors.
- 97.** Mahatma Gandhi National Rural Employment Guarantee Act aims at providing
- employment to rural people in government offices.
 - 200 days of work/year in rural areas.
 - 100 days of wage employment in a year to rural households.
 - 365 days work in rural areas.
- 98.** A landless worker in a village takes a kind loan of two bags of rice from the village landlord. The condition is that she will repay the loan in two and half bags of rice at the end of one year. The interest paid equals _____
- The difference between the money 'value of rice between now and at the end of the year.
 - 31.25 percent of the original amount of loan.
 - 25 percent of the original amount of loan.
 - The difference between the rates of interest charged by banks between now and at the end of the year.
- 99.** Non-market activity is _____
- a state of unemployment.
 - producing for self consumption.
 - selling the products nearby temples.
 - selling the products through the Regulated Market.
- 100.** A typical farmer's capital includes tractor, turbines, plough, seeds, fertilisers, pesticides and cash in hand. Which of these combination can be classified as working capital?
- Tractor, turbines and plough
 - Seeds, fertilisers, pesticides and cash in hand
 - Plough, seeds, fertilisers and pesticides
 - Plough, seeds, fertilisers, pesticides and cash in hand.

ANSWERS

MENTAL ABILITY TEST

1. (c) 2. (b) 3. (d) 4. (c) 5. (b) 6. (b) 7. (d) 8. (d) 9. (a) 10. (c)
 11. (b) 12. (c) 13. (c) 14. (c) 15. (a) 16. (a) 17. (a) 18. (c) 19. (a) 20. (b)
 21. (c) 22. (b) 23. (a) 24. (c) 25. (d) 26. (b) 27. (b) 28. (d) 29. (c) 30. (b)
 31. (b) 32. (b) 33. (b) 34. (b) 35. (c) 36. (b) 37. (d) 38. (b) 39. (c) 40. (d)
 41. (d) 42. (c) 43. (c) 44. (b) 45. (c) 46. (b) 47. (d) 48. (c) 49. (b) 50. (a)

ENGLISH LANGUAGE

1. (b) 2. (d) 3. (c) 4. (d) 5. (c) 6. (d) 7. (c) 8. (d) 9. (a) 10. (a)
 11. (b) 12. (a) 13. (d) 14. (d) 15. (d) 16. (c) 17. (d) 18. (a) 19. (a) 20. (c)
 21. (a) 22. (c) 23. (a) 24. (d) 25. (b) 26. (d) 27. (b) 28. (d) 29. (c) 30. (a)
 31. (d) 32. (a) 33. (a) 34. (c) 35. (c) 36. (b) 37. (d) 38. (a) 39. (b) 40. (c)
 41. (a) 42. (b) 43. (c) 44. (c) 45. (b) 46. (c) 47. (b) 48. (c) 49. (b) 50. (b)

SCHOLASTIC APTITUDE TEST

1. (c) 2. (a) 3. (b) 4. (d) 5. (b) 6. (b) 7. (a) 8. (d) 9. (c) 10. (a)
 11. (c) 12. (a) 13. (d) 14. (b) 15. (d) 16. (d) 17. (d) 18. (a) 19. (c) 20. (b)
 21. (d) 22. (b) 23. (a,b) 24. (b) 25. (c) 26. (a) 27. (c) 28. (b) 29. (c) 30. (d)
 31. (c) 32. (d) 33. (b) 34. (d) 35. (b)

36. Option (a) will be correct if rating of each bulb is 46.46V

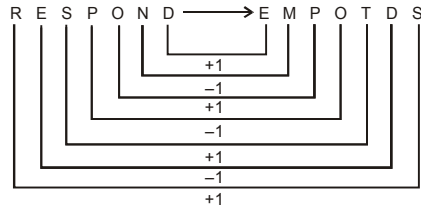
Option (b) will be correct if rating of each bulb is 12 V

37. (b) 38. (b) 39. (b) 40. (c)
 41. (b) 42. (a) 43. (a) 44. (d) 45. (b) 46. (c) 47. (d) 48. (d) 49. (d) 50. (b)
 51. (c) 52. (c) 53. (a) 54. (c) 55. (d) 56. (d) 57. (c) 58. (b) 59. (a) 60. (b)
 61. (a) 62. (d) 63. (d) 64. (a) 65. (a) 66. (d) 67. (a) 68. (a) 69. (b) 70. (c)
 71. (c) 72. (d) 73. (d) 74. (c) 75. (b) 76. (d) 77. (b) 78. (b) 79. (a) 80. (c)
 81. (a) 82. (d) 83. (c) 84. (a) 85. (b) 86. (a) 87. (d) 88. (b) 89. (a) 90. (b)
 91. (c) 92. (c) 93. (d) 94. (c) 95. (d) 96. (d) 97. (c) 98. (c) 99. (b) 100. (b)

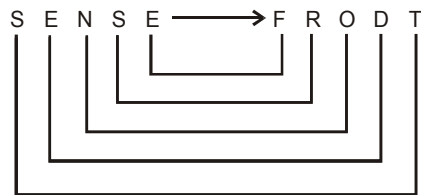
EXPLANATIONS

MENTAL ABILITY TEST

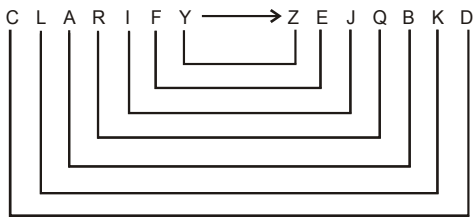
1.



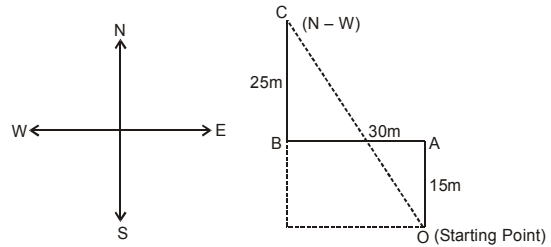
and



Similarly



2.

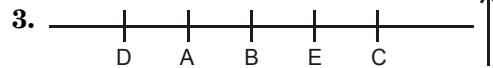


From the given figure.

$$\begin{aligned} CX &= BC + BX \\ &= (25 + 15)\text{m (Since } OA = BX) \\ &= 40 \text{ m} \end{aligned}$$

$$\begin{aligned} \therefore OC &= \sqrt{(CX)^2 + (OX)^2} = \sqrt{(40)^2 + (30)^2} \\ &= \sqrt{2500} = 50 \text{ m} \end{aligned}$$

Hence from starting point, Madhu is in north-west direction.



From the figure it is clear that D is third to the left of E.

4-8.

Department	A (M)	B (M)	C (M)	E (M)	F (M)	G (M)	H (M)
Administration					✓	✓	
Account	✓	✓					✓
Operations							

Salaries of 7 employees are

$$G > H > A > F, B, E > C$$

4. From the above statement it is clear that GCH is a group of females.
5. The department in which three people work is Accountants.
6. According to statement it is clear that the position of A from the top when they are arranged in descending order of their income is third.

7. From the given statement it is not clear that B works in any of the departments.
8. According to statement it is clear that B earns less than A and H.

14.
$$\frac{54}{32} = (5 + 4) - (3 + 2) = 4$$

$$\frac{36}{42} = (3 + 6) - (4 + 2) = 3$$

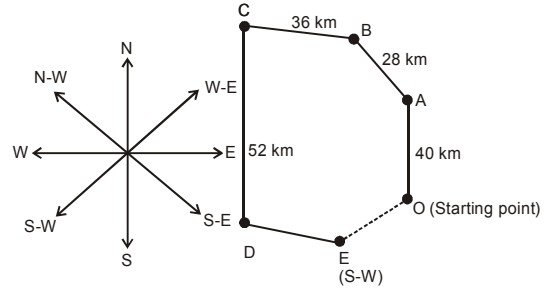
$$\frac{92}{22} = (9 + 2) - (2 + 2) = 7$$

Similarly

$$\frac{28}{33} = (2 + 8) - (3 + 3) = 4$$

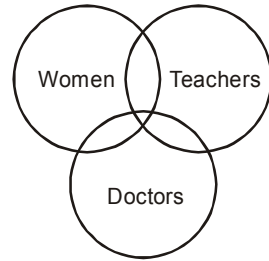
15. po Ki top ma → Usha is playing cards
kop ja ki ma → Asha is playing tennis
ki top sop ho → they are playing football
po sur kop → cards and tennis
So, the code language for Asha is 'Ja'.

16.



Hence the shift had finally drifted in South-West direction.

17.



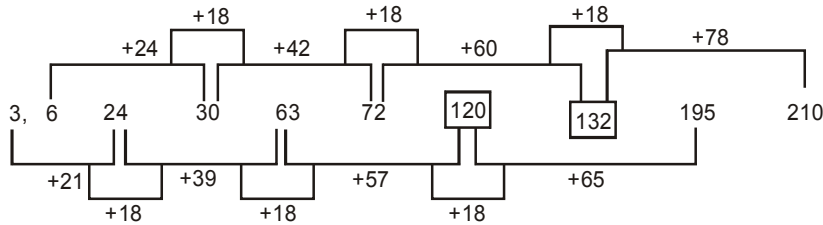
19.

$$(11)^2 - (9)^2 = 121 - 81 = 40$$

$$(15)^2 - (7)^2 = 225 - 49 = 176$$

$$(25)^2 - (21)^2 = 625 - 441 = \boxed{184}$$

20.



23. $c \boxed{a} b / b a \boxed{c} / c a b / \boxed{b} a c / \boxed{b} a c / \boxed{c} a b / \boxed{b} a c$

24. Average speed of a boat

$$= \frac{2.5}{\frac{1}{1} + \frac{1}{2} + \frac{0.5}{4}} \text{ km/h}$$

$$= \frac{2.5}{1 + 0.5 + \frac{1}{8}} = \frac{2.5}{1.5 + 0.125}$$

$$= \frac{2.5}{1.625} \text{ km/h}$$

26. Total amount of (A + B + C) = ₹ 1000

According to equation

$$2A = 500$$

$$A = ₹ 250$$

and $\frac{c}{2} = 250$

$$\therefore c = ₹ 500$$

So, the amount is given to B

$$= 1000 - (250 + 500)$$

$$= \text{Rs. } 250$$

27. According to question

$$5e + 75 + 9p = 100 \quad \dots(i)$$

$$\text{and } 2e + 65 + 10p = 80 \quad \dots(ii)$$

Here e = eraser
 s = sharpener
 p = pencil

Equation (i) $\times 2 -$ (ii)

$$8e + 85 + 8p = 120$$

$$\therefore e + s + p = 15$$

So, the total cost of one eraser, one sharpener and one pencil is ₹ 15.

29. Stimulant is related to activity similarly symptom is related to disease

30. $6 \times 3 - 4 \times 2 = 10$

$$9 \times 5 - 5 \times 3 = 30$$

$$6 \times 5 - 5 \times 2 = \boxed{20}$$

31. $[(7)^2 - \{(4)^2 + (3)^2\}] \div 2 = 12$

$$[(4)^2 + \{(3)^2 + (1)^2\}] \div 2 = 3$$

$$[(7)^2 + \{(5)^2 + (2)^2\}] \div 2 = \boxed{10}$$

32. $P \rightarrow 3 + 8 = 11$ (Position of alphabets start from Z)

$$G \rightarrow 11 + 9 = 20$$

$$U \rightarrow 2 + 4 = 6$$

$$W \rightarrow 3 + 1 = 4$$

Similarly

$$\boxed{B} \rightarrow 7 + 18 = 25 \text{ (Position of alphabets start from Z)}$$

37.

	Row - 1	Row - 2
Column- 1	A	D
Column- 2	B	E
Column-3	C	F

38. $(A + B) > C + D \quad \dots(i)$

$$A + C = B + D \quad \dots(ii)$$

$$A = \frac{1}{2} (B + D) \quad \dots(iii)$$

$$\therefore B + D = 2A$$

From equation (ii)

$$A + C = 2A$$

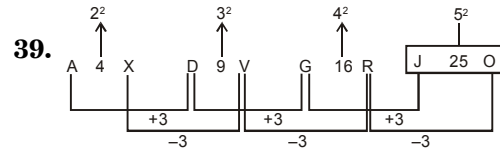
$$\therefore C = A$$

From equation (i)

$$\therefore B > D \text{ (Since } C = A)$$

$$\therefore \text{So, we have } B > D > C = A$$

Hence the income of B is the highest.



40.

	Rohit	Kunal	Ashish	Ramesh
Class	IV	IV	V	VI
Far	k	—	k	k
Near	—	k	—	—
Subject M (good)	—	—	M,H, S.S Sc.	—
Subject — (weak)	—	M	—	M, H, SS, Sc

Here

M = Mathematics

H = Hindi

S.S. = Social Science

Sc. = Science

So, the boy who is good at all the subject is 'Ashish'.

42. Let first, second and third pipe be A, B & C.

According to question,

$$B = A - 5 \quad \dots(i)$$

$$B = C + 4 \quad \dots(ii)$$

Let the time required by the first pipe to fill the tank be x hr

From equation (i)

$$B = x - 5$$

From equation (ii)

$$c = x - 9$$

Again According to question

$$\frac{1}{A} + \frac{1}{B} = \frac{1}{C}$$

$$\frac{1}{x} + \frac{1}{x-5} = \frac{1}{x-9}$$

$$\frac{x-5+x}{x(x-5)} = \frac{1}{x-9}$$

$$(2x-5)(x-9) = x(x-5)$$

$$x^2 - 18x + 45 = 0$$

$$x^2 - 15x - 3x + 45 = 0$$

$$x(x - 15) - 3(x - 15) = 0$$

$$x = 3 = 0$$

∴ $x = 3$ is not possible

$$∴ x - 15 = 0$$

$$∴ x = 15$$

So, the time required by the first pipe to fill the tank is 15 hours.

44. No. of hours between 1 pm on Wednesday and 1 am on Friday = 60 hr.

Total change of time when minutes hand is slow and fast = 3 minutes

$$\text{Now correct time} = \frac{60}{3} = 20 \text{ hr}$$

So after 20 hours i.e. 1 pm on Tuesday the time will be 9.00 am on Wednesday.

45-47.

$$\begin{array}{cccccccc} T & E & N & N & I & S & \% & \neq & \$ & @ & \$ & \& \\ 7 & 2 & 1 & 1 & 4 & 8 & 4 & 2 & 1 & 7 & 1 & 8 \end{array}$$

$$\begin{array}{cccccccc} T & R & U & E & @ & + & \neq & * \\ 7 & 3 & 9 & 2 & = & 7 & 9 & 2 & 3 \end{array}$$

50. $\begin{array}{cccccccccccc} B & R & E & A & K & T & H & R & O & U & G & H \\ 7 & 8 & 1 & 2 & 11 & 12 & 5 & 6 & 3 & 4 & 9 & 10 \end{array} \longrightarrow \begin{array}{cccccccccccc} E & A & O & U & H & R & B & R & G & H & K & T \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 \end{array}$

Similarly

$$\begin{array}{cccccccccccc} D & I & S & T & R & I & B & U & T & I & O & N \\ 7 & 8 & 1 & 2 & 11 & 12 & 5 & 6 & 3 & 4 & 9 & 10 \end{array} \longrightarrow \begin{array}{cccccccccccc} S & T & T & I & B & U & D & I & O & N & R & I \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 \end{array}$$

ENGLISH LANGUAGE

1. According to the passage genes helps to protect the crops from insect bites and option (b), explains the same statement.
2. The statement "loudest public food fight" explains that people are raising voice against this action and option (d) says the same thing that there is a strong protest against GMOs.
3. There are people who support the activity of GMO and say that it brings the price down as per the passage and statement 3 agrees with it.
4. GMOs are pesticide and can also affect the crop and bring hazard to health. The statement 4 explains the same.
5. Organic foods are pesticides free and are grown free from GMOS as explained in the sentence 3.
6. The writer of the passage has explained both the positive and the negative side of the technology; option (d) is the correct answer as it says the same thing.

$$\begin{array}{cccccccc} P & R & I & M & E & * & = & ? & \neq & \% \\ 5 & 3 & 4 & 6 & 2 & = & 3 & 6 & 5 & 2 & 4 \\ S & P & I & N & E & \neq & \$ & \% & ? & \& \\ 8 & 5 & 4 & 1 & 2 & = & 2 & 1 & 4 & 5 & 8 \end{array}$$

45. $\begin{array}{cccc} M & I & N & T \\ \downarrow & \downarrow & \downarrow & \downarrow \\ = & \% & \$ & @ \end{array}$

46. $\begin{array}{cccc} R & I & N & S & E \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ * & \% & \$ & \& \neq \end{array}$

47. $\begin{array}{ccccccc} I & N & T & E & R & E & S & T \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ \% & \$ & @ & \neq & * & \neq & \& @ \end{array}$

48. No. of tourist have visited at least two states = $24 + 8 + 10 + 12 = 54$

49. No. of tourist that have visited only two states = $12 + 10 + 8 + 20 = 50$

7. By the statement "the golden age of answers" writers explain the benefits and extra advantages of the technology like pop-ups ads to provide information.
8. As per the passage, the technology also takes something in return of benefits and one of the negative thing is one has to surrender his/her privacy while using these technologies, hence option (d) is the correct answer.
9. According to the passage, revolution has brought many radical changes to our lives, hence option (a) is correct answer.
10. Sometimes author says good things about the technology and sometimes bad, there is confusion in his thoughts, so option (a) is the correct answer.
11. The old man Surti is very much concerned about the wastage of water. Hence he always checks who all people are doing this and try to stop it. So, option (b) is correct answer.
12. Surti is a well-educated, national award winning author, he does things very carefully and used to help people with the plumber for their water related problems and people trusted him for this.
13. Middle-class families are only bothered when they don't get water; if they are getting it they are not concerned about the wastage at all. So, lack of concern is the correct answer.
14. By saving water and educating people about its importance is a significant work done by the author Surti.
15. Spurred into action is a phrase which means encouraging someone to act.
20. The journey of bus is going up and down and roller-coaster is a ride that goes ups and down which gives the same experience as that of bus.
21. The production of Ambassador Car is stopped so the word Obsolete is appropriate in the sentence as it means vanished; something is completely replaced by something new.
22. In this sentence, there is a discussion about report which is to be discussed tomorrow, and the word "Tabled" means to formally present something at meeting or seminar.
23. In this sentence, speaker is asking to try something difficult and the word "Shot" means to try something in which there are less chances to succeed.
24. Grandfather is the eldest and the one who takes all the decisions, so the noun "Authority" which means a power to influence or command thought is the most appropriate.
25. The word Weary is an adjective which means exhausted in strength describes the status of the Rashmi.
26. Permission is a noun which means formal consent and in this sentence tax offender needs consent to do any action.
27. Movement is a noun which means the act of moving and in this sentence it is most appropriate word as it describes the action of the driver.
28. Question mark is used here as a phrase defining about the bad situation of the company's future.
29. The coffee room is divided into two different sections and the word "Segregated" is an adjective and it means set apart or separated from others of the same kind or group.
36. The pronoun "these" is correct in this blank as here we are talking the laddu that already discussed in the passage.
37. The word saturated takes the preposition "with", so option (d) is the correct answer.
38. The adjective "edible" defines the quality of camphor.
39. The preposition "to" is the only correct option for this blank.
40. The adjective "eager" means desperate or great desire for something and here in this sentence it defines the devotees.
41. Laddu is a dish there and hence option (a) is correct.

42. The laddu got famous and earned fame all over the world for its taste and aroma; hence option (b) fame is the correct word.
43. To keep its uniqueness safe, the temple has taken its patent which is a legal right to stop any imitation. Hence option (c) is the correct answer.
48. Undertake means to take upon oneself the responsibility and option (c) Refuse is opposite to it which means to decline to accept.
49. Hefty means heavy in weight and light is not having much weight.
50. Miniature means a greatly reduced and massive is big in quantity.

SCHOLASTIC APTITUDE TEST

42. When a natural number x is divided by '5', the remainder is 2

$$\therefore x = 5P + 2 \quad \dots (i)$$

When a natural number y is divided by '5' the remainder is 4

$$\therefore y = 5Q + 4 \quad \dots (ii)$$

When $x + y$ is divided by '5', the remainder is z

Adding Eq. (i) and (ii), we get

$$x + y = 5(P + Q) + 6$$

Now when $x + y$ is divided by '5' remainder will be 1

$$\therefore z = 1$$

Hence the value of $\frac{2z-5}{3}$

$$= \frac{2(1)-5}{3} = -1$$

43. As the degree of given polynomial is '3', hence it will have three zeroes

Let α, β, γ be the zeroes of the given polynomial

Now α, β, γ are in A.P.

$$\therefore \text{Let } \alpha = a - d, \beta = a \text{ and } \gamma = a + d$$

$$\text{Now } \alpha + \beta + \gamma = \frac{144}{64}$$

$$\therefore 3a = \frac{144}{64}$$

$$\therefore a = \frac{144}{64 \times 3} = \frac{3}{4}$$

$$\text{and } \alpha \beta \gamma = \frac{15}{64}$$

$$\therefore (a-d)(a)(a+d) = \frac{15}{64}$$

$$\therefore a(a^2 - d^2) = \frac{15}{64}$$

$$\therefore \frac{3}{4} \left(\frac{9}{16} - d^2 \right) = \frac{15}{64}$$

$$\therefore \frac{9}{16} - d^2 = \frac{5}{16}$$

$$\therefore d^2 = \frac{9}{16} - \frac{5}{16} = \frac{4}{16}$$

$$\therefore d^2 = \frac{1}{4}$$

$$\therefore d = \pm \frac{1}{2}$$

Now difference between largest and smallest zeroes of polynomial

$$= (a + d) - (a - d)$$

$$= 2d = 2 \left(\frac{1}{2} \right)$$

($\therefore$ In option all the values are +ve)

$$= 1$$

$\therefore$ Option (a) is correct

44. The given equation is

$$2x + y = 10$$

$$\therefore x + (x + y) = 10$$

Now $x + y$ is maximum when $x = 0$

$\therefore$ The maximum value of $x + y$ is 10.

$$\text{Now } 2x + y = 10$$

$$\therefore 2(x + y) - y = 10$$

Now $x + y$ is minimum when

$$y = 0$$

$\therefore$ The minimum value of $x + y$ is

$$\frac{10}{2} = 5$$

$\therefore$ The sum of maximum and minimum values of $(x + y)$

$$= 10 + 5 = 15$$

$\therefore$ Option (d) is correct

45. The given equation is

$$7\left(y + \frac{1}{y}\right) - 2\left(y^2 + \frac{1}{y^2}\right) = 9$$

Let $y + \frac{1}{y} = m$... (i)

Now squaring both side, we get

$$y^2 + \frac{1}{y^2} + 2 = m^2$$

$$\therefore y^2 + \frac{1}{y^2} = m^2 - 2 \quad \dots (ii)$$

Now putting the value of equation (i) and (ii) in original equation

$$7\left(y + \frac{1}{y}\right) - 2\left(y^2 + \frac{1}{y^2}\right) = 9$$

$$7m - 2(m^2 - 2) = 9$$

$$\therefore 7m - 2m^2 + 4 = 9$$

$$\therefore 2m^2 - 7m - 4 + 9 = 0$$

$$\therefore 2m^2 - 7m + 5 = 0$$

$$\therefore 2m^2 - 5m - 2m + 5 = 0$$

$$\therefore m(2m - 5) - 1(2m - 5) = 0$$

$$\therefore (m - 1)(2m - 5) = 0$$

$$\therefore m = 1 \quad \text{or} \quad m = \frac{5}{2}$$

Now $y + \frac{1}{y} = m = 1$ is not possible as the value of $y + \frac{1}{y}$ will be always greater than 1.

$$\therefore y + \frac{1}{y} = \frac{5}{2}$$

$$\therefore y^2 + 1 = \frac{5}{2}y$$

$$\therefore y^2 - \frac{5}{2}y + 1 = 0$$

$$\therefore 2y^2 - 5y + 2 = 0$$

$$\therefore 2y^2 - 4y - y + 2 = 0$$

$$\therefore 2y(y - 2) - 1(y - 2) = 0$$

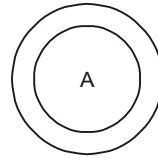
$$\therefore (2y - 1)(y - 2) = 0$$

$$\therefore y = \frac{1}{2} \quad \text{or} \quad y = 2$$

Hence number of integral solution is 1.

$\therefore$ Option (b) is correct

46.



According to question

A, B and A + B are in A.P.

$$\therefore 2B = A + A + B$$

$$\therefore B = 2A$$

$$\therefore \text{Area of bigger circle} = A + B = 3A$$

$$\therefore \pi R^2 = 3A$$

$$\therefore \pi(4)^2 = 3A$$

$$\therefore A = \frac{16\pi}{3}$$

Now A is the area of smaller circle.

$$\therefore A = \pi r^2$$

$$\therefore \frac{16\pi}{3} = \pi r^2$$

$$\therefore \frac{16}{3} = r^2$$

$$\therefore r = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$$

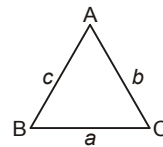
$\therefore$ Option (b) is correct

47. According to question

$$a = b + c - 8 \quad \dots (i)$$

$$b = a + c - 8 \quad \dots (ii)$$

$$c = a + b - 8 \quad \dots (iii)$$



Solving equation (i), (ii) and (iii), we get

$$a = b = c = 8$$

$\therefore$ The given triangle is equilateral triangle

$\therefore$ Area of equilateral triangle

$$= \frac{\sqrt{3}}{4}(\text{side})^2 = \frac{\sqrt{3}}{4}(8)^2 = 16\sqrt{3}$$

$\therefore$ Option (d) is correct.

$$48. \quad \operatorname{cosec} x - \cot x = \frac{1}{3}$$

$$\therefore \frac{1}{\sin x} - \frac{\cos x}{\sin x} = \frac{1}{3}$$

$$\therefore \frac{1 - \cos x}{\sin x} = \frac{1}{3}$$

$$\therefore 3 - 3 \cos x = \sin x$$

Now squaring on both side, we get

$$9 + 9 \cos^2 x - 18 \cos x = \sin^2 x$$

$$9 \cos^2 x - 18 \cos x + 9 = 1 - \cos^2 x$$

$$\therefore 10 \cos^2 x - 18 \cos x + 8 = 0$$

$$\therefore 5 \cos^2 x - 9 \cos x + 4 = 0$$

$$\therefore 5 \cos^2 x - 5 \cos x - 4 \cos x + 4 = 0$$

$$\therefore 5 \cos x (\cos x - 1) - 4 (\cos x - 1) = 0$$

$$\therefore (5 \cos x - 4) (\cos x - 1) = 0$$

$$\therefore \cos x = \frac{4}{5} \quad \text{or} \quad \cos x = 1$$

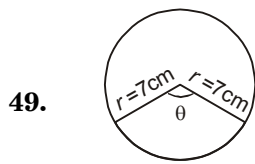
$$\text{Now for } \cos x = \frac{4}{5}, \sin^2 x = 1 - \cos^2 x$$

$$= 1 - \frac{16}{25} = \frac{9}{25}$$

$$\therefore \cos^2 x - \sin^2 x = \frac{16}{25} - \frac{9}{25} = \frac{7}{25}$$

and for $\cos x = 1$ (which is not possible as $\cos x = 1$ for $x = 0$)

Hence option (d) is correct.



$$\Delta = \frac{abc}{4R}$$

$$\therefore R = \frac{abc}{4\Delta}$$

$$= \frac{2 \times 7 \times 7 \times 14 \sin\left(\frac{\theta}{2}\right)}{4 \times 49 \sin \theta}$$

$$= \frac{7 \sin\left(\frac{\theta}{2}\right)}{2 \sin\left(\frac{\theta}{2}\right) \cos\left(\frac{\theta}{2}\right)}$$

$$= \frac{7}{2} \sec\left(\frac{\theta}{2}\right)$$

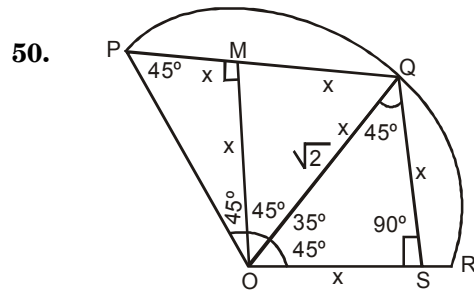
Now, area of circle = πR^2

$$= \frac{22}{7} \times \left[\frac{7}{2} \sec\left(\frac{\theta}{2}\right) \right]^2$$

$$= \frac{22}{7} \times \frac{49}{4} \sec^2\left(\frac{\theta}{2}\right)$$

$$= \frac{77}{2} \sec^2\left(\frac{\theta}{2}\right)$$

$\therefore$ Option (d) is correct.



As

$PQ \parallel QS$

$$\Rightarrow \angle POS + \angle MPO = 180^\circ$$

$$\Rightarrow 35^\circ + \angle P = 180^\circ$$

$$\therefore \angle P = 45^\circ$$

Now, Radius = 12 cm

$$\therefore \sqrt{2}x = 12$$

$$\therefore x = 6\sqrt{2} \text{ cm}$$

$\therefore$ Area of shaded portion

$$= \frac{135^\circ}{360} \times \pi (12)^2 - \text{Area of trapezium}$$

$$= \frac{135^\circ}{360} \times \pi \times 144 - \frac{1}{2} \times (2x + x) \times x$$

$$= \frac{135^\circ}{360} \times \frac{22}{7} \times 144 - \frac{1}{2} \times 3x^2$$

$$= \frac{135^\circ}{360^\circ} \times \frac{22}{7} \times 144 - \frac{1}{2} \times 3 \times 72$$

$$= \frac{1188}{7} - 108 = \frac{432}{7} = 61\frac{5}{7}$$

$\therefore$ Option (b) is correct.

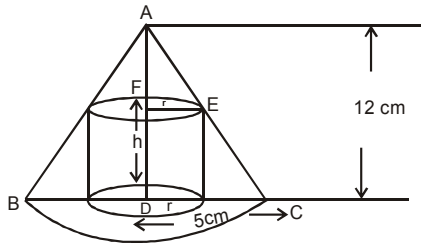
51. Percent change in total surface area

$$= \left[\frac{6\pi r^2}{4\pi r^2} \times 100 \right] \%$$

$$= \left[\frac{3}{2} \times 100 \right] \% = 150\%$$

∴ Option (c) is correct.

52.



$$h = 2r \text{ (given)}$$

$$\triangle AFE \sim \triangle ADC$$

$$\therefore \frac{12 - 2r}{r} = \frac{12}{5}$$

$$\therefore r = \frac{30}{11} \text{ cm}$$

Now,

$$\text{volume of cylinder} = \pi r^2 h$$

$$= \frac{22}{7} \times \left(\frac{30}{11} \right)^2 \times \left(2 \times \frac{30}{11} \right)$$

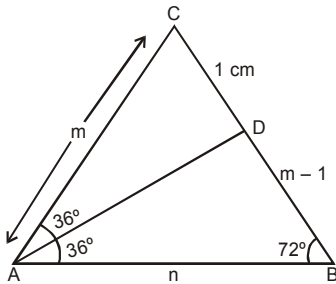
$$(\because h = 2r)$$

$$= \frac{22}{7} \times \frac{900}{121} \times \frac{2 \times 30}{11}$$

$$= 127.50$$

∴ Option (c) is correct.

54.



$$\frac{m}{n} = \frac{1}{m-1}$$

$$\therefore m^2 - 1 = n$$

Now from cosine rule :

$$\cos 72^\circ = \frac{m^2 + n^2 - m^2}{2mn}$$

$$\therefore \cos 72^\circ = \frac{n}{2m}$$

$$\therefore n = 2m \cos 72^\circ$$

$$\therefore m^2 - m = 2m \cos 72^\circ$$

$$(\because n = m^2 - m)$$

$$\therefore m^2 - 2m \cos 72^\circ - m = 0$$

$$\therefore m^2 = m(2 \cos 72^\circ + 1)$$

$$\therefore m = 2 \cos 72^\circ + 1$$

$$\therefore m = 2 \left(\frac{\sqrt{5} - 1}{4} \right) + 1$$

$$\left(\because \cos 72^\circ = \frac{\sqrt{5} - 1}{4} \right)$$

$$= \frac{\sqrt{5} - 1}{2} + 1 = \frac{\sqrt{5} - 1 + 2}{2}$$

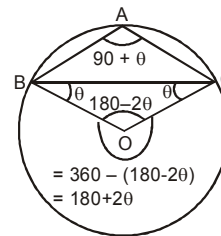
$$= \frac{1 + \sqrt{5}}{2}$$

$$\text{Now } BD = m - 1$$

$$= \frac{1 + \sqrt{5}}{2} - 1 = \frac{\sqrt{5} - 1}{2}$$

∴ Option (c) is correct.

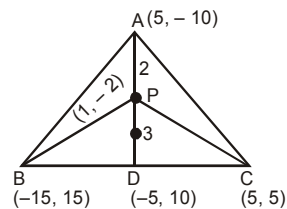
55.



$$\text{Now, } \angle BAC - \angle OBC$$

$$= (90^\circ + \theta) - (\theta) = 90^\circ$$

57. D is midpoint of BC



The coordinate of

$$D = \left(\frac{-15+5}{2}, \frac{15+5}{2} \right) \\ = (-5, 10)$$

Now, $A \xrightarrow{2} P \xrightarrow{3} D$
 $(5, 10) \quad (x, y) \quad (-5, 10)$

$$\therefore P(x, y) = \left[\frac{2(-5)+3(5)}{5}, \frac{2(10)+3(-10)}{5} \right] \\ = (1, -2)$$

Now area of $\triangle PBC$

$$= \frac{1}{2} \begin{vmatrix} 1 & -2 & 1 \\ -15 & 15 & 1 \\ 5 & 5 & 1 \end{vmatrix} \\ = \frac{1}{2} [1(15-5) + 2(-15-5) + 1(-75-75)] \\ = \frac{1}{2} [10 - 40 - 150] \\ = \frac{1}{2} [-180] = |-90| = 90$$

and

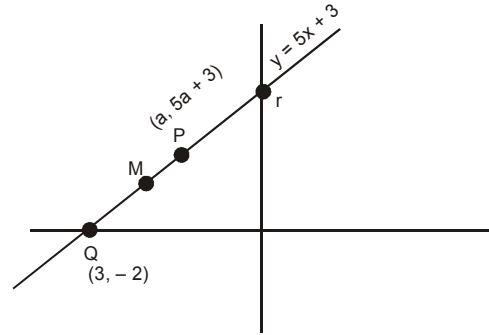
$$\text{area of } \triangle ABC = \frac{1}{2} \begin{vmatrix} 5 & -10 & 1 \\ -15 & 15 & 1 \\ 5 & 5 & 1 \end{vmatrix} \\ = \frac{1}{2} [5(15-5) + 10(-15-5) + 1(-75-75)] \\ = \frac{1}{2} [50 - 200 - 150] = \frac{1}{2} [-300] \\ = (-150) = 150$$

Now ratio, of area of $\triangle PBC$ and $\triangle ABC$

$$= \frac{90}{150} = \frac{3}{5}$$

$\therefore$ Option (c) is correct.

58.



The coordinate of M = $\left(\frac{a+3}{2}, \frac{5a+1}{2} \right)$

From option (1), $y = 5x + 1$

$$\frac{5a+1}{2} = 5\left(\frac{a+3}{2}\right) + 1$$

$$\frac{5a+1}{2} \neq \frac{5a+15+2}{2}$$

$\therefore$ Option (a) is not correct.

From option (b),

$$y = 5x - 7$$

$$\frac{5a+1}{2} = 5\frac{(a+3)}{2} - 7$$

$$= \frac{5a+15-14}{2}$$

$$\frac{5a+1}{2} = \frac{5a+1}{2}$$

Hence M must lie on the line represented by $y = 5x - 7$

$\therefore$ Option (b) is correct.

59. Three digit = $3 \times 3 \times 2 = 18$

$$\text{Divisible by } 5 = (2 \times 2 \times 1) + (3 \times 2) = 10$$

$$\therefore \text{ Required probability} = \frac{10}{18} = \frac{5}{9}$$

60. $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + x + y = 13 \times 15$

$$\therefore x + y = 104$$

Now by seeing option

$$51 + 53 = 104$$

$\therefore$ Second largest number is 51.

$\therefore$ Option (b) is correct

NTSE - 2014

NATIONAL LEVEL

PART I : MENTAL ABILITY TEST

1. Select the correct number that is missing in the number series given below :

214, 265, 367, ?, 724

- (a) 520 (b) 501
(c) 525 (d) 571

2. Select the correct alphabet number that is missing in the alphabet number series given below :

NAJ31, BEF28, RAM31, ?, YAM31

- (a) RPA31 (b) PRA30
(c) RPA30 (d) PAR31

3. P + Q mean P is the father of Q; P - Q means P is the wife of Q; P × Q means P is the brother of Q. Which of the following means A is the maternal uncle of D ?

- (a) $A \times B - C + D$ (b) $D \times C - B \times A$
(c) $A \times C + B - D$ (d) $A - C \times B + D$

4. Select from the alternative two signs which need to be interchanged to make the following equation correct

$$36 \div 12 \times 6 + 9 - 6 = 38$$

- (a) - and $\times$ (b) $\div$ and $\times$
(c) - and + (d) $\div$ and +

5. According to a certain code, '=' means '>', '-' means '+', '+' means '-'. If a, b and c are positive integers and $a = b = c$, then which of the following are true ?

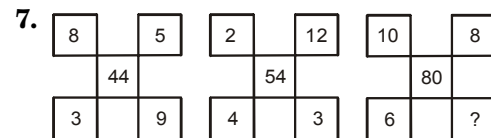
- (a) $b = a + c$ (b) $ac = b^2$
(c) $a - c = 2b$ (d) $ab = c^2$

6. Find the correct group of letters in place of '?' in the following series.

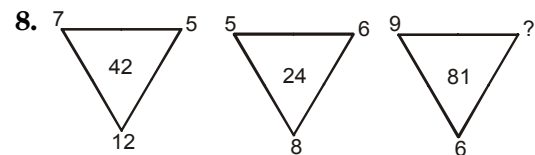
FNHLJ, WOUQS, BNEKH, ?, DTHPL

- (a) NBKEH (b) NVPTR
(c) NFLHJ (d) NDRZV

Directions (Q. 7 – 8) : Each of the following questions contains three figures in which numbers are written according to a pattern. Find the missing number for each question from among the alternatives.



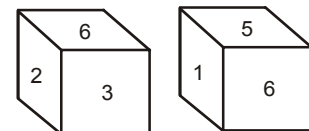
- (a) 13 (b) 14
(c) 12 (d) 18



- (a) 14 (b) 16
(c) 15 (d) 11

9. Two faces of a cube are given below. Which number will be opposite 3 ?

- (a) 1
(b) 5
(c) 4
(d) 2



Directions (Q. 10 – 11) : Each of the following questions has a problem followed by a few numbered statements. Decide which of the statements are sufficient for answering the problem and choose your answer from the alternative

10. A, B and C together can complete a work in 'x' days. How many days would B alone take to complete the work ?

Statements :

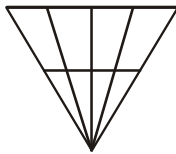
- I. C can complete the work in half the number of days taken by A
II. B can complete the work in half the number of days taken by A and C together

III. A and C taken together can complete the work in 'z' days

- (a) Both I and II are required
 (b) I alone is sufficient
 (c) II and III taken together are sufficient
 (d) Either II or III is sufficient
11. A boat travels in a stream from A to B and then from B to A. What is the speed of the boat in still water ?

Statements :

- I. The speed of the boat in still water is 2km/h more than the speed of the current
 II. The speed of the current is 1 km/h more than the speed of the boat
 III. Boat covers the distance of y kilometres between A and B downstream and upstream in x hours
- (a) All of I, II and III are required
 (b) Both II and III are required
 (c) I and III taken together are sufficient
 (d) Either I and II together or II and III together are sufficient
12. How many triangles are there in the following figure ?



- (a) 20
 (b) 22
 (c) 18
 (d) 17
13. There are two statements given below as premises, which support the conclusion suggested in the answer options. You may select the conclusion that makes the whole argument valid :

Statements :

- I. No film actors are cricketers
 II. Some cricketers are poets
- (a) Therefore, some poets are film actors
 (b) Therefore, some poets are not film actors
 (c) Therefore, all poets are film actors
 (d) Therefore, all film actors are poets

14. Find the missing (?) in the following series :
 2, 6, 30, 260, ?

(a) 470
 (b) 510
 (c) 630
 (d) 3130

15. One term in the following number series is wrong. Find the wrong term
 2, 6, 18, 82, 650

(a) 2
 (b) 18
 (c) 82
 (d) 650

16. If RIR is coded as IRI then MUM is coded as
 (a) NFN
 (b) UMU
 (c) UNU
 (d) MFM

17. If FAST is coded as 798 and LAST is coded as 906 then BUSY is coded as

(a) 1759
 (b) 1431
 (c) 952
 (d) 948

18. Six students A, B, C, D, E and F are in a class. A and B are from Town and C, D, E and F are from village. D and F are studious while others are casual. A, C, D are girls and B, E, F are boys. Who is the studious girl from village ?

(a) C
 (b) D
 (c) E
 (d) F

19. Read the following information carefully and answer the questions given below it :

A. Gopal is shorter than Ashok but taller than Kunal

B. Navin is shorter than Kunal

C. Jayesh is taller than Navin

D. Ashok is taller than Jayesh

Who among them is the tallest ?

(a) Gopal
 (b) Ashok
 (c) Kunal
 (d) Navin

20. Five persons are standing in a line. One of two persons at the extreme ends is a professor and the other is businessman. An advocate is standing to the right of a student. An author is to the left of the businessman. The student is standing between the professor and the advocate. Counting from the left, the advocate is at which place ?

(a) 1st
 (b) 2nd
 (c) 3rd
 (d) 5th

Directions (Q. 21 – 24) : A code language has been used to write the words in capital letters English in Column I as Greek letters in Column II. Greek letters in Column II do not appear in the same order as letters in Column I. Decode the language and choose the correct code for the word given in each question from amongst the alternatives provided.

Column-I	Column-II
CLEAR	γβωπθ
VIEW	νεγδ
TURN	ηρπσ
BUTTER	σρασπγ
OILY	δλθμ
WRITE	γπσνδ
VOWEL	νλεγθ

21. LIVER

- (a) νηλμπ (b) δγθπε
(c) ρσωεν (d) αβδγη

22. TROUBLE

- (a) ναβδγηλ (b) νσωδγθε
(c) δγηλωεν (d) σλρπαγθ

23. BROWN

- (a) ωενλω (b) ωδπρν
(c) απλλην (d) πρβνε

24. CYCLE

- (a) βθγμβ (b) βμβνπ
(c) πρπεω (d) πλβνπ

Directions (Q. 25 – 28) : P, Q, R, S, T, V and W are seven members of a family. Each of them has a different profession – Lawyer, Chartered Accountant (CA), Engineer, Teacher, Doctor, Architect and Pharmacist. There are three female members. No lady is either Pharmacist or CA. Each of them has a different monthly income. The Chartered Accountant earns the most. S, the engineer, earns less than V, the doctor. R, the teacher earns more than P and less than S. W's wife earns the least. T is an unmarried lady lawyer and she earns less than P and more than only Q. The pharmacist's income is not the lowest.

25. Which of the following pairs of professional represents the professions of husband and wife?

- (a) Pharmacist, Architect
(b) Chartered Accountant, Architect
(c) Engineer, Pharmacist
(d) Chartered Accountant, Engineer

26. Which of the following statements is false ?

- (a) The Architect earns more than the Lawyer
(b) The Teacher earns less than the Engineer
(c) The Doctor earns more than the Engineer
(d) The Pharmacist earns more than the Lawyer

27. What is P's profession ?

- (a) Pharmacist (b) Lawyer
(c) Teacher (d) None of the above

28. Which of the following represents the three female members of the family ?

- (a) PTQ (b) TRQ
(c) VTQ (d) Data inadequate

29. Which of the following Venn Diagram correctly represents Ocean, Indian Ocean, Pacific Ocean and Mariana Trench?

- (a)  (b) 
(c)  (d) 

30. If RAJASTHAN – 9R17J8L19H13 is a coded language, then what is the encrypted form of the MANIPUR in the same language ?

- (a) 14R13H11G9 (b) 13M14W11B9
(c) 13R14J11F9 (d) 14M13V11J9

31. What is the next number in the series 7, 23, 55, 109, ...

- (a) 199 (b) 189
(c) 191 (d) 209

41. What is 'X' in the following table.

7	2	19	3	5
6	4	X	3	5
8	5	24	7	4

- (a) 16 (b) 17
(c) 18 (d) 21

42. Consider the question and two statements that follow :

What is the total cost of one pen, and one pencil and I note book ?

Statements :

- I. The total cost of 5 pen, 6 pencils and 7 note books is ₹ 178
II. The total cost of 6 pens, 4 pencils and 2 note books, is ₹ 124 Which one of the following is correct?
- (a) Statement I alone is sufficient to answer the question
(b) Statement II alone is sufficient to answer the question
(c) Statement I and II together are sufficient to answer the question
(d) Both statements are not sufficient to answer the question

43. Which one of the following differs the rest ?

- (a) MGD LFC (b) JQV IPU
(c) ZUBXTA (d) DYSCXR

44. Which one of the following fits inside the bracket ?

714 () 65 IF 953 (RVXYS) 28

- (a) UWZSR (b) UWZRS
(c) TZWVU (d) TZWUV

45. If 'X' was born on December 6, 1983 and 'Y' on February 4, 1984, then when will 'Y' be half in age as compared to 'X' ?

- (a) April 4, 1984 (b) April 5, 1984
(c) April 6, 1984 (d) April 8, 1984

46. Famine : Hunger :: War : _____

- (a) Enmity (b) Insecurity
(c) Destruction (d) Infantry

47. Five persons P, Q, R, S and T are sitting in a row. Q is in between P and T. To find who among them is in the middle, which of the following information given in the following statement is/are sufficient ?

Statements :

I. P is left of Q and right of S

II. R is at the right end

Select the correct answer using the code given below :

- (a) I only (b) II only
(c) Either I or II (d) Both I and II

48. Certain blank spaces are left in the following series. Which is the group of letters given below, if put in the blank spaces in sequence, will complete the series ?

a _ ab _ a _ ba _ ab _ _ _ ab _

- (a) bbaabb (b) babaaaa
(c) abaaaba (d) aaaaaaa

49. If the letters of the word 'BLUE' are arranged according to dictionary, what is the position of the word 'UBLE' ?

- (a) 19
(b) 20
(c) 21
(d) 22

50. All except one does not belong to the same group. Which is that ?

(a)

+	^	^
O	+	^
O	^	O

(b)

&	•	•
#	#	&
•	&	&

(c)

#	@	@
#	~	@
~	~	@

(d)

/	/	=
=	/	=
<	>	=

PART II : ENGLISH LANGUAGE

Direction(Q.1-5) : Read the following Passage and Answer the Questions given after it.

Ray Bradbury is regarded as one of the greats of 20th century science fiction along with Isaac Asimov and A.C. Clarke. He established himself at the age of thirty with *The Martian Chronicle*, which perhaps remains his best known work. The book celebrates space travel, but it is also critical of the social abuses that modern technology had made possible. Though other writers had represented science and technology as a mixed bag of blessings, his book had a great impact. Initially his audience was small as most readers had no patience with jargon. His popularity grew as he avoided technical words and expressed his ideas about the future in common language.

1. Ray Bradbury became famous because
 - (a) he was friends with Isaac Asimov and A.C. Clarke.
 - (b) he started writing at the age of thirty.
 - (c) he wrote in futuristic language.
 - (d) of the book *The Martian Chronicle* that he wrote.
2. In his books Bradbury expressed the view that modern technology
 - (a) had made space travel possible.
 - (b) was based on the inventions of great scientists like Asimov and Clarke.
 - (c) appealed only to a small audience of readers who knew jargon.
 - (d) was a good thing but could be misused.
3. Bradbury's fears regarding the development and use of modern technology were
 - (a) totally unfounded and unconvincing.
 - (b) related to his personal experiences as a user of technology.
 - (c) shared by other writers of science fiction as well.
 - (d) expressed using jargon.

4. My The phrase 'mixed bag of blessings' means

- (a) having both advantages and disadvantages.
- (b) the constant interaction between science and technology which benefits both.
- (c) having both familiar and unexpected consequences.
- (d) using technical words and expressions.

5. The phrase 'no patience with jargon' refers to

- (a) fiction writer's lack of knowledge of proper technical terms.
- (b) reader's lack of interest in fiction containing many technical terms.
- (c) the negative attitude of scientists and technologists to fiction.
- (d) the use of difficult words.

Direction (Q. 6-10) : Read the following Passage and Answer the Questions given after it.

On the second day of our stay we had a skiing lesson. We began with learning how to clip on the special shoes and strap on the skis. Then we tried to master the art of balancing on the skis as we moved sideways and forward. There was a lot of slipping and falling. But we finally managed slow runs down the gentle slope. The helmeted toddlers skimming around like small gnats were an embarrassing contrast to our clumsiness. But we ignored them firmly. Soon, exhausted we cut short the lesson and retreated to the institute.

All around us youngsters were happily trying their hand at skiing, snowboarding and floating in hot air balloons like flitting sky gods. It was truly a winter wonderland to revel in.

6. The difficult part of learning to ski for beginners is

- (a) clipping on shoes and strapping on skis.
- (b) balancing on skis while moving sideways and forward.
- (c) avoiding bumping into noisy toddlers.
- (d) doing fast runs on the steep slopes.

7. The expression 'skimming around like small gnats' suggests that the toddlers were
- (a) able to go skillfully up and down the slopes.
 - (b) an irritation as they moved in all directions noisily.
 - (c) skilled and confident like pilots of fighter planes.
 - (d) careless and kept bumping into those around them.
8. The writer and his friends cut short the skiing lessons because
- (a) they were tired and needed to rest.
 - (b) they did not like to be in the same place as toddlers.
 - (c) they had to go for other lessons.
 - (d) many of them were hurt after falling down repeatedly.
9. The institute mentioned is a place where
- (a) only families with children go during school holidays.
 - (b) advance training in skiing is given to prepare teams for competitions.
 - (c) nature and adventure camps for young children are organized.
 - (d) facilities and training for different winter sports is provided to visitors.
10. The narrator in this passage seems to be
- (a) a trainer of young children learning to ski.
 - (b) an older skier who goes to the institute often.
 - (c) a member of an older group of beginners.
 - (d) a parent whose toddlers are learning to ski.

Direction (Q. 11-15) : Read the following Passage and Answer the Questions given after it.

The dainty swallow is known to be a great air-borne acrobatic artist, but its eating habits may come as a surprise. It needs to devour nearly a thousand tiny insects each day to keep its supple body energized. These

black and white birds are found in the countryside, especially near water bodies and human habitations. Unlike birds who peck at insects on trees or on the ground, swallows feed on flying insects, houseflies, mosquitoes, gnats, midges, etc. They spend most of the time in flight and are natural hunters of flying insects. They play a role in our health by reducing the numbers of malaria and dengue causing mosquitoes. Their bodies and wings allow incredible manoeuvrability and precision in flight. Their short wide bills help them to feed as they sweep through clouds of swarming insects near water and grasslands bits and above trees.

11. Swallows are largely found in
- (a) villages near rivers and lakes.
 - (b) cities with large water bodies and parks.
 - (c) places where human habits attract insects.
 - (d) forests with tall trees.
12. Swallows live near water bodies because
- (a) constant flying makes them thirsty.
 - (b) they cannot store water in their short wide bills.
 - (c) they love to skim over cool water as they perform acrobatics.
 - (d) a large number of insects are found there.
13. Swallows devour a large number of insects because
- (a) they are natural hunters.
 - (b) their daily need for energy from food is very high.
 - (c) such insects would otherwise spread diseases.
 - (d) the insect population is very large.
14. The swallow's short wide bill is designed to
- (a) trap small flying insects.
 - (b) destroy disease spreading insects.
 - (c) help it perform acrobatic manoeuvres.
 - (d) help it fly through insect swarms with great precision.

15. The swallow is described as an air-borne acrobat because of its
- (a) high energy needs to keep its body supple.
 - (b) ability to catch even small insects.
 - (c) varied movement in fast flight.
 - (d) ability to eat insects.

Direction(Q.16-17): *The following five sentences come from a paragraph. The first and the last sentences are given. Choose the order in which the four sentences (P, Q, R, S) should appear to complete the paragraph.*

16. S1 Once an ant saw, hanging from a plant, a mature chrysalis which could just move its tail.

S2 _____

S3 _____

S4 _____

S5 _____

- S6 The next moment the butterfly rose in the air and was soon out of the sight of the ant.

(P) The next morning as the ant passed by the same plant it saw a butterfly with gorgeous wings near the remnants of the chrysalis.

(Q) 'Poor creature! You can just about move your tail while I can run here and there,' it mocked the chrysalis.

(R) 'Look at me, Ant! Can you fly from one place to another in a short time?' it said as it dried its wings.

(S) The chrysalis heard all this but kept quiet.

(a) QSPR (b) RPSQ

(c) SPQR (d) SRPQ

17. S1 We would like to thank you once again for having selected our dealership.

S2 _____

S3 _____

S4 _____

S5 _____

- S6 We look forward to a long lasting relationship and wish you safe motoring.

(P) However, in case you experience any incidence which is not to your satisfaction, we will be grateful if you could provide your valuable feedback directly to us at our website.

(Q) We will bring necessary improvements in the process/organization to deliver better services to our esteemed customers.

(R) First of all, our entire team is dedicated to ensure your complete satisfaction and give you a wonderful experience.

(S) This will help us to resolve your concern immediately.

(a) SPQR (b) RPSQ

(c) SQPR (d) QRPS

Direction (Q. 18-19): *The following questions have the second sentence missing. Choose the appropriate sentence from the given options to complete it.*

18. A. If you wanted to know all about bread and bread making you must visit the Bread Museum in Ulm, Germany.

B. _____

C. There are exhibitions on the cultivation of seeds, milling techniques, techniques of bread-making, equipment, the sale of bread; virtually everything you wanted to know about bread.

(a) There are interesting tidbits on the use of bread on social and religious occasions as well.

(b) A range of bread ovens, bread baskets and baking moulds are used in Germany.

(c) Set up in 1955, this huge museum gives you a highly detailed history of bread making and displays about 10,000 objects related to bread and bread production.

(d) Bread making is an ancient art.

19. A. Anne Frank began to keep a diary on her thirteenth birthday, June 12, 1942, three weeks before she went into hiding with her family and friends in the sealed-off upper rooms of the annex of her father's office building in Amsterdam.
- B. _____
- C. They were, however, betrayed in August 1944 and were deported to the Nazi concentration camp.
- (a) With the assistance of a group of her father, Otto Frank's trusted colleagues, they remained hidden for two years and one month.
- (b) Anne Frank was helped by her friends.
- (c) Anne died in Bergen-Belsen shortly before its liberation in April 1945.
- (d) Of the group of eight, only Otto Frank survived the war.

Direction (Q. 20-27) : Choose the word which best fills the blank from the four options given.

20. The hedge has become a little untidy after the monsoon. I think I'll call the gardener to _____ the edges a bit.
- (a) thin (b) prim
(c) slim (d) prune
21. The men drilled and _____ the stone into smaller bits so that they could be carted away in trucks.
- (a) mauled (b) hacked
(c) whittle (d) hewed
22. Be careful. The cat might you if it feels frightened.
- (a) scratch (b) hit
(c) cut (d) kill
23. She cut the cake into equal wedges and _____ it amongst the children.
- (a) scattered (b) separated
(c) distributed (d) spread

24. For the curry you need to
- (a) chop (b) strip
(c) saw (d) bite
25. The men _____ off some of the upper branches of the tree near the window to allow more light in.
- (a) pluck (b) tore
(c) brought (d) lopped
26. They picked their axes and _____ the thick thorny bushes that grew all around.
- (a) slice (b) chopped
(c) pulled (d) scratched
27. The doctor made a neat _____ at the mouth of the boil.
- (a) wound (b) dent
(c) incision (d) path

Direction (Q. 28-37) : In the following passage there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the given options.

Unlike most nutrients, vitamin D is a hormone and is synthesized (28).....the body through a process (29).....depends upon the ultraviolet rays (30).....sunlight. Brief exposure of the face (31)..... arms to ultraviolet light (32).... the most reliable source of (33).... in spring and summer. Deficiency (34).....vitamin-D causes rickets. This (35).... deformity in bones among (36)..... Therefore, a good exposure to (37)....is essential.

28. (a) with (b) by
(c) for (d) on
29. (a) this (b) that
(c) these (d) there
30. (a) of (b) by
(c) on (d) for
31. (a) but (b) because
(c) and (d) yet
32. (a) was (b) is
(c) were (d) are

33. (a) vitamin D (b) protein
(c) cell (d) hormone
34. (a) off (b) for
(c) of (d) on
35. (a) give (b) cause
(c) causing (d) causes
36. (a) child (b) infants
(c) young (d) boy
37. (a) sunlight (b) sunlights
(c) ray (d) lights

Direction (Q. 38-40): Choose the appropriate phrasal verbs to complete the sentences.

38. My sister our grandmother who loved to take up challenges.
(a) takes back (b) takes off
(c) takes after (d) takes in
39. Ravi's family could never on his small salary if his wife had not decided to work.
(a) get off (b) get by
(c) get after (d) get found
40. Soon winter and the nights became misty and chilly.
(a) set about (b) set off
(c) set aside (d) set in

Direction (Q. 41-43) : Select the meaning of the given phrases/idioms.

41. Take the bull by the horns.
(a) try to overpower a bull by catching hold of its horns
(b) grapple with a difficult situation without avoiding it
(c) act positively even if one is feeling angry
(d) having a bull fight.
42. To think 'one' is cat's whisker's
(a) think of oneself as a difficult person
(b) think one is wonderful
(c) think one is elegant like a cat
(d) think one is honest

43. talk shop
(a) talk about shops in general
(b) talk about one's shop
(c) talk about work
(d) talk about shopping

Direction (Q. 44-48) : Select the most appropriate option to fill in the blanks from the given alternatives.

44. It is.....to note that the govenment has at last decided to revise the salaries of railway linesmen.
(a) hearten (b) hearty
(c) heartfelt (d) heartening
45. We need to be careful to ensure that our project is on the right
(a) route (b) road
(c) track (d) way
46. With two school going children to manage, some of my mornings are quite
(a) jumpy (b) rushed
(c) quick (d) racy
47. Some of the areas in the hills are quite populated. You many not find a village for miles.
(a) heavily (b) densely
(c) sparsely (d) quietly
48. Most of the youngsters today are.....in social networking in all the their free.
(a) engaged (b) employed
(c) involved (d) implicated

Direction (Q. 49-50) : Select the word which means the opposite of the given word.

49. Miserable
(a) painful (b) angry
(c) happy (d) frightened
50. Unique
(a) special (b) uncommon
(c) well-to-do (d) common-place

PART III

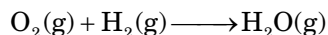
SCHOLASTIC APTITUDE TEST

1. Which one of the following statements is **NOT** true about evolution?
 - (a) Evolution leads to generation of diverse forms of life
 - (b) Time dating and fossil studies help in understanding of evolution
 - (c) Evolution is not always progressive series of changes that occur in organism
 - (d) Human beings have not evolved from chimpanzees.
2. Which one of the following is known as energy currency of cell ?
 - (a) Adenosine diphosphate
 - (b) Adenosine triphosphate
 - (c) Pyruvate
 - (d) Glucose
3. An analysis of soil sample revealed 0.1 mg of a pesticide and 1 mg of the same pesticide was found in grains. However in the adipose tissue of birds the concentration was 2 mg.
The reason for this is the phenomenon known as
 - (a) Bio-absorption
 - (b) Bio-translocation
 - (c) Bio-magnification
 - (d) Bio-multiplication
4. Diseases that spreads by vector such as mosquitoes are
 - (a) Encephalitis and Malaria
 - (b) Syphilis and AIDS
 - (c) Tuberculosis and sleeping sickness
 - (d) Kala-azar and SARS
5. Which one of the following is correct route for passage of sperms ?
 - (a) Testes – scrotum – vasdeferens – urethra – penis
 - (b) Scrotum – testes – urethra – vasdeferens – penis
 - (c) Testes – vasdeferens – urethra – seminal vesicles
 - (d) Testes – vasdeferens – urethra – penis
6. Suggest which among the following is **NOT** a function attributed to endoplasmic reticulum
 - (a) Detoxification of poisons and drugs
 - (b) Digestion/egestion of foreign materials outside the cell
 - (c) Manufacture of fat and lipid molecules
 - (d) Biogenesis of membranes
7. In nitrogen cycle, atmospheric nitrogen is fixed by bacteria and converted into ammonia. Ammonia is further converted into other forms of nitrogen. At the end of the cycle it returns to the atmosphere by the process of :
 - (a) Ammonification (b) Nitrification
 - (c) Denitrification (d) Assimilation
8. Cell organelles that are involved in the waste disposal system of the cell are :
 - (a) Golgi apparatus (b) Lysosomes
 - (c) Chromosomes (d) Ribosomes
9. Sequence of events which occur in a reflex action are
 - (a) Receptor – motor neuron – CNS – sensory neuron – effector muscle
 - (b) Effector muscle – CNS – sensory nerve – sensory organ
 - (c) CNS – sensory neuron – motor neuron – effector muscle
 - (d) Receptor organ – sensory neuron – CNS – motor neuron – effector muscle
10. Movement of food in digestive tract is due to
 - (a) concentration gradient
 - (b) secretions
 - (c) peristalsis
 - (d) villi
11. A pea plant with round green (RRyy) pea seed is crossed another pea plant with wrinkled yellow (rrYY) seeds. What would be the nature of seed in the first generation (F₁ generation) ?
 - (a) Round green (b) Wrinkled green
 - (c) Wrinkled yellow (d) Round yellow

12. Some organisms are sensitive to different levels of air pollution and are used as pollution-indicators. Suggest which among the following fits into the category.
 (a) Fungi (b) Fresh water algae
 (c) Bacteria (d) Lichens
13. A group of laboratory mice having tails are bred together and their progeny studied. The progeny had tails. However, scientist surgically removed the tails of the progeny and again bred them for four successive generations. What do you think would be the nature of the new progeny?
 (a) All mice born will have tails
 (b) All mice born will have no tails
 (c) The ratio of tail less to tailed mice will be 1 : 3
 (d) The ratio of tail less to tailed mice will be 1 : 4
14. Which of the following statements is **NOT** correct ?
 (a) Tendons are tissues with great strength and flexibility
 (b) Bones are connected to each other by tendons
 (c) Cartilage smoothens bone surface at joints
 (d) Tendons connect muscles to bones
15. Which of the following are the correct examples of matter ?
 (a) Glass bottle, water and noise
 (b) Air, wood and vacuum
 (c) Silver foil, hot air and chalk
 (d) Sand, oxygen and light flash
16. Two identical beakers labeled as (X) and (Y) contain 100 cm³ of water each at 20°C. To the water in the beaker(X) 100 g of water at 0°C was added and stirred to mix thoroughly. To the beaker(Y) 100 g of ice at 0°C was added and stirred till it melted into water. The water in the beaker (Y) will be
 (a) hotter than water in beaker X
 (b) colder than water in beaker X
 (c) heavier than water in beaker X
 (d) lighter than water in beaker X
17. At 283 K a saturated solution of solid X can be prepared by dissolving 21.0 g of it in 100 g of water. The maximum amount of X which can be dissolved in 100 g of water at 313 K is 62.0 g. An attempt is made to dissolve 50.0 g of X in 100 g of water at 313 K
 (A) All the 50.0 g of X will dissolve at 313 K
 (B) At 313 K 29.0 g of X will remain undissolved
 (C) Solubility of X decrease with increase of temperature
 (D) On cooling the solution of X from 313 K to 283 K more than 21.0 g of X will crystallize out
 Which of the above statements are correct ?
 (a) A and B (b) A and D
 (c) B and C (d) A, C and D
18. Two elements A and B contain 13 and 8 proton respectively. If the number of neutrons in them happen to be 14 and 8 respectively, the formula unit mass for the compound between A and B unit would be
 (a) 43 (b) 75
 (c) 102 (d) 112
19. The reaction of burning carbon in oxygen is represented by the equation

$$\text{C (s)} + \text{O}_2 \text{ (g)} \longrightarrow \text{CO}_2 \text{ (g)} + \text{Heat} + \text{Light}$$
 When 9.0 g of solid carbon is burnt in 16.0 g of oxygen gas, 22.0 g of carbon dioxide is produced. The mass of carbon dioxide gas formed on burning of 3.0 g of carbon in 32.0 g of oxygen would be (Note: Atomic mass of C = 12.0 u, O = 16.0 u)
 (a) 6.60 g (b) 7.33 g
 (c) 8.25 g (d) 11.00 g
20. An atom of an element(X) has its K, L and M shells filled with some electrons. It reacts with sodium metal to form a compound NaX. The number of electrons in the M shell of the atom(X) will be
 (a) Eight (b) Seven
 (c) Two (d) One

21. Oxygen gas reacts with hydrogen to produce water. The reaction is represented by the equation



The above reaction is an example of

- (A) Oxidation of hydrogen
(B) Reduction of oxygen
(C) Reduction of hydrogen
(D) Redox reaction
- (a) *a, b and c* (b) *b, c, and d*
(c) *a, c and d* (d) *a, b and d*
22. Match the items of column – I with the items of column – II

Column – I

- A. $\text{NH}_4\text{OH} + \text{CH}_3\text{COOH} \longrightarrow$
 $\text{CH}_3\text{COONH}_4 + \text{H}_2\text{O}$
 B. $2\text{AgBr} \longrightarrow 2\text{Ag} + \text{Br}_2$
 C. $\text{ZnCO}_3 \longrightarrow \text{ZnO} + \text{CO}_2$
 D. $2\text{Al} + \text{Fe}_2\text{O}_3 \longrightarrow 2\text{Fe} + \text{Al}_2\text{O}_3$

Column - II

- (i) Thermal decomposition
(ii) Thermit reaction
(iii) Photochemical reaction
(iv) Neutralization reaction

A	B	C	D
(a) iii	i	iv	ii
(b) ii	iv	i	iii
(c) iii	ii	iv	i
(d) iv	iii	i	ii

23. Which of the following represents the correct order of the acidic strength for equimolar aqueous solution of HCl, H_2SO_4 , NH_4OH and NaOH
- (a) $\text{HCl} < \text{NH}_4\text{OH} < \text{NaOH} < \text{H}_2\text{SO}_4$
 (b) $\text{NH}_4\text{OH} < \text{NaOH} < \text{H}_2\text{SO}_4 < \text{HCl}$
 (c) $\text{HCl} < \text{H}_2\text{SO}_4 < \text{NH}_4\text{OH} < \text{NaOH}$
 (d) $\text{NaOH} < \text{NH}_4\text{OH} < \text{HCl} < \text{H}_2\text{SO}_4$
24. Metals like sodium, potassium, calcium and magnesium are extracted by electrolysis of their chlorides in molten state. These metals are not extracted by reducing of their oxides with carbon because
- (a) reduction with carbon is very expensive
(b) carbon readily makes alloy with these metals

- (c) carbon has less affinity for oxygen than these metals
(d) carbon is weaker reducing agent than these metals

- (a) *a and b* (b) *b and c*
(c) *c and d* (d) *d and a*

25. A hydrocarbon has a molecular formula as C_6H_{12} . It does not react with hydrogen to give C_6H_{14} nor does it react with chlorine to give $\text{C}_6\text{H}_{12}\text{Cl}_2$. The hydrocarbon C_6H_{12} is

- (a) A saturated hydrocarbon
(b) An unsaturated hydrocarbon
(c) An open chain hydrocarbon
(d) a cyclo-alkane

- (a) *a and b* (b) *c and d*
(c) *d and b* (d) *a and d*

26. An organic compound is a clear liquid having a molecular formula $\text{C}_4\text{H}_8\text{O}$. It has an open chain structure. Without any carbon-carbon double bond. The compound can be

- (A) an alcohol (B) an ester
(C) an aldehyde (D) a ketone
- (a) *a and b* (b) *c and d*
(c) *b and d* (d) *d and a*

27. An element with atomic number 17 is placed in the group 17 of the long form periodic table. Element with atomic number 9 is placed above and with atomic number 35 is placed below it. Element with atomic number 16 is placed left and with atomic number 18 is placed right to it. Which of the following statements are correct ?

- (A) Valency of the element with atomic number 18 is zero
(B) Elements with same valency will have atomic number 16, 17 and 18
(C) Valency of elements with atomic number 9, 17 and 35 is one
(D) Element with atomic number 17 is more electronegative than element with atomic numbers 16 and 35

- (a) *a, b and c* (b) *a, c and d*
(c) *b, c and d* (d) *a, b and d*

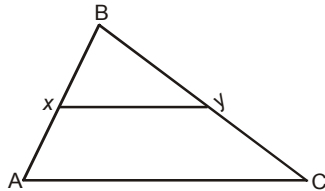
- 28.** A car is moving with a constant speed of 70 km/h. Which of the following statements is correct ?
- The acceleration of the car is definitely zero.
 - The car has an acceleration only if it is moving along a curved path.
 - The car may have an acceleration even if it is moving along a straight path.
 - The car may not have an acceleration even if it is moving along a curved path.
- 29.** A box of mass 20 kg is pushed along a rough floor with a velocity 2 m/s and then let go.
The box moves 5 m on the floor before coming to rest. What must be the frictional force acting on the box ?
- 4N
 - 2N
 - 20 N
 - 8 N
- 30.** Two objects, one 4 times as massive as the other, are approaching each other under their mutual gravitational attraction. When the separation between the objects is 100 km, the acceleration of the lighter object is 1 m/s^2 . When the separation between them is 25 km, the acceleration of the heavier object is
- 1 m/s^2
 - 2 m/s^2
 - 8 m/s^2
 - 4 m/s^2
- 31.** A spring balance measures the weight of an object in air to be 0.1 N. It shows a reading of 0.08 N when the object is completely immersed in water. If the value of acceleration due to gravity is 10 m/s^2 , the volume of the object is
- 20 cm^3
 - 80 cm^3
 - 200 cm^3
 - 2 cm^3
- 32.** A force of 10 N is applied on an object of mass 1 kg of 2s, which was initially at rest. What is the work done on the object by the force ?
- 200 J
 - 20 J
 - 16 J
 - 180 J
- 33.** Stethoscope of doctors for finding quality, strength and frequency of human heart beat is based on the principle of
- SONAR
 - Reverberation
 - Multiple reflection
 - Echo
- 34.** A ray of light is incident in medium 1 on a surface that separates medium 1 from medium 2. Let v_1 and v_2 represent the velocity of light in medium 1 and medium 2 respectively. Also let n_{12} and n_{21} represent the refractive index of medium 1 with respect to medium 2 and refractive index of medium 2 with respect to medium 1, respectively. If i and r denote the angle of incidence and angle of refraction, then
- $\frac{\sin i}{\sin r} = n_{21} = \frac{v_1}{v_2}$
 - $\frac{\sin i}{\sin r} = n_{21} = \frac{v_2}{v_1}$
 - $\frac{\sin i}{\sin r} = n_{12} = \frac{v_1}{v_2}$
 - $\frac{\sin i}{\sin r} = n_{12} = \frac{v_2}{v_1}$
- 35.** A convex lens has a focal length of 0.5 m. It has to be combined with a second lens, so that the combination has a power of 1.5 dioptre. Which of the following could be the second lens ?
- A concave lens of focal length 2 m
 - Another convex lens of focal length 0.5 m.
 - A concave lens of focal length 0.5 m.
 - A convex lens of focal length 2 m.
- 36.** Which of the following statements is correct ?
- A person with myopia can see nearby objects clearly.
 - A person with hypermetropia can see nearby objects clearly.
 - A person with myopia can see distant objects clearly.
 - A person with hypermetropia cannot see distant objects clearly.

- 37.** Consider two conducting plates A and B, between which the potential difference is 5 V, plate A being at a higher potential. A proton and an electron are released at plates A and B respectively. The two particles then move towards the opposite plates - the proton to plate B and the electron to plate A. Which one will have a larger velocity when they reach their respective destination plates ?
- Both will have the same velocity.
 - The electron will have the larger velocity.
 - The proton will have the larger velocity.
 - None will be able to reach the destination point.
- 38.** Which one of the following statements best describes the nature of the field lines due to a bar magnet ?
- Field lines start from the north pole and end on the south pole. Any number of field lines can pass through a point.
 - Field lines start from the north pole and end on the south pole. Only one field line passes through a point.
 - Field lines are continuous lines passing inside and outside the magnet. Only one field line passes through a point.
 - Field lines are continuous lines passing inside and outside the magnet. Any number of field lines can pass through a point.
- 39.** Which of the following statements is correct ?
- AC generator generates a higher voltage.
 - DC generator generates a higher voltage.
 - AC generator has a permanent magnet whereas a DC generator has an electromagnet.
 - There is a split-ring commutator in a DC generator but not in an AC generator.
- 40.** A star produces its energy through the process of
- nuclear fusion.
 - chemical reaction.
 - nuclear fission.
 - gravitational attraction between different parts of the star.
- 41.** If θ is an acute angle such that $\tan \theta = \frac{2}{3}$, then evaluate
- $$\left(\frac{1 + \tan \theta}{\sin \theta + \cos \theta} \right) \left(\frac{1 - \cot \theta}{\sec \theta + \operatorname{cosec} \theta} \right)$$
- $-\frac{1}{5}$
 - $-\frac{4}{\sqrt{13}}$
 - $\frac{1}{5}$
 - $\frac{4}{\sqrt{13}}$
- 42.** The value of the expression
- $$\frac{1}{\sqrt{11-2\sqrt{30}}} - \frac{3}{\sqrt{7-2\sqrt{10}}} - \frac{4}{\sqrt{8+4\sqrt{3}}}$$
- after simplification is
- $\sqrt{30}$
 - $2\sqrt{10}$
 - 1
 - 0
- 43.** The minimum value of the polynomial $p(x) = 3x^2 - 5x + 2$ is
- $-\frac{1}{6}$
 - $\frac{1}{6}$
 - $\frac{1}{12}$
 - $-\frac{1}{12}$
- 44.** For the equation
- $$|x^2| + |x| - 6 = 0$$
- there are four roots
 - the sum of the roots is -1
 - the product of the roots is -4
 - the product of the roots is -6
- 45.** In $\triangle ABC$, D is a point on BC such that $3BD = BC$. If each side of the triangle is 12 cm, then AD equals
- $4\sqrt{5}$ cm
 - $4\sqrt{6}$ cm
 - $4\sqrt{7}$ cm
 - $4\sqrt{11}$ cm

46. In $\triangle ABC$, $\overline{XY}$ is parallel to $\overline{AC}$ and divides the triangle into the two parts of equal area.

Then the $\frac{AX}{AB}$ equals

- (a) $\frac{\sqrt{2}+1}{2}$
 (b) $\frac{2-\sqrt{2}}{2}$
 (c) $\frac{2+\sqrt{2}}{2}$
 (d) $\frac{\sqrt{2}-1}{2}$



47. P is a point in the interior of an equilateral triangle with side a units. If p_1, p_2 and p_3 are the distances of P from the three sides of the triangle, then $p_1 + p_2 + p_3$

- (a) equals $\frac{2a}{3}$ units
 (b) equals $\frac{a\sqrt{3}}{2}$ units
 (c) is more than a units
 (d) cannot be determined unless the location of P is specified

48. In how many ways can a given square be cut into two congruent trapeziums?

- (a) Exactly 4 (b) Exactly 8
 (c) Exactly 12 (d) More than 12

49. In how many ways can you partition 6 into ordered summands? (For example, 3 can be partitioned in 3 ways as : $1+2, 2+1, 1+1+1$)

- (a) 27 (b) 29
 (c) 31 (d) 33

50. The number of integers n (< 20) for which $n^2 - 3n + 3$ is a perfect square is

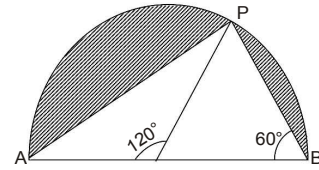
- (a) 0 (b) 1
 (c) 2 (d) 3

51. For positive x and y , the LCM is 225 and HCF is 15. There

- (a) is exactly one such pair
 (b) are exactly two such pairs
 (c) are exactly three such pairs
 (d) are exactly four such pairs

52. In the figure, a semi-circle with centre O is drawn on AB. The ratio of the larger shaded area to the smaller shaded area is

- (a) $\frac{4\pi - 2\sqrt{3}}{2\pi - 2\sqrt{3}}$
 (b) $\frac{4\pi - 3\sqrt{3}}{3\pi - 3\sqrt{3}}$
 (c) $\frac{4\pi - 3\sqrt{3}}{2\pi - 3\sqrt{3}}$
 (d) $\frac{3\pi - 2\sqrt{3}}{2\pi - 3\sqrt{3}}$



53. In $\triangle ABC$, angle B is obtuse. The smallest circle which covers the triangle is the

- (a) Circumcircle
 (b) Circle with AB as diameter
 (c) Circle with BC as diameter
 (d) Circle with AC as diameter

54. Which of the numbers can be expressed as the sum of squares of two positive integers, as well three positive integers?

- (a) 75 (b) 192
 (c) 250 (d) 100

55. If P is a point inside the scalene triangle ABC such that $\triangle APB, \triangle BPC$ and $\triangle CPA$ have the same area, then P must be

- (a) In centre of $\triangle ABC$
 (b) Circum centre of $\triangle ABC$
 (c) Centroid of $\triangle ABC$
 (d) Ortho centre of $\triangle ABC$

56. If the line segments joining the midpoints of the consecutive side of a quadrilateral ABCD form a rectangle then $\square ABCD$ must be

- (a) Rhombus (b) Square
 (c) Kite (d) All of the above

57. C_1 and C_2 are two circles in a plane. If N is the total number of common tangents, then which of the following is wrong?

- (a) $N = 2$ when C_1 and C_2 intersect but do not touch
 (b) $N = 4$ when C_1 and C_2 are disjoint
 (c) When C_1 and C_2 touch then N must be 3
 (d) N can never be more than 4

58. The sides of a triangle are of lengths 20, 21 and 29 units. The sum of the lengths of altitudes will be

- (a) $\frac{1609}{29}$ units (b) 49 units
(c) $\frac{1609}{21}$ units (d) 70 units

59. If a, b, c be the 4th, 7th and 10th term of an AP respectively, then the sum of the roots of the equation

$$ax^2 - 2bx + c = 0$$

- (a) is $-\frac{b}{a}$
(b) is $-\frac{2b}{a}$
(c) is $\frac{c+a}{a}$
(d) cannot be determined unless some more information is given about the AP

60. PQRS is the smallest square whose vertices are on the respective sides of the square ABCD. The ratio of the areas of $\square$ PQRS to $\square$ ABCD is

- (a) 1 : 2 (b) $1 : \sqrt{2}$
(c) 1 : 3 (d) 2 : 3

61. Consider the following events related to the French Revolution and identify the correct chronological response from the options given thereafter :

- (A) Convocation of Estates General
(B) Storming of the Bastille
(C) Peasant revolts in the countryside
(D) Third Estate forms National Assembly
(a) a, c, d, b (b) d, b, c, a
(c) a, d, b, c (d) b, a, c, d

62. Consider the following statements and identify the correct response from the options given thereafter :

- (A) The colonies in the Caribbean were important suppliers of tobacco, indigo, sugar and coffee.
(B) The slave trade began in the 15th century.
(C) French port cities like Bordeaux and Nantes owed their economic prosperity to the flourishing slave trade.

- (D) Slavery was finally abolished in the French colonies in 1848.

- (a) a, c, d (b) a, b, d
(c) b, c, d (d) b, c, a

63. Match the List-I with List-II and select the correct response from the options given thereafter

List – I

- A. Liberals
B. Radicals
C. Conservatives
D. Socialists

List – II

- I. Government to be based on the majority of country's population
II. The past has to be respected and change has to be brought about through a slow process
III. Property to be controlled by society as a whole
IV. Men of property mainly should have the right to vote

Codes :

	A	B	C	D
(a)	III	II	I	IV
(b)	II	IV	I	III
(c)	I	II	III	IV
(d)	IV	I	II	III

64. Consider the following statements and identify the correct response from the options given thereafter :

Statement I : Nazism became a mass movement after the Great Depression.

Statement II : After 1929, banks collapsed and businesses shut down, workers lost their jobs and the middle classes were threatened with destitution.

- (a) Statement I is false and Statement II is true
(b) Statement I is true and Statement II is false
(c) Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I
(d) Both Statement I and Statement II are true but Statement II is not the correct explanation of Statement I

65. Consider the following statements and identify the correct response from the options given thereafter :

Statement I : According to the Criminal Tribes Act of 1871, nomadic pastoralists were forced to live only in notified village settlements.

Statement II : Colonial state wanted to transform all grazing lands into cultivated farms.

- (a) Statement I is false and Statement II is true
 (b) Statement I is true and Statement II is false
 (c) Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I
 (d) Both Statement I and Statement II are true but Statement II is not the correct explanation of Statement I
66. Match the List-I with List-II and select the correct response from the options given thereafter :

List – I

- A. The British government established monopoly in opium trade in Bengal
 B. The British government exported 50,000 chests of opium from Bengal annually.
 C. Opium production in British occupied territories declined rapidly.
 D. Village headmen started paying peasants for producing opium in advance.

List – II

1. 1780s 2. 1820s
 3. 1870 4. 1773

Codes :

	A	B	C	D
(a)	2	3	4	1
(b)	4	3	2	1
(c)	3	2	1	4
(d)	1	2	4	3

67. Consider the following statements and identify the correct response from the options given thereafter :
- (a) Cricket, in Victorian England, was an all season leisure game for aristocrats.
 (b) The captain of the team was traditionally a batsman in Victorian England as amateurs played only as batsmen.

- (c) Len Hutton was the first professional Yorkshire batsman to lead the English test team.

- (d) There was a clear social hierarchy between the batsmen and the bowlers in Victorian England.

- (a) a, b and c (b) a, b and d
 (c) a, c and d (d) b, c and d

68. Consider the following statements and identify the correct response from the option given thereafter :

Statement I : Campaign for dress reforms by women started with the development of the suffrage movement.

Statement II : Dress reform emphasized differences between men and women and established the status of women as obedient and dutiful.

- (a) Statement I is false and Statement II is true
 (b) Statement I is true and Statement II is false
 (c) Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I
 (d) Both Statement I and Statement II are true but Statement II is not the correct explanation of Statement I

69. Consider the following statements and identify the correct response from the option given thereafter :

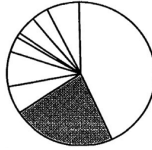
Statement I : Schools became an important place for political and cultural battles in Vietnam under the French rule

Statement II : Teachers did not blindly follow the curriculum but sometimes modified the text and criticized what was stated.

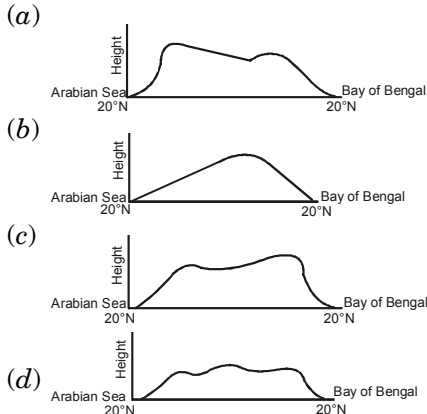
- (a) Statement I is false and Statement II is true
 (b) Statement I is true and Statement II is false
 (c) Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I
 (d) Both Statement I and Statement II are true but Statement II is not the correct explanation of Statement I

- 70.** Consider the following statements and identify the correct response from the option given thereafter :
- Statement I :** In 1921, as the Non-cooperation movement spread, houses of talukdars were looted and merchants were attacked.
- Statement II :** Mahatma Gandhi had declared that tax was not to be paid and land was to be redistributed amongst the poor.
- Statement I is false and Statement II is true
 - Statement I is true and Statement II is false
 - Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I
 - Both Statement I and Statement II are true but Statement II is not the correct explanation of Statement I
- 71.** Consider the following statements and identify the correct response from the option given thereafter :
- Statement I :** In Victorian Britain, the upper classes - the aristocrats and the bourgeoisie - preferred things produced by machine.
- Statement II :** Machine goods were mass produced and were easily available.
- Statement I is false and Statement II is true
 - Statement I is true and Statement II is false
 - Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I
 - Both Statement I and Statement II are true but Statement II is not the correct explanation of Statement I
- 72.** Consider the following statements and identify the correct response from the option given thereafter :
- Statement I :** In the 19th century, London was a colossal city.
- Statement II :** London had many large factories.
- Statement I is false and Statement II is true
 - Statement I is true and Statement II is false
 - Both Statement I and Statement II are true and Statement II is the correct explanation of Statement I
 - Both Statement I and Statement II are true but Statement II is not the correct explanation of Statement I
- 73.** Consider the statement given below and select the correct explanation from the responses given thereafter :
- People of depressed classes found it difficult to find housing in Bombay during the late nineteenth century.
- Bombay had a mere 9.5 square yards average space per person.
 - Wages of depressed classes were usually less than that of others.
 - Most people of depressed classes were kept out of chawls.
 - People belonging to the depressed classes had fixed space allotted per family.
- 74.** Consider the statement given below and select the correct explanation from the responses given thereafter :
- In 1878 the Vernacular Press Act was passed.
- Englishmen criticized the printed matter objectionable to the Government.
 - After the Revolt of 1857 the British wanted to clamp down the Indian press.
 - British rule needed to be celebrated by journals and papers.
 - Nationalist newspapers grew in numbers and needed to be controlled.
- 75.** By the 18th century, which of the following commodities were produced on large plantations in America by slave labour and exported to other countries.
- Grains such as wheat and barley
 - Tropical fruits such as bananas and oranges
 - Animal products such as wool and beef
 - Cash crops such as sugar and cotton
- 76.** May stems are succulent, my leaves are mostly thick. In which category of the following vegetation type I am largely found ?
- Tropical deciduous forest
 - Montane forest
 - Tropical thorn forest and scrubs
 - Mangrove forest

77. The following diagram shows the general land use category in India. Identify the shaded category.



- (a) Net sown area
(b) Forest
(c) Current Fallow
(d) Barren and waste land
78. **Assertion (A)** : Since 1981, growth rate of population in India has started declining gradually
Reason (R) : Birth rate is declining
Select the correct option from the given alternatives.
- (a) Both A and R are true but R is not the correct explanation of A.
(b) Both A and R are false.
(c) A is false and R is true
(d) Both A and R are true and R is the correct explanation of A.
79. Which of the following diagram shows the approximate relief of India around, 20°N latitude from Daman to Bhubaneswar?



80. Identify the right pair from the following :

A. Ennore	1. Nuclear
B. Rawat Bhata	2. Thermal
C. Kopili	3. Hydro electric
D. Nagarcoil	4. Wind

Codes :

	A	B	C	D
(a)	4	2	3	1
(b)	1	3	3	1
(c)	2	3	2	4
(d)	2	1	4	3

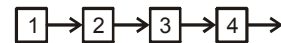
81. The peninsular part of India experiences peak summers earlier than northern India

- (a) Due to apparent northward movement of the sun, the global heat belts shift northwards.
(b) Cold waves from central Asia sweeps through the northern plains during that time.
(c) There is less rainfall in the peninsular India during that time.
(d) Clouds do not form in those months.

82. National Highway-7 is the longest national highway in India, which traverses between Varanasi and Kanya Kumari. Identify the places on route from North to South.

- (a) Nagpur – Jabalpur – Bangalore – Hyderabad – Madurai
(b) Jabalpur – Nagpur – Hyderabad – Bangalore – Madurai
(c) Jabalpur – Nagpur – Bangalore – Hyderabad – Madurai
(d) Nagpur – Jabalpur – Hyderabad – Bangalore – Madurai

83. The process of manufacturing of cotton garment is depicted in the following flow diagram. Identify the correct sequence.



- A. Dyeing and finishing
B. Fiber production
C. Garment manufacture
D. Weaving

Codes :

	1	2	3	4
(a)	B	A	C	D
(b)	B	D	C	A
(c)	B	D	A	C
(d)	B	A	D	C

84. Match the fresh water lakes on the map of India (I, II, III, IV) with their respective names.

- A. Bhimtal
B. Loktak
C. Barapani
D. Dal lake



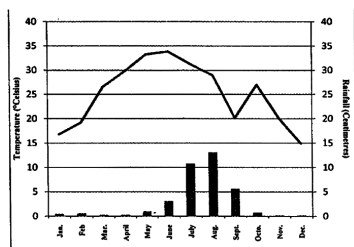
Codes :

	A	B	C	D
(a)	III	II	I	IV
(b)	IV	III	II	I
(c)	III	I	II	IV
(d)	II	III	I	II

85. A major line of latitude that passes through Mizoram also passes through which one of the following state ____.

(a) Nagaland (b) Odisha
(c) Bihar (d) Jharkhand

86. Observe the following graph of a particular place. It is situated at an altitude of 224 meters above Mean Sea Level and at latitude $26^{\circ}18'N$



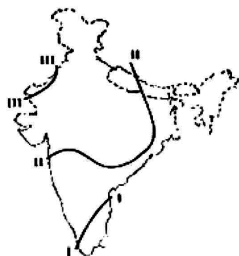
Identify the type of natural vegetation most likely to be found in this place

(a) Montane forest
(b) Mangrove forest
(c) Tropical thorn forest
(d) Tropical evergreen forest

87. Identify the state from given names which has all the following characteristics

A. Its annual rainfall is 200–400 cm
B. Most of the area is covered under with alluvial soil
C. Rice is the predominant crop of this state
(a) Punjab (b) Assam
(c) Odhisha (d) Tamil Nadu

88. With the help of given map identify the dates of advancing Monsoon in India.



(a) I – 1 June; II – 10 June; III – 15 July
(b) I – 1 June; II – 10 June; III – 1 July
(c) I – 15 June; II – 15 July; III – 15 August
(d) I – 15 July; II – 10 June; III – 1 June

89. Match the places with altitude

Column – I

(Altitude in meters above
Mean Sea level)

I. 1461
II. 6
III. 224
IV. 312

Column – II

(Place)

A. Nagpur
B. Shillong
C. Jodhpur
D. Kolkata

Codes :

	I	II	III	IV
(a)	D	A	C	B
(b)	C	A	B	D
(c)	B	D	C	A
(d)	B	A	C	D

90. What was the local time in Tokyo situated at $139^{\circ}45'$ East longitude, when the President of India was hosting the Indian National Flag in the presence of Japanese Prime Minister at 10 a.m. in New Delhi? The viewer in Japan were watching live telecast of this event.

(a) 6.11 a.m. (b) 1.49 a.m.
(c) 2.49 a.m. (d) 1.49 p.m.

91. The following statements are about democracy in the contemporary world.

A. Democracy expanded throughout the 20th century
B. Democracy did not spread evenly throughout the world
C. All the member states of the International Monetary Fund (IMF) are democracies
D. All the permanent members of the United Nations Security Council are democracies

(a) A and B
(b) A, B and C
(c) A, B and D
(d) B, C and D

92. Match the following

A. Abraham Lincoln	I. How long shall we continue to deny equality in our social and economic life? If we continue to deny it for long, we will do so only by putting our political democracy in peril.
B. Mahatma Gandhi	II. Democracy is 'government of the people, by the people and for the people'.
C. Dr. B.R. Ambedkar	III. The service of India means the service of the millions who suffer. It means the ending of poverty and ignorance and disease and inequality of opportunity.
D. Jawaharlal Nehru	IV. I shall work for an India in which ... all communities shall live in perfect harmony. There can be no room in such an India for the curse of untouchability.

Codes :

	A	B	C	D
(a)	II	I	IV	III
(b)	II	IV	I	III
(c)	I	III	IV	II
(d)	I	II	III	IV

93. Parliament of India consists of

- Rajya Sabha and Lok Sabha
- President, Rajya Sabha and Lok Sabha
- Election Commission, Rajya Sabha and Lok Sabha
- President, Election Commission, Rajya Sabha and Lok Sabha

94. Which of the following is not a feature of a democratic form of government ?

- Majority rule
- Rights of minorities
- Universal adult franchise
- Majoritarianism

95. Which of the following institutions have reserved seats for women ?

- Lok Sabha
 - Rajya Sabha
 - Legislative Assemblies
 - Municipalities
 - Panchayats
- A, C, D, E
 - B, C, D, E
 - D and E
 - E only

96. The following are major changes that occurred in agriculture in the post-Independent India.

- Use of high yielding variety (HYV) seeds
 - Introduction of Genetically modified (GM) crops
 - Application of chemical fertilizers and pesticides
 - Organic farming
- Which of the above signifies Green Revolution of late 1960s and 1970s ?
- A and B
 - B and C
 - A and C
 - B and D

97. Information relating to which of the following aspects are used to determine the human development in a country ?

- Health, education and poverty
- Inequality, health and education
- Health, education and income
- Women's health, education and income

98. A farmer in a farm produces 100 kg of paddy in one acre of land, during every season. One year, his son joined him in farming. Which of the following definitely indicates discussed unemployment ?

- Output remains at 100 kilograms
- Output increased to 150 kilograms
- Output increased to 200 kilograms
- Output increased to 250 kilograms

99. How membership in a Self Help Group helps a poor rural woman ?

- (a) Facilitates her how to help herself in daily work
- (b) To work together in factories and get regular employment
- (c) To overcome the problem of lack of collateral as borrowing is based on the group
- (d) To get free money from the government

100. Though consumers in India has the right to information about the product he/she purchases, which of the following aspects of a product, the producer need not inform the consumer ?

- (a) Date of production
- (b) Date of expiry
- (c) Address of the producer
- (d) The production process

ANSWERS

MENTAL ABILITY TEST

1. (a)	2. (c)	3. (a)	4. (d)	5. (a)	6. (a)	7. (a)	8. (c)	9. (a)	10. (d)
11. (c)	12. (a)	13. (b)	14. (d)	15. (c)	16. (b)	17. (b)	18. (b)	19. (b)	20. (c)
21. (b)	22. (d)	23. (c)	24. (a)	25. (b)	26. (a)	27. (a)	28. (d)	29. (c)	30. (d)
31. (c)	32. (b)	33. (a)	34. (b)	35. (d)	36. (b)	37. (a)	38. (a)	39. (d)	40. (d)
41. (c)	42. (d)	43. (c)	44. (d)	45. (a)	46. (c)	47. (d)	48. (d)	49. (b)	50. (d)

ENGLISH LANGUAGE

1. (d)	2. (d)	3. (d)	4. (a)	5. (b)	6. (b)	7. (a)	8. (a)	9. (d)	10. (c)
11. (a)	12. (d)	13. (b)	14. (a)	15. (c)	16. (a)	17. (b)	18. (c)	19. (a)	20. (d)
21. (b)	22. (a)	23. (c)	24. (a)	25. (d)	26. (b)	27. (c)	28. (b)	29. (b)	30. (a)
31. (c)	32. (b)	33. (a)	34. (c)	35. (d)	36. (b)	37. (a)	38. (c)	39. (b)	40. (a)
41. (b)	42. (b)	43. (c)	44. (d)	45. (c)	46. (b)	47. (c)	48. (a)	49. (c)	50. (d)

SCHOLASTIC APTITUDE TEST

1. (d)	2. (b)	3. (c)	4. (a)	5. (d)	6. (b)	7. (c)	8. (b)	9. (d)	10. (c)
11. (d)	12. (d)	13. (a)	14. (b)	15. (c)	16. (b)	17. (b)	18. (c)	19. (d)	20. (b)
21. (d)	22. (d)	23. (d)	24. (c)	25. (d)	26. (b)	27. (b)	28. (b)	29. (d)	30. (d)
31. (d)	32. (a)	33. (c)	34. (a)	35. (a)	36. (a)	37. (b)	38. (c)	39. (d)	40. (a)
41. (a)	42. (d)	43. (d)	44. (c)	45. (c)	46. (b)	47. (b)	48. (d)	49. (c)	50. (c)
51. (b)	52. (c)	53. (a)	54. (c)	55. (c)	56. (a)	57. (c)	58. (a)	59. (c)	60. (a)
61. (c)	62. (a)	63. (d)	64. (c)	65. (c)	66. (b)	67. (d)	68. (b)	69. (c)	70. (d)
71. (a)	72. (b)	73. (c)	74. (b)	75. (a)	76. (a)	77. (b)	78. (d)	79. (a)	80. (c)
81. (a)	82. (b)	83. (c)	84. (c)	85. (d)	86. (a)	87. (b)	88. (a)	89. (c)	90. (d)
91. (a)	92. (b)	93. (b)	94. (d)	95. (c)	96. (c)	97. (c)	98. (a)	99. (c)	100. (d)

EXPLANATIONS**MENTAL ABILITY TEST**

1. $214 + 51 \times 1 = 265$
 $265 + 51 \times 2 = 367$
 $367 + 51 \times 3 = 520$
 $520 + 51 \times 4 = 724$

3. According to question

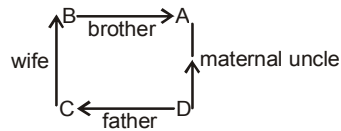
$$P + Q = Q \xrightarrow{\text{father}} P$$

$$P - Q = Q \xrightarrow{\text{wife}} P$$

$$P \times Q = Q \xrightarrow{\text{Brother}} P$$

From option (a)

$$A \times B - C + D$$



So A is the maternal uncle of D.

4. From option (a),
 $= 36 \div 12 - 6 + 9 \times 6$
 $= 3 - 6 + 54$
 $\Rightarrow 51 \neq 38$
 From option (b)
 $= 36 \times 12 \div 6 + 9 - 6$
 $= 72 + 9 - 6$
 $\Rightarrow 75 \neq 38$
 From option (c)
 $= 36 \div 12 \times 6 - 9 + 6$
 $= 18 - 9 + 6$
 $\Rightarrow 15 \neq 38$
 From option (d)
 $36 + 12 \times 6 \div 9 - 6$
 $= 36 + 8 - 6$
 $\Rightarrow 38 = 38$
 So option (d) will balance the given equation.
5. From option (a)
 $= b > a - c$
 also $a = b = c$
 $\therefore b > b - c$
 $b > 0$

Here a , b & c are positive integer, so option (1) is true.

9. According to figure the number opposite to 3 will be 1.

10. From statement I

$$\frac{1}{2}C = A$$

$$C = 2A$$

Now let A can complete a work in y day

$$\therefore C = 2y$$

Now A, B and C together can complete a work in x day.

$$\begin{aligned} \therefore \text{B's one day work} &= \frac{1}{x} - \left(\frac{1}{y} + \frac{1}{2y} \right) \\ &= \frac{1}{x} - \frac{3}{2y} = \frac{2y - 3x}{2xy} \end{aligned}$$

$$\text{So B can do a work in } \frac{2xy}{2y - 3x} \text{ day}$$

From statement II

$$A + C = \frac{1}{2}B$$

$$B = 2(A + C)$$

Let A & C together can complete in m days

$$\therefore B = 2m \text{ days}$$

From statement III

A and C taken together can complete the work in ' z ' day

$$\therefore \text{B's one day work} = \frac{1}{x} - \frac{1}{2} = \frac{z - x}{2x}$$

$$\therefore \text{B can complete the work in } \frac{2x}{z - x} \text{ days.}$$

So either II or III are sufficient for answering the problem.

11. Let a & b be the speed of boat and the speed of the current

From statement I

According to statement I

$$a = b + 2$$

$$a - b = 2 \quad \dots(i)$$

From statement II

$$b = a + 1$$

$$b - a = 1 \quad \dots(ii)$$

Compare statement (i) & (ii), we get the speed of the boat is not possible.

From statement III

$$x = \frac{y}{(a+b)} + \frac{y}{(a-b)}$$

$$\frac{x}{y} = \frac{2a}{(a+b)(a-b)} \dots(iii)$$

Compare equation (i) & (iii), we get

$$\frac{x}{y} = \frac{2a}{(2a-2) \cdot 2}$$

$$2ax - 2x = ay$$

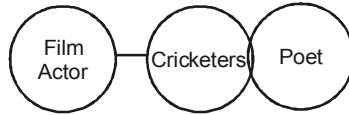
$$\therefore a = \frac{2x}{2x - y}$$

$$\text{So the speed of boat} = \frac{2x}{2x - y}$$

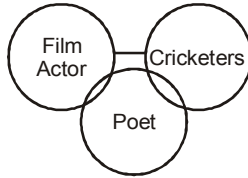
Thus statement I & III together are sufficient for answering the problem.

12. There are 20 triangles in the given figure.

13.



Or



So, option (b) support the given conclusion.

16. In the given question, the letter in the middle will be same as the letter on the left side and the right side and the same letters on the left side and the right side will be in middle. So the code for MUM will be UMU.

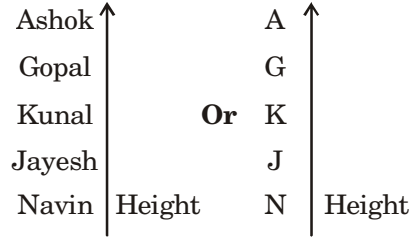
18.

Students

	A	B	C	D	E	F
Town	✓	✓	—	—	—	—
Village	—	—	✓	✓	✓	✓
Studious	—	—	—	✓	—	✓
Casual	✓	✓	✓	—	✓	—
Girls	✓	—	✓	✓	—	—
Boys	—	✓	—	—	✓	✓

So from the above table D is the studious girl from village.

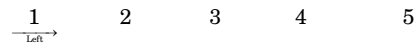
19.



So, Ashok is the tallest among all.

Professor Student Advocate Author Businessman

20.



Thus, the advocate is standing at 3rd place.

21. From the given columns, the code for Liver is $\delta\gamma\theta\pi\epsilon$

22. The code for

T	R	O	U	B	L	E
σ	λ	ρ	π	α	γ	θ

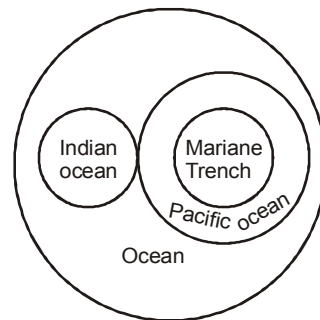
23. The code for

B	R	O	W	N
α	π	λ	η	υ

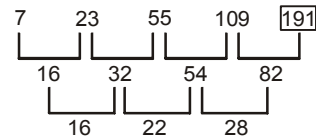
24. The code for

C	Y	C	L	E
β	θ	γ	μ	β

29.



31.



33. From the given venn diagram, the number of non educated non working urban females are 13.

34. The number of the urban males (not woman) who are educated but not working are 40.
36. The total number of non-working females but educated are 19.
38. Police stop the crime similarly Dam stop the affect of flood.
40. According to statement I, there is only one letter that is 'A' that represent a student who passed in all the four subject. So, I statement is false. For statement II, there are 4 letters that is B, C, L and Q that represent a student who passed on three subject only. So II statement is also false.

Therefore both the statement I and II are false.

41. $8 + 5 + 7 + 4 = 24$

$7 + 2 + 3 + 5 = 17$

$\therefore 6 + 4 + 3 + 5 = x$

$\therefore x = 18$

42. Let the cost of one pen, one pencil and one note book be ₹ x , ₹ y and ₹ z .

From statement I

$5x + 6y + 7z = 178 \quad \dots(i)$

From statement II

$6x + 4y + 2z = 124 \quad \dots(ii)$

Now if we compare equation (i) & (ii), there is a third statement is require to give the cost of one pen, one pencil and one note book. Therefore both statements are not sufficient to answer the question.

45. From the given question x is 60 days older than y .

From option (a)

The number of days from 4 February, 1984 to April 9, 1989 will be 60 days. So y is 60 days older. Therefore when y is 60 days older then x is 120 days older. Hence y will be half in age of x .

46. If any region face famine then that region get affected from hunger similarly if there is a war in any region then there is destruction on that region.

47. According to question,

P Q T

Now from statement I

S P Q

or

S P Q T

from statement II, R is at right end.

Now comparing statement I and II, we get

S P Q T R

So Q is in the middle.

Therefore both the statement I and II are sufficient to give the information.

48. $a \boxed{a} a b \boxed{a} a \boxed{a} b a \boxed{a} a b \boxed{a} \boxed{a} a b \boxed{a}$

49. The position of word U B L E

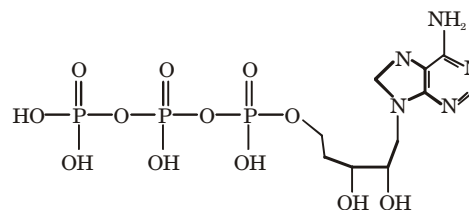
$= 21 - 2 + 1$

$= 20$

50. From the given answer, answer figure (d) is different from others because is the mathematical sign.

SCHOLASTIC APTITUDE TEST

- Human beings and chimpanzees were descended from common ancestors. About 5-8 million years ago, this common ancestor existed option (d) is not true about evolution of human beings.
- Adenosine triphosphate (ATP) is an energy currency for cell. ATP server as cellular energy due to common component of many biological reactions. Structure of ATP →



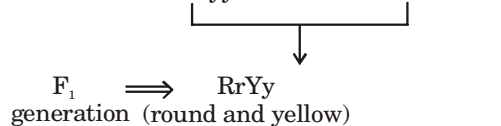
- When chemical substances become more concentrated at each trophic level, then this process is called biomagnification. Such substances are DDT, PCBs etc. In the adipose tissue of birds the concentration of nutrients increases because of biomagnification phenomenon.

4. Encephalitis is inflammation of the brain.
Japanese encephalitis is a disease spread by mosquito.
Malaria is a blood disease caused by parasite *plasmodium* and transmitted to people by female *Anopheles* mosquito.
5. Route of sperm movement in reproductive tract of is male testes – Vas deferens – urethra – penis.
6. Functions of Endoplasmic reticulum —
 - Transportation of proteins and other carbohydrates.
 - Help in nuclear membrane formation and biogenesis of membrane nuclear membrane.
 - Help in cellular reactions.
 - Synthesis of lipids, proteins, steroids (cholesterol).
 - Drug detoxification.Digestion and egestion of foreign materials is occurred by lysosomes or suicide bags.
7. Denitrification is the biological conversion of nitrate to nitrogen gas. Denitrification is the reverse process of nitrification. Important denitrifying bacteria are *Thiobacillus denitrificans*, *Pseudomonas*, *micrococcus denitrificans*.
8. Lysosomes act as waste disposal system of the cell. They contain a number of enzymes capable of proteins breaking down. Lysosomes are called suicide bags because they clean up the cell.
9. Reflex action is a spontaneous rapid motor response to a stimulus. A simple reflex action consists of 5 components—
 1. Receptor (Responds to stimulus).
 2. Sensory neuron (Receptor to axon & transmits impulse).
 3. Integration center (sensory impulse to motor impulse).
 4. Motor neuron (efferent impulses from integration centre).
 5. An Effector responds (glands, muscles)Hence, the sequence of events in a reflex action are →
Receptor → sensory neuron → CNS → motor neuron → effector responds.

- 10.** Peristalsis is a coordinated movement which is due to coordinated contractions muscular layers. Peristalsis movements enable food to progress along the digestive tract. Thus, option (c) is correct.

- 11. According to law of dominance given by Mendel —**

Round green seed	Wrinkled yellow seed
Parents $\Rightarrow$ RRyy	X rrYY



In first generation off springs are all round yellow.

12. Lichens are, fungi that live with algae, or mutualistic associations of alga and a fungus. Lichens are used as environmental indicators and sensitive to air pollutants (Primarily sulphur dioxide, heavy metals etc.)
13. Acquired characteristics are those changes of an organism which are the result of use, disuse and environmental factors influences. All mice born will have tails because somatic variations are not inherited to next generation (theory of inheritance of acquired characters).
14. Tendon is a fibrous connective tissue, connects, bone to muscle. A ligament connects bone to bone.
So, statement (b) is not correct.
15. In option (c), all three things are material object. But noise, light flash, vacuum are not material object that's why option (a), (b), (d) are not correct examples regarding matter.
16. In beaker (y), of 100 gm of ice at 0°C is added then final temperature = 0°C
But in beaker (x), if 100 gm. of water is added then final temperature
$$= 100 \times 1 (T_f - 0)$$
$$= 100 \times (20 - T_f) = 10^{\circ}\text{C}$$

$\therefore$ Water in the beaker (y) will be colder than water in beaker (x) because of absorption of latent heat.

17. $\therefore$ 62 gm of X is dissolved in 100g of water at 313k.
 $\therefore$ 50 gm of X will dissolve completely at 313 K temperature.
 $\therefore$ On cooling the solution of X from temperature 313 k to 203 k, 29 gm of X will crystallize out.

Thus, option (a) and (d) are correct statements.

18.

	Proton	Neutron	
$\therefore$ Element A $\rightarrow$	13	14	= 27
$\therefore$ Element B $\rightarrow$	8	8	= 16
$\therefore$ A =	${}_{13}\text{Al}^{27}$	B =	${}_{8}\text{O}^{16}$

 Formula of compound of elements A and B is Al_2O_3 .
 Hence, formula unit mass

$$= (27 \times 2) + (16 \times 3)$$

$$= 54 + 48 = 102.$$

19. Reaction of burning carbon in oxygen $\rightarrow$
 $\text{C}_{(s)} + \text{O}_{2(g)} \rightarrow \text{CO}_{2(g)} + \text{Heat} + \text{Light}$
 12 gm 32 gm $\rightarrow$ 44 gm
 Here, moles of carbon = $\frac{1}{4}$,
 (atomic mass of C = 12)
 And, moles of oxygen = 1
 (atomic mass of O = 16)
 When $\frac{1}{4}$ mole of O_2 react with $\frac{1}{4}$ mole of carbon, then CO_2 mass will be
 $\Rightarrow 3 + \frac{1}{4} \times 32 = 11 \text{ gm}.$

20. In compound NaX, X elements is chlorine
 (Electrons per shell)

	K	L	M
$\therefore$ Na =	2	2, 6	1
$\therefore$ Cl =	2	2, 6	2, 5

$\therefore$ Now, compound will be NaCl.

Number of electron in outer most shell of Cl = 7

21. In reaction $\text{O}_{2(g)}^0 + \text{H}_{2(g)}^0 \rightarrow \text{H}_2^{+1}\text{O}_{(g)}^{-2}$,
 oxidation of hydrogen and reduction of oxygen takes place.

Above reaction is an example of redox reaction because one substance is oxidized and the other reduced.

22. (a) $\text{NH}_4\text{OH} + \text{CH}_3\text{COOH} \rightarrow \text{CH}_3\text{COONH}_4 + \text{H}_2\text{O}$

Above reaction is a neutralization reaction because acid and base react to transform water and salt. Here combination of H^+ ions and OH^- ions involve.

- (b) $2\text{AgBr} \rightarrow 2\text{Ag} + \text{Br}_2$, this reaction is a photochemical reaction which takes place in the presence of light.

This reaction is used in photographic process.

- (c) In reaction $\text{ZnCO}_3 \rightarrow \text{ZnO} + \text{CO}_2$, thermal decomposition occurs.

- (d) $2\text{Al}_{(s)} + \text{Fe}_2\text{O}_{3(s)} \rightarrow 2\text{Fe}_{(s)} + \text{Al}_2\text{O}_{3(s)}$

The reaction of iron oxide and aluminium is an example of thermite reaction, this reaction is used in welding and preparation of metal from their oxides.

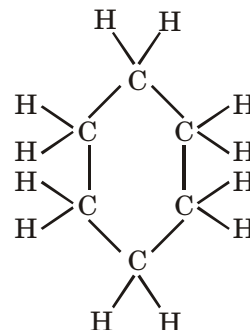
23. Weaker the acid, stronger the conjugate base, due to this effect correct order of acidic strength



Hence, option (d) is correct sequence of given solutions.

24. Due to less reducing power than given metal, carbon not extract these metals by reducing of their oxides. Carbon also has less affinity for oxygen than these metals.

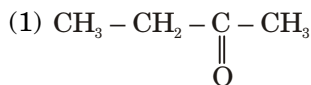
25. The hydrocarbon C_6H_{12} is a cyclohexane (or cycloalkane) which is produced by hydrogenation of benzene.



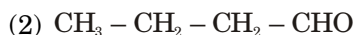
Cyclohexane

Cyclohexane does not have any double bond between carbons like in benzene because cyclohexane is saturated.

26. General formula aldehyde and ketone are $C_nH_{2n}O$ with C_4H_8O formula, compound can be $\rightarrow$



butanone
(a ketone)



butanal
(a aldehyde)

Thus, option (b) shows correct organic compound.

27.

Group (in periodic table)		
16 (chalcogens)	17 (halogens)	18 (noble gases)
	${}_9\text{F}$ (fluorine)	
(Sulphur) ${}_{16}\text{S}$	${}_{17}\text{Cl}$ (chlorine)	${}_{18}\text{Ar}$ (Argon)
	${}_{35}\text{Br}$ (bromine)	
	Valency = 1	Valency = 0

— Chlorine is more electronegative than bromine and sulphur.

— Argon has zero valency

— F, Cl and Br contain 1 valency.

So, option (b) is correct regarding periodic table's elements properties.

28. In curved path centripetal acceleration act.

29. By work energy theorem

$$\frac{1}{2}mv^2 = fd$$

30. Gravitational force

$$F = \frac{GM_1M_2}{R^2}$$

$$\frac{G(m)(4m)}{(100)^2} = m(a_1) \quad \dots(i)$$

$$\frac{G(m)(4m)}{(25)^2} = (4m)a_2 \quad \dots(ii)$$

31. The Buoyant force = $0.02 = \rho Vg$

$$0.02 = V(10^3) \times (10)$$

$$V = 2 \text{ cm}^3$$

- 32.

$$a = 10 \text{ m/sec}^2$$

$$S = ut + \frac{1}{2}at^2$$

$$S = 0 + \frac{1}{2}(10) \times (4)$$

$\Rightarrow$

$$S = 20$$

$$W = (20) \times (10) = 200$$

33. Stethoscope of doctors for finding quality, strength and frequency of human heart beat is based on the principle of multiple reflection.

34. By Snell's law.

$$n_1 \sin(i) = n_2 \sin(r)$$

- 35.

$$\frac{1}{F} = \frac{1}{F_1} + \frac{1}{F_2};$$

$$1.5 = \frac{1}{0.5} + \frac{1}{F_2}$$

36. By definition of myopia.

37. The electron has less mass as compared to proton. Hence, gain larger velocity.

Work = (Charge) (Potential difference)

$$(q_e)(5V) = \frac{1}{2}m_e V_e^2 \quad \dots(i)$$

$$(q_p)(5V) = \frac{1}{2}m_p V_p^2 \quad \dots(ii)$$

$$(q_e = q_p), (m_e < m_p)$$

38. The properties of magnetic lines of forces.

39. The construction of AC and DC generator.

40. A star produces its energy through the process of nuclear fusion.

- 42.

$$\sqrt{11 - 2\sqrt{30}} = \sqrt{6} - \sqrt{5}$$

$$\sqrt{7 - 2\sqrt{10}} = \sqrt{5} - \sqrt{2}$$

$$\text{and } \sqrt{8 + 4\sqrt{3}} = \sqrt{6} + \sqrt{2}$$

Simplifying we get

$$\begin{aligned} & \frac{1}{\sqrt{11 - 2\sqrt{30}}} - \frac{3}{\sqrt{7 - 2\sqrt{10}}} - \frac{4}{\sqrt{8 + 4\sqrt{3}}} \\ &= \sqrt{6} + \sqrt{5} - \frac{3(\sqrt{5} + \sqrt{2})}{3} - \frac{4(\sqrt{6} - \sqrt{2})}{4} \\ &= 0 \end{aligned}$$

43. Min. of $P(x) = \frac{4(3)(2) - (5)^2}{4(3)} = \frac{-1}{12}$

44. $|x^2| + |x| - 6 = 0$
 $\Rightarrow (|x| + 3) + (|x| - 2) = 0$
 $\Rightarrow x = \pm 2$

45. Draw $AM \perp BC$ then

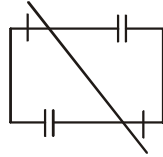
and $AM = 6\sqrt{3}$
 $DM = 2$
 $\Rightarrow AD = \sqrt{112}$

46. $\frac{BX^2}{AB^2} = \frac{1}{2}$
 $\Rightarrow \frac{BX}{AB} = \frac{1}{\sqrt{2}}$
 $\Rightarrow \frac{AX}{AB} = \frac{2 - \sqrt{2}}{2}$

47. $P_1 + P_2 + P_3 = \text{height of Equilateral}$

$$\Delta = \frac{\sqrt{3}a}{2}$$

48.



Whenever line dividing the square passes through its centre it divides square into two trapezium. As there are infinitely such lines. There will be infinitely many possibility

49. Total number of partitions

$$= {}^5C_1 + {}^5C_2 + {}^5C_3 + {}^5C_4 + 1 = 31$$

50. Let $n^2 - 3n + 3 = k^2$

$$\Rightarrow n^2 - 3n + 3 - k^2 = 0$$

For k to be an integer

$(-3)^2 - 4(3 - k^2)$ is a perfect square.

Let $9 - 12 + 4x^2 = p^2$

$$\Rightarrow (2k + p)(2k - p) = 3$$

$$\Rightarrow k = 1$$

Hence $n^2 - 3n + 2 = 0$

$$\Rightarrow n = 1, 2$$

51. Let numbers are $15x$ and $15y$

Then $15xy = 225$

$$\Rightarrow xy = 15$$

either $x = 15,$

$$y = 1$$

Or $x = 1,$

$$y = 15$$

Hence $(x, y) = (1, 15) \text{ or } (15, 1)$

52. Ratio = $\frac{\frac{120^\circ}{360^\circ} \pi r^2 - \frac{1}{2} r^2 \frac{\sqrt{3}}{2}}{\frac{60^\circ}{360^\circ} \pi r^2 - \frac{1}{2} r^2 \frac{\sqrt{3}}{2}}$
 $= \frac{4\pi - 3\sqrt{3}}{2\pi - 3\sqrt{3}}$

53. Circumcircle

54. $x^2 + y^2 + z^2 = m^2 + n^2$

$$15^2 + 4^2 + 3^2 = 15^2 + 5^2$$

55. Centroid divides a Δ into three equal areas

56. Rhombus

57. If circles touch internally then number of common tangent in 1

58. Sum of altitudes = $20 + 21 + \frac{420}{29}$

$$= \frac{1609}{29} \text{ units}$$

59. $2b = c + a,$

$$\text{sum of roots} = \frac{2b}{a} = \frac{c+a}{a}$$

60. $\frac{\text{Ar PQRS}}{\text{Ar ABCD}} = \frac{\left(\frac{a}{\sqrt{2}}\right)^2}{a^2} = \frac{1}{2}$

■ ■

NTSE - 2013

NATIONAL LEVEL

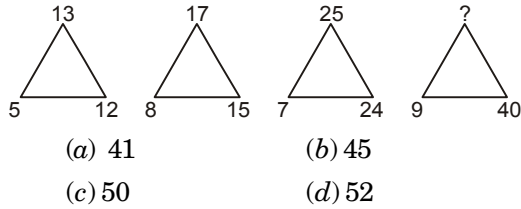
PART I : MENTAL ABILITY TEST

- Here are some words translated from an artificial language
mie pie is blue light
mie tie is blue berry
aie tie is rasp berry
Which words could possibly mean "light fly"?
(a) pie zie (b) pie mie
(c) aie zie (d) aie mie
- If in certain code, STUDENT is written as RSTEDMS, then how would TEACHER be written in the same code?
(a) SZZDGEQ (b) SZDDGEQ
(c) SDZDGDQ (d) SDZCGDQ
- Which group of letters is different from others ?
(a) CBAED (b) IJHGK
(c) SRQPT (d) TVWYZ
- In the following letter sequence, some of the letters are missing. These are given in order as one of the alternatives below. Choose the correct alternative.
 $\alpha\beta\_ \alpha\_ \beta\beta\beta\_ \alpha\alpha\alpha\_ \beta\beta$
(a) $\alpha\beta\beta\alpha$ (b) $\beta\alpha\beta\alpha$
(c) $\alpha\alpha\alpha\beta$ (d) $\alpha\beta\alpha\beta$
- Fill in the missing number

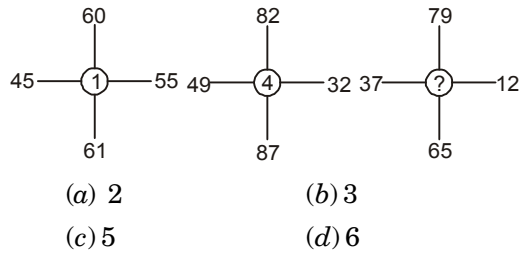
-C	2B	-3A
2A	?	-B
-3C	-A	-2B

(a) -3C (b) -2C
(c) 3C (d) 2B
- Vimla used to board the train from Metro Station A for going to her office. Since Station A is a terminus, she had no problem in getting a seat. Ever since she shifted to Locality B she finds it difficult to get a seat, as by the time the train reaches Locality B it becomes crowded. Find the statement among the alternatives which must be true as per the given information.
(a) Vimla would prefer to take a bus rather than the metro
(b) Vimla's travel to office has become less comfortable ever since she has shifted.
(c) Commuters staying in and around Locality B would demand metro services originating from station near Locality B.
(d) Vimla would look for a job close to her home.
- Ramesh started going for regular morning walks for controlling his blood sugar level. He did so for a month and also started taking Yoga lessons, without going for any pathological examination. He underwent pathological test after two months and found that the blood sugar level has come down. Presuming that he had no changed his food habits during these two months, which statement among the alternatives given below follows most logically?
(a) Blood sugar level comes down after doing regular morning walk.
(b) Blood sugar level comes down after doing Yoga.
(c) Blood sugar level comes down on doing regular morning walk and Yoga
(d) Regular morning walk, Yoga or both may bring down sugar level despite not changing food habits.

8. Find the number in the position of '?'.



9. Identify the number in the position of '?'



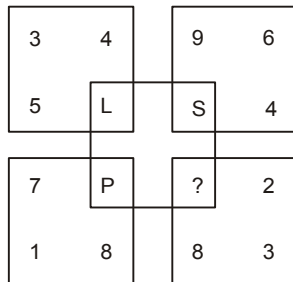
10. Find the next number in the sequence 0, 2, 24, 252, _____

(a) 620 (b) 1040
(c) 3120 (d) 5430

11. Find the next number in the sequence 6, 24, 60, 120, _____

(a) 180 (b) 210
(c) 240 (d) 360

12. Find the letter to be placed in place of '?' in the figure given.



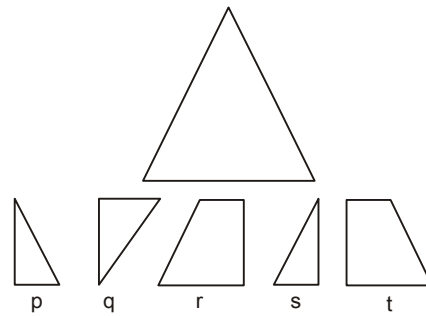
(a) M (b) N
(c) Q (d) R

13. In this multiplication question the five letters represent five different digits. What are the actual figures? There is no zero.

SEAM
T
MEATS

- (a) M = 3, E = 9, A = 7, T = 4, S = 8
(2) M = 3, E = 9, A = 7, T = 8, S = 4
(3) M = 4, E = 3, A = 9, T = 7, S = 8
(4) M = 4, E = 9, A = 3, T = 7, S = 8

14. Identify which among the pieces given below will not be required to complete the triangular pattern shown below.

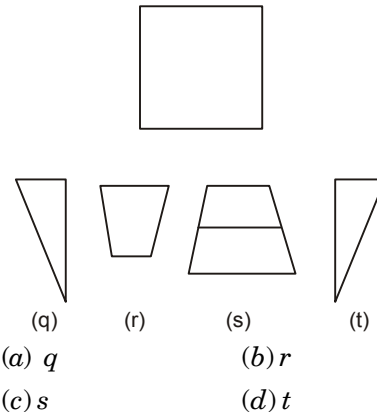


(a) q (b) r
(c) s (d) t

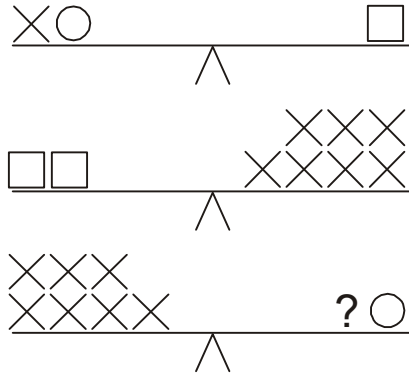
15. Find the missing number in the series 2, 10, 26, _____, 242

(a) 80 (b) 81
(c) 82 (d) 84

16. A pattern is given below. You have to identify which among the following pieces will not be required to complete the pattern.

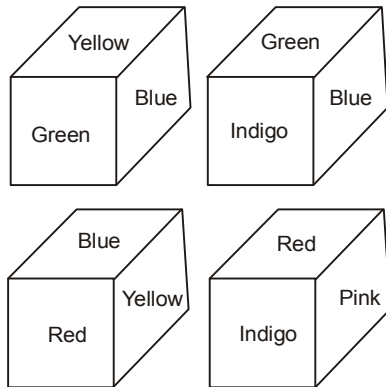


17. Which symbol replaces the '?'. Figure below represent a balance.



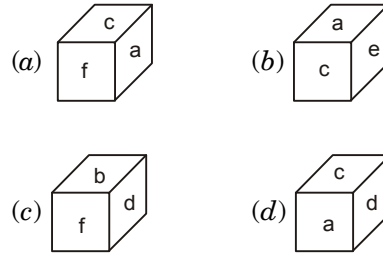
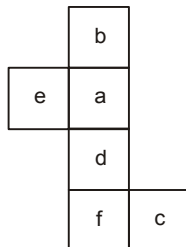
- (a) (b)
(c) (d)

18. On the basis of the four positions of a dice given below find the colour of the face opposite 'Yellow'.

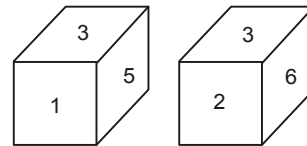


- (a) Indigo (b) Red
(c) Pink (d) Blue

19. If the given figure is folded a form a box, which among the boxes below will be formed ?

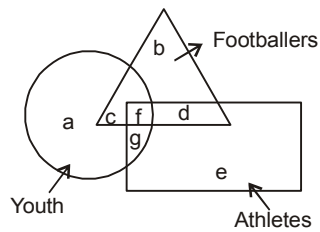


20. Two positions of a dice are shown. Which number will appear on the face opposite the one having 5 ?



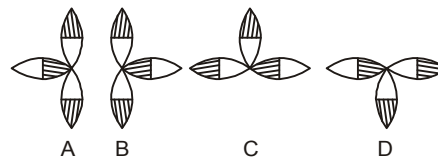
- (a) 1 (b) 2
(c) 4 (d) 6

21. In the figure, the circle represents youth, the triangle represents footballers and the rectangle represents athletes. Which letter (s) represent(s) athletes among youths who are not footballers ?



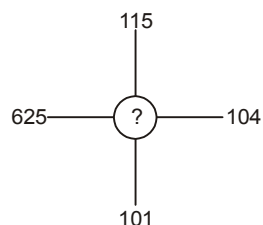
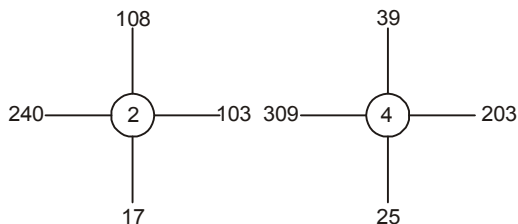
- (a) g (b) g and c
(c) f (d) f and d

22. Find the odd man out



- (a) A (b) B
(c) C (d) D

23. Identify the number corresponding to the '?'



- (a) 3 (b) 5
(c) 7 (d) 8
24. Which of the given alternative is the mirror image of REASON, if the mirror is placed below the word ?
(a) ЯEVA2ON (b) BEVA2ON
(c) ЯEA2ON (d) BEVA2ON
25. A sprinter goes off the starting block for 100 m run and at that instant the second-hand of a stopwatch had pointed towards North. He touches the finishing line exactly after 12 seconds. In which direction did the second hand point when he just crossed the finishing line?
(a) 18° North of East
(b) 18° East of North
(c) 72° North of East
(d) 82° East of North
26. Two candles are of different lengths and thicknesses. The short and the long ones can burn respectively for 3.5 hour and 5 hours. After burning for 2 hour, the lengths of the candles become equal in length. What fraction of the long candle's height was the short candle initially ?

(a) $\frac{2}{7}$ (b) $\frac{5}{7}$

(c) $\frac{3}{5}$ (d) $\frac{4}{5}$

27. Mother was asked how many gifts she had in the bag. She replied that there were all dolls but six, all cars but six, and all books but six. How many gifts had she in all ?

(a) 9 (b) 18
(c) 27 (d) 36

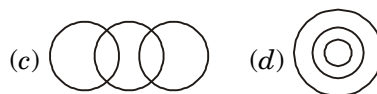
28. Question given below has a problem and two statements I & II. Decide if the information given in the statement is sufficient for answering the problem:

K, R, S and T are four players in Indian Cricket team. Who is the oldest among them?

I : The total age of K & T together is more than that of S

II : The total age of R & K together is less than that of S.

- (a) Data in statement I alone is sufficient
(b) Data in statement II alone is sufficient
(c) Data in both statements together is sufficient
(d) Data in both statement together is not sufficient
29. Which of the following diagram/sets indicate the relation between women, mothers and parents ?



30. In a diary, there are 60 cows and buffalos. The number of cows is twice that of buffalos. Buffalo X ranked seventeenth in terms of milk delivered. If there are 9 cows ahead of Buffalo. X, how many buffalos are after in rank in terms of milk delivered ?

(a) 10 (b) 11
(c) 12 (d) 13

31. What is the mirror image of



(a) 2A18d (b) 24k8d
(c) 2A13d (d) 2A13b

Question 32 to 36 are based on the following information:

$\alpha, \beta, \gamma, \delta, \epsilon, \phi, \Psi, \eta$ are sitting on a merry-go-round facing at the centre. δ is second to the left on η who is third to the left of α . β is fourth to the right of γ who is immediate neighbour of η . Ψ is not a neighbour of β or γ . ϕ is not a neighbour of β .

32. Who is third to the left of β ?
- (a) α (b) γ
(c) ϕ (d) Ψ
33. In which of the following pairs is the first person sitting to the immediate right of the second person ?
- (a) δ, Ψ (b) β, ϵ
(c) η, β (d) Ψ, η
34. What is ϕ 's position with respect to Ψ ?
- (a) Third towards right
(b) Third towards left
(c) Second towards right
(d) Second towards left
35. Who is sitting between α and β ?
- (a) Both ϵ and η
(b) Both ϕ and γ
(c) Only ϵ
(d) Only ϕ

36. How many of them are sitting between γ and β ?

(a) 0 or 6 (b) 1 or 5
(c) 2 or 4 (d) 3

36. How many of them are sitting between γ and β ?

(a) 0 or 6 (b) 1 or 5
(c) 2 or 4 (d) 3

37. In a school 120 boys have registered for a singles carom tournament. Each match eliminates one player. How many matches are to be organized to determine the champion ?

(a) 60 (b) 61
(c) 119 (d) 120

38. Amongst five friends, Lata, Alka, Rani, Asha and Sadhana. Lata is older than only three of her friends. Alka is younger to Asha and Lata. Rani is older than only Sadhana. Who amongst them is the eldest ?

(a) Asha (b) Lata
(c) Alka (d) Sadhana

39. Twenty four teams are divided into 4 groups of six teams each. Within each group the teams play each other exactly once. The winners of each group then play in the semi-finals. Winners of the semi-finals play in the finals and losers for the 3 place. How many matches are played?

(a) 60 (b) 63
(c) 64 (d) 66

(Q. 40-41) : Take the given statement(s) as true and decide which of the conclusion logically follows from the statements.

40. Statement:

All Actors are Musicians. No Musician is a Singer. Some Singers are Dancers. Some Dancers are Musicians.

Conclusions :

I : Some Actors are Singers

II : Some Dancers are Actors

III : No Actor is a Singer

- (a) Only conclusion I follows.
- (b) Only conclusion III follows.
- (c) Exactly one of conclusion I, III follows.
- (d) Only conclusion II follows.

41. Statement :

All Clocks are Alarms. No Clocks are Cuckoos. All Cuckoos are Alarms. Some Cuckoos are Birds.

Conclusion :

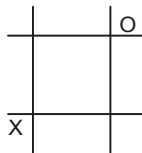
I : Some Alarms are Birds.

II : No Clock is a Bird

III : All Birds are Alarms

- (a) Only conclusion I follows.
- (b) Only conclusion II follows.
- (c) Only conclusion III follows.
- (d) Both conclusions II and III follow

- 42.** Two players X and O play a game of "noughts and crosses" on a 3 × 3 grid. The purpose of the game is for a player to get 3 symbols belonging to the player in a straight line (vertically, horizontally or diagonally). Each player marks one symbol on his or her turn. After two moves (1 turn each), the grid looks as follows with X to play next. Where should X put his symbol next so that he will always win this game finally regardless of how well O plays?



- (a) Bottom row right corner
- (b) Bottom row middle cell
- (c) Middle row left most cell
- (d) It is not possible to always ensure X wins if O plays carefully

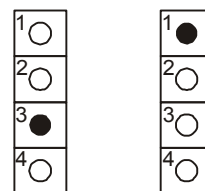
- 43.** An electrical circuit for a set of 4 lights depends on a system of switches A, B, C and D. When these switches work they have the following effect on the lights: They each change the state of two lights (i.e. on becomes off and off becomes on). The lights that each switch controls are as follows.

A	B	C	D
1 and 2	2 and 4	1 and 3	3 and 4

= ON

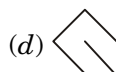
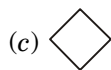
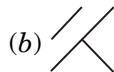
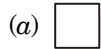
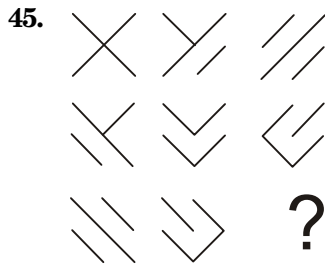
= OFF

In configuration 1 shown below, switches CBDA are activated in turn, resulting in configuration 2. One switch did not work and had no effect at all. Which was that switch?



configuration1 configuration2

- (a) A
 - (b) B
 - (c) C
 - (d) D
- 44.**
-
- is to
- as
- is to
- ?
- (a)
 - (b)
 - (c)
 - (d)

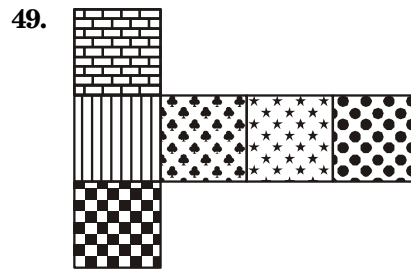


46. A, B, C, D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting next to E, who is sitting on the left end of the bench. C is on the second position from the right. A is to the right of B and E. Counting from the left, in which position is A sitting?

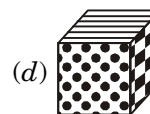
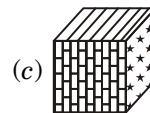
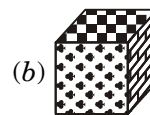
- (a) 2
(b) 3
(c) 5
(d) Cannot be determined from the given conditions
47. I left home for bringing milk between 7am and 8am. The angle between the hour-hand and the minute-hand was 90° . I returned home between 7 am and 8 am. Then also the angle between the minute-hand and hour-hand was 90° . At what time (nearest to second) did I leave and return home?
- (a) 7h 18 m 35s & 7h 51m 24s
(b) 7h 19m 24s & 7h 52m 14s
(c) 7h 20m 42s & 7h 53m 11s
(d) 7h 21m 49s & 7h 54m 33s

48. I left home at 3:00pm and returned at 3:48pm. The clock was rotated by 45° , so that when I left, the hour-hand of a clock was pointing along the south-east direction. In which direction would the hour-hand point when I returned?

- (a) 15° East of South
(b) 21° East of South
(c) 63° South of East
(d) 27° South of East



When the above is folded into a cube, which is the only cube that can be produced amongst the following?



50. What will be water image of CHICK ?
- (a) CHICK
(b) CHIOX
(c) KCIHC
(d) XOIHO

PART II : ENGLISH LANGUAGE

I. Read the following passage and answer the question given after it.

Jyoti lived with her mother in a small village. From a young age she had witnessed her mother, a widow, being ill treated by the villagers. But when she was in high school she began to understand things. She couldn't take the insults to her mother anymore. She decided to change the way widows were viewed in village society. Jyoti started a "Widow Empowerment Campaign". She spoke to village elders and knocked on two hundred doors to spread her message. She learned to organize street plays which she used to make people aware about the plight of widows.

Naturally her ideas were not acceptable to the society entrenched in tradition. People pushed her out of their houses and refused to listen to what she had to say. But she went on relentlessly without faltering.

Today, widows are allowed go out of their homes like others. Many, including her mother are now employed at organisations and literacy centres.

1. The story of Jyoti is an illustration of
 - (a) rigidity of traditional families.
 - (b) organisation of street plays.
 - (c) the spread of employment opportunities for widows
 - (d) crusade of a young girl for social change.
2. A major factor in Jyoti's success seems to be :
 - (a) social and economic development programmes.
 - (b) sympathy and encouragement from her mother.
 - (c) her own courage and determination.
 - (d) support from her friends.

3. "She knocked on two hundred doors" indicates that Jyoti
 - (a) went knocking at the doors one after the other.
 - (b) visited people at their houses individually.
 - (c) approached a large number of people.
 - (d) spoke to every family in the village.
4. The words 'entrenched in tradition' imply that villagers .
 - (a) deeply believed in traditions.
 - (b) were opposed to traditions.
 - (c) had begun to shed traditions.
 - (d) had begun to follow traditions.
5. Jyoti's relentless campaign
 - (a) created an unrest.
 - (b) created a dent in society.
 - (c) left people untouched.
 - (d) created a revolution.

Q. 6-10 Read the following passage and answer the questions given after it.

Designing toys for children is chall-enging yet stimulating. Considering the low attention span of today's kids, toys with higher play value are able to engage them longer. Young minds are also quite impressionable. So toy design has to be conscious about ethics and values and also aid their cognitive, physical, emotional and social skills. But above all, fun is the primary objective of play, Fun is what makes them come back for more; makes them learn and remember. Another crucial factor is eco-friendliness. Some of the best pro-environment design processes can actually be found in the Indian handicrafts industry. One such example is the lathe-turned toy craft of Channapatna— a town near Bangaluru. The age old craft uses wood and colours made completely from natural materials like turmeric, kumkum, indigo, etc. Creating modern designs based on such conventional techniques opens up a new range of products that are unique, educational and organic.

6. Toys are said to have a high play value when
 - (a) they present challenges to designers and to children who play with them.
 - (b) they are costly but also have high quality.
 - (c) they are able to keep children's attention for long periods.
 - (d) they are used by a large number of children.
7. The reference to the 'impressionable nature' of young children is to suggest that
 - (a) they are attracted to toys that are well designed and brightly coloured.
 - (b) their attitudes, values and ethics can easily be influenced by others.
 - (c) they like toys that help them learn and remember while having fun.
 - (d) they like toys which are small in size.
8. Toys that are considered eco-friendly are those that
 - (a) promote interest in preserving the natural environment.
 - (b) use natural materials.
 - (c) help the development of social skills.
 - (d) use high quality fibre.
9. Which of the following is true for the toy craft of Channapatna?
 - (a) It is famous for their beautiful shapes and bright colours.
 - (b) It is made by artificial materials.
 - (c) It is based on modern design principles and efficient machines.
 - (d) It is an old and traditional practice.
10. 'Fun is what makes them come back for more; makes them learn and remember.' means
 - (a) Children learn through fun and play.
 - (b) Children play more and more for fun.

(c) Children remember things while playing.

(d) Children learn only through play.

Q.11-15 Read the following passage and answer the questions that follow.

Years ago, people woke up to find sparrows chirping in their backyard. A noisy lot, they took grains right from your hand if you had befriended them. They got over their fear easily and demanded food or water with their loud chirping if you had forgotten to give them their regular share of food. Tiny pink beaks opened to morsels of food or worms sometimes regurgitated by the parent birds. We had a splendid time watching the bird family bond and as children sat gazing at them as they picked up grain or splashed about us in muddy water.

Many people have written poems and lyrics on sparrows, their noisy chirps, their friendly nature, and their spotty feathers. Sparrows were a menace on the fields. There were guards with slings and stones to chase them away as they ate grain from standing crops. Now people are trying to woo them back to nature.

11. The author calls sparrow a friendly bird because
 - (a) they chirp in the backyard.
 - (b) they demand food.
 - (c) they eat from our hand
 - (d) they are with humans always.
12. Which of the following statements shows that watching sparrows was fun for the author?
 - (a) Tiny beaks opened to morsels of food or worms sometimes regurgitated by the parent birds.
 - (b) Children sat gazing at them as they picked up grain or splashed about us in muddy water.
 - (c) They demanded food or water with their loud chirping.
 - (d) They live near our houses.

13. The farmers consider sparrows a nuisance because
 (a) they are loud and noisy.
 (b) they chirp loudly.
 (c) they splash around in muddy water.
 (d) they eat up the grains from the fields.
14. 'Regurgitated by the parent birds' means
 (a) chewed and fed
 (b) digested and brought back
 (c) chewed and spat out.
 (d) swallowed and brought back
15. Sparrows have been a topic of interest for many...
 (a) poets (b) scientists
 (c) farmers (d) children

Q.16-17 The following five sentences come from a paragraph. The first and the last sentences are given.

Choose the order in which the three sentences (PQR) should appear to complete the paragraph.

16. S1 One major problem that the world faces today is the rapid growth of population.
 S2 _____
 S3 _____
 S4 _____
 S5 This will cause serious problems of hunger and overcrowding!
 P- This is often referred to as population explosion.
 Q- It is not so much the actual population, but its increase that is alarming.
 R- Experts predict that by 2020 there will be about 10 billion people in the world.

Choose from the options given below:

- (a) QPR (b) PRQ
 (c) PQR (d) QRP

17. S1 Supposing you have to make a payment of Rs. 100, you could do so in coins.

S2 _____

S3 _____

S4 _____

S5 This paper money saves you a lot of trouble and also saves precious metal.

P- The person to whom the payment is being made would also find it very tedious.

Q- So the government gives you the alternative of paper money.

R- But so many coins would be very cumbersome to carry around.

Choose from the options given below:

- (a) RQP (b) PRQ
 (c) PQR (d) RPQ

Q.18-19 Following questions have the second sentence missing. Choose the appropriate sentence from the given options to complete it.

18. A. My sister and I have never seen a house on fire before.

B. _____

C. We rushed out and saw fire blazing in the distance.

- (a) We joined a large crowd of people who had gathered at the end of the street.
 (b) One evening when we heard fire engines rushing past my house.
 (c) What a terrible scene we saw that day.
 (d) We went out with everyone.

19. A. By climbing summit of Mount Everest you are overwhelmed by a deep sense of joy and thankfulness.

B.

- C. The experience changes you completely and you are never the same again.

- (a) It is a joy that lasts a lifetime.
(b) Yet, it is a fleeting moment.
(c) You feel humiliated.
(d) It is a justification.

Q. 20-29 Choose the word which best fills the blank from the four options given.

20. It is a good practice to the document once again before sending it for publication

- (a) scan (b) peer
(c) look up (d) see

21. When the teacher asked Ravi a question, he gave her a blank _____.

- (a) gaze (b) glare
(c) stare (d) peek

22. She had her _____ fixed on the horizon.

- (a) glance (b) sight
(c) gaze (d) look

23. If you _____ something amiss, please contact the authorities

- (a) notice (b) view
(c) sight (d) glimpse

24. I caught a _____ of him in the crowd for a fleeting moment before he disappeared.

- (a) glare (b) glance
(c) glimpse (d) look

25. After the shipwreck, they were _____ on the island for three days.

- (a) sleeping (b) marooned
(c) guided (d) found

26. The landlord _____ the tenant for not paying rent.

- (a) evicted (b) posted
(c) forced (d) shooed

27. The village in the wake of tsunami, was a terrifying _____ of a devastation.

- (a) scenery (b) scene
(c) landscape (d) moment

28. The workers angrily voiced their _____ to the management.

- (a) preservation (b) resentment
(c) irritation (d) resistant

29. A fair-minded person is required to _____ the dispute between the two brothers.

- (a) mediate (b) interrupt
(c) intercept (d) moderate

Q.30-35 Select the meaning of the given phrases/idioms.

30. Pulled up

- (a) helped (b) advised
(c) told (d) scolded

31. Keep up

- (a) maintain (b) leave behind
(c) confirm (d) accept

32. Carry on

- (a) start (b) execute
(c) finish (d) continue

33. Hand in glove

- (a) in collusion
(b) holding opposite views
(c) warm and secure
(d) with friends

34. Be in someone's shoes

- (a) wear shoes that do not belong to self
(b) be like them
(c) to pretend to be somebody else
(d) imagining oneself to be in another person's situation

35. Pull someone's leg
 (a) to tease somebody
 (b) to throw somebody out
 (c) to trip a person purposely
 (d) to stretch someone's leg

Q.36-43 In the following passage there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the given options.

At markets or at county fairs in the old days, the customer had to be on guard against a dishonest trader. A house wife, for example, wanting (36) _____ buy a live piglet might be (37) _____ a discount if she bought (38) _____ packed one, tied up in a small sack (39) _____ a poke. Anyone who agreed to (40) _____ a pig in a poke was naturally (41) _____ a risk. The pig might be ill (42) _____ even dead: Or it might turn (43) _____ to be not a piglet at all.

36. (a) for (b) from
 (c) into (d) to
 37. (a) served (b) offered
 (c) preferred (d) liked
 38. (a) the (b) an
 (c) a (d) some
 39. (a) said (b) known
 (c) called (d) thought
 40. (a) buy (b) sell
 (c) give (d) eat
 41. (a) taking (b) making
 (c) getting (d) sitting
 42. (a) but (b) taking
 (c) or (d) to
 43. (a) on (b) out
 (c) in (d) into

Q.44-47 Select the most appropriate option to fill in the blanks from the given alternatives.

44. The teacher spoke _____ to the students who were naughty.
 (a) kind
 (b) kindness
 (c) kindly
 (d) kindliness
 45. The builder _____ her problem by not constructing a boundary wall around her house.
 (a) compound
 (b) compounded
 (c) comprehend
 (d) compounding
 46. _____ he has started arriving on time for all the functions.
 (a) Lately (b) Late
 (c) Later (d) Latter
 47. After a week's rain, the _____ was as its highest.
 (a) humid (b) humidness
 (c) humidity (d) humidify

Q.48-50 Select the word which means the opposite of the given word.

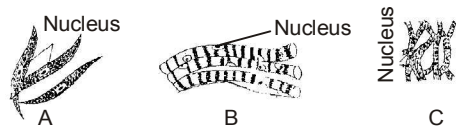
48. Scared
 (a) nervous (b) brave
 (c) cautious (d) timid
 49. Conquer
 (a) descent (b) victory
 (c) perish (d) surrender
 50. Criticize
 (a) fault (b) create
 (c) defend (d) acclaim

PART III : SCHOLASTIC APTITUDE TEST

1. An animal cell, a plant cell and a bacterium share the following structural features :

- (a) Cell membrane, endoplasmic reticulum, vacuoles
- (b) Cell wall, plasma membrane, mitochondria
- (c) Cell wall, nucleus, cytoplasm
- (d) Plasma membrane, cytoplasm, ribosomes

2. Given below are figures of three kinds of muscle fibres.



Which one/ones would you find in the grass hopper's legs ?

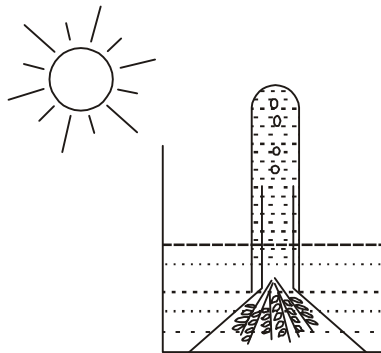
- (a) A only
 - (b) B only
 - (c) A and C
 - (d) B and C
3. A plant that has well differentiated body, special tissues for transport of water and other substances, but does not have seed or fruits is a(n):
- (a) Bryophyte
 - (b) Angiosperm
 - (c) Gymnosperm
 - (d) Pteridophyte
4. Raju was suffering from severe stomach pain and the doctor diagnosed that he was suffering from peptic ulcers and treated him with antibiotics. He was relieved of pain. What could be the reason for peptic ulcers?
- (a) Reduced secretion of hormones.
 - (b) Reduced water content.
 - (c) Growth of *Helicobacter pylori*.
 - (d) Excess secretion of enzyme.
5. The average temperature of the Earth remains fairly steady as compared to that of the moon because of the

- (a) atmosphere
- (b) lithosphere
- (c) biosphere
- (d) hydrosphere

6. In flowers, which one of the following conditions will increase chances of self-pollination?

- (a) Pistil is longer than stamens in a flower
- (b) Stamens are just above the stigma of a pistil in a flower.
- (c) In all flowers of the plant only pistil is present.
- (d) In all flowers of the plant only stamens are present.

7. Photosynthesis in an aquatic plant was measured by counting the number of O_2 bubbles coming out of the cut end of the plant. What will happen to O_2 production if you use a pipe blow air from your mouth into the beaker?



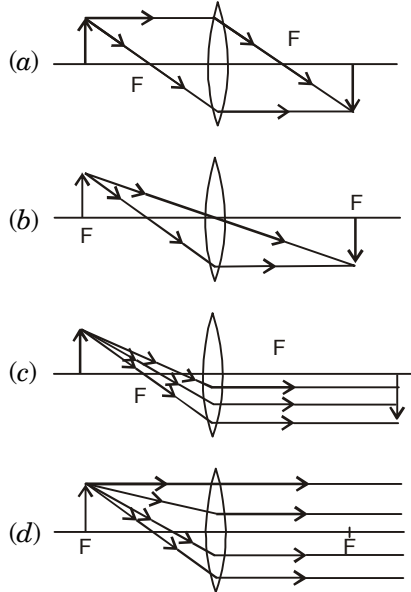
- (a) Air from mouth contains O_2 which is being added to the plant. Hence increase in O_2 production.
- (b) Air from mouth contains CO_2 which is utilized in photosynthesis. Hence increase in O_2 production.
- (c) Bacteria from mouth will infect plant. Hence reduction in O_2 production.
- (d) Water is already in contact with air. Hence air from mouth will have no effect.

8. A person with blood group 'A' can donate blood to the persons with blood group 'A' or 'AB' because it
- has both 'A' and 'B' antigens.
 - has only 'A' antigen and 'B' antibodies.
 - has only 'B' antigen and 'A' antibodies
 - does not have any antigens and antibodies.
9. What would happen to the person if cerebellum of his brain is damaged?
- He will lose his memory power.
 - He will not be able to swallow food properly.
 - He will be unable to coordinate and stand properly.
 - He will lose his powers of vision and hearing.
10. Which of the following statements are correct?
- Tapeworms are hermaphrodites and undergo self-fertilization.
 - Earthworms are hermaphrodites and undergo self-fertilization.
 - Tapeworms are hermaphrodites but undergo cross-fertilization.
 - Earthworms are hermaphrodites but undergo cross-fertilization
- A and B
 - B and C
 - C and D
 - D and A
- 11-12 A group of red beetles lives on green leaves of a tree. Beetles multiply through sexual reproduction. One day, some green beetles are seen among the red beetles. Green beetles breed to produce green progeny. Crows on the tree eat beetles.
11. Some green beetles appear among the red beetle because
- beetles become green by accumulating chlorophyll from the green leaves that they eat.
 - natural variations occur during sexual reproduction.
 - red beetles mimic green colour of leaves whenever they see crows.
 - beetles change colour from red to green with change of season.
12. The colour composition of beetle population is likely to change in the following manner:
- Both red and green beetle survive equally.
 - Only the red beetle survives.
 - More red beetles survive than the green.
 - More green beetles survive than the red
13. In the following food chain who gets less energy than the tertiary consumer and more than the primary consumer?
- Grass → Grasshopper → Frog → Snake → Eagle
- Grasshopper
 - Frog
 - Snake
 - Eagle
14. Non-degradable and fat soluble pollutant, such as DDT enters the food chain, the pollutant
- magnifies in concentration at each trophic level.
 - 'degrades at first trophic level.
 - accumulates in the body fat of organism at first trophic level and does not pass to second trophic level.
 - decreases in concentration at each trophic level.
15. A drop each of two non-corrosive and non-irritating liquids A and B at a temperature of 22°C are placed on the skin. Liquid A gives a more cooling sensation than liquid B. Which of the following can be said about the liquids A and B?
- Liquid A has higher boiling point than that of liquid B.
 - Liquid A has higher latent heat of vaporisation than that of liquid B.
 - Liquid A has lower latent heat of vaporisation than that of liquid B.
 - The boiling points of liquid A and B are equal.

16. There is a mixture of three solid compounds A, B and C. Out of these compounds A and C are soluble in water and compound C is sublimable also. In what sequence the following techniques can be used for their effective separation?
- Filtration
 - Sublimation
 - Crystallisation from water extract
 - Dissolution in water
- (II), (I), (IV), (III)
 - (IV), (I), (II), (III)
 - (I), (II), (III), (IV)
 - (II), (IV), (I), (III)
17. Which of the following is a suitable example for illustrating the law of conservation of mass ? (Atomic mass of O = 16; H = 1)
- 18g of water is formed by the combination of 16g oxygen with 2g of hydrogen.
 - 18g of water in liquid state is obtained by heating 18g of ice.
 - 18g of water is completely converted into vapour state on heating.
 - 18g of water freezes at 4°C to give same mass of ice.
18. An element X has 7 electrons in its L shell. What is true about the element X?
- It belongs to period 9 of modern periodic table.
 - Its atom contains 9 protons.
 - It has a valency of 7.
 - Its atoms can accept an electron to acquire noble gas configuration.
- (I) and (II)
 - (II) and (III)
 - (III) and (IV)
 - (II) and (IV)
19. The reaction between carbon and oxygen can be represented as
- $$\text{C}_{(s)} + \text{O}_{2(g)} \rightarrow \text{CO}_{2(g)} + \text{heat}$$
- In which of the following type(s), the above reaction can be classified?
- Combustion reaction
 - Displacement reaction
 - Endothermic reaction
 - Combination reaction
- (I) and (III)
 - (I), (III) and (IV)
 - (I) and (IV)
 - (I) only
20. A metal carbonate X on treatment with a mineral acid liberates a gas which when passed through aqueous solution of a substance Y gives back X. The substance Y on reaction with the gas obtained at anode during electrolysis of brine gives a compound Z which can decolorise coloured fabrics. The compounds X, Y and Z respectively are
- CaCO_3 , Ca(OH)_2 , CaOCl_2
 - Ca(OH)_2 , CaO , CaOCl_2
 - CaCO_3 , CaOCl_2 , Ca(OH)_2
 - Ca(OH)_2 , CaCO_3 , CaOCl_2
21. A salt can be between produced by reaction
- a weak acid and weak base
 - metal oxide and water
 - metal and a mineral acid
 - metal oxide and a mineral acid
- A, B and C
 - B, C and D
 - C, D and A
 - D, A and B
22. Which of the following is true about the two statements?
- Statement I :** Reactivity of aluminium decreases when it is dipped in nitric acid.
- Statement II :** A protective layer of aluminium nitrate is formed when aluminium is dipped in nitric acid.

- (a) I is correct but II is incorrect
 (b) I is incorrect but II is correct.
 (c) Both the statements are correct and II is also the correct explanation of I
 (d) Both the statements are correct but II is not correct explanation of I
- 23.** A silvery white metal X reacts with water at room temperature to produce a water soluble compound Y and a colourless gas Z. The reaction is highly exothermic and the Z catches fire immediately during the reaction. The solution of Y in water on reacting with stoichiometric amount of dilute solution of hydrochloric acid gives a solution of pH = 7.0. The compounds X, Y and Z respectively are :
- (a) Al, $\text{Al}(\text{OH})_3$ and H_2
 (b) Ag, AgOH and H_2
 (c) K, KCl and H_2
 (d) Na, NaOH and H_2
- 24.** A compound X is obtained by the reaction of alkaline KMnO_3 with another compound Y followed by acidification. Compound X also reacts with compound Y in presence of few drops of H_2SO_4 to form a sweet smelling compound Z. The compound X, Y and Z are respectively.
- (a) Ethanol, Ethene, Ethanoic acid
 (b) Ethanoic acid, Ethanol, Ethylethanoate
 (c) Ethanoic Acid, Ethanal, Ethene
 (d) Ethanol, Ethanoic Acid, Sodium Ethanoate
- 25.** Which of the following pairs of compounds of carbon will undergo combustion as well as addition reactions.
- (a) CH_4 and C_2H_6
 (b) $\text{C}_2\text{H}_6\text{O}$ and $\text{C}_3\text{H}_8\text{O}$
 (c) $\text{C}_2\text{H}_4\text{O}_2$ and $\text{C}_3\text{H}_6\text{O}$
 (d) C_2H_2 and C_3H_6
- 26.** An element X combines with hydrogen to form a compound XH_3 . The element X is placed on the right side of the periodic table. What is true about the element X?
- (A) Has valence electrons
 (B) Is a metal and is solid
 (C) Is a non-metal and is a gas
 (D) Has a 5 valence electrons
 (E) XH_3 reacts with water to form a basic compound
- (a) A, B and C (b) B, C and D
 (c) C, D and E (d) E, A and B
- 27.** An element X (atomic number 12) reacts with another element Y (atomic number 17) to form a compound Z. Which of the following statements are true regarding this compound?
- I. Molecular formula of Z is XY_2
 II. It is soluble in water
 III. X and Y are joined by sharing of electrons
 IV. It would conduct electricity in the molten state.
- (a) (II) and (III) (b) (I) and (III)
 (c) (I), (III) and (IV) (d) (II) and (IV)
- 28.** A ship sends a sonar wave to the sea bed which is flat and measured several times over a large area. One day the reflected sound wave takes longer time than in previous measurements. The possible reason is:
- (a) the frequency of the sonar wave, generated by the equipment is lower than previous measurements.
 (b) there is a solid object of large size in the path of sonar wave.
 (c) there is a huge air bubble in the path of sonar wave.
 (d) the loudness of the sonar wave, generated by the equipment is lower than previous measurement.

29. Which of the following ray diagram is correct ?



30. A concave lens always gives a virtual image. In optical lenses worn by humans which of the following statements is true?

- (a) The lens can never be concave.
 (b) In some cases the lens can be concave if the focal length is much larger than 2.5 cm.
 (c) All focal length concave lenses are possible.
 (d) All focal length convex lenses are possible.

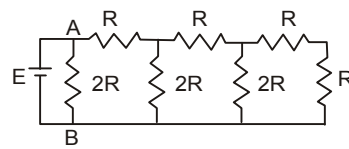
31. A geo-stationary satellite is orbiting around earth at height of 30,000 km in circular orbit. The radius of the earth is taken as 6000 km. The geo-stationary satellite comes back to its position after one revolution in exactly 24 hours. Let the acceleration due to gravity (g) be 10 m/s^2 and mass of satellite be 1000 kg; calculate the work done in 12 hours when moving under gravitational force.

- (a) $3.6\pi \times 10^{14} \text{ J}$
 (b) $2\pi \times 7.2\pi \times 10^{14} \text{ J}$
 (c) $1.8\pi \times 10^{14} \text{ J}$
 (d) 0 J

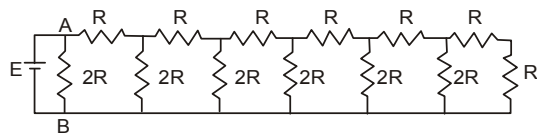
32. Consider a simple circuit containing a battery and three identical incandescent bulbs A, B and C. Bulb A is wired in parallel with bulb B and this combination is wired in series with bulb C. What would happen to the brightness of the other two bulbs if bulb A were to burn out?

- (a) Only bulb B would get brighter.
 (b) Both A and B would get brighter.
 (c) Bulb B would get brighter and bulb C would get dimmer.
 (d) There would be no change in the brightness of either bulb B or bulb C

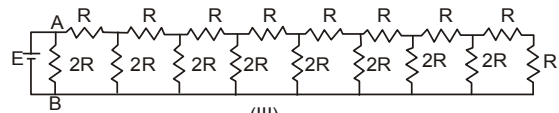
33. Three different circuits (I, II and III) are constructed using identical batteries and resistors of R and $2R$ ohm. What can be said about current I in arm AB of each circuit?



(I)



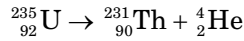
(II)



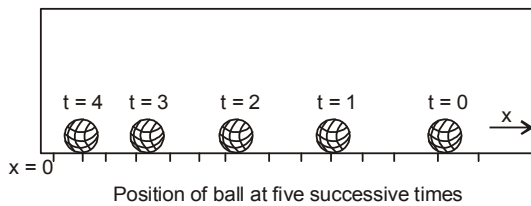
(III)

- (a) $I_{II} < I_I < I_{III}$ (b) $I_I < I_{II} < I_{III}$
 (c) $I_I = I_{II} = I_{III}$ (d) $I_I > I_{II} = I_{III}$

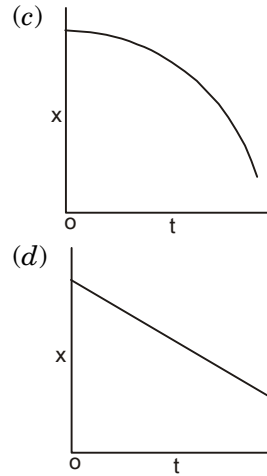
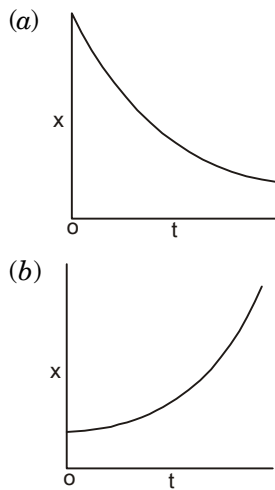
34. A uranium nucleus at rest decays into a thorium nucleus and a helium nucleus, as shown below. Which of the following is true?



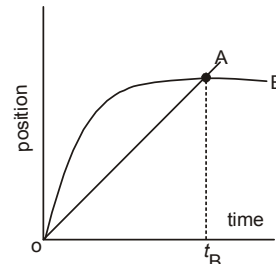
- (a) Each decay product has the same kinetic energy.
- (b) The decay products tend to go in the same direction.
- (c) The thorium nucleus has more momentum than the helium nucleus.
- (d) The helium nucleus has more kinetic energy than the thorium nucleus.
35. The figure below shows the position of a ball at $t = 0$, $t = 1\text{s}$, $t = 2\text{s}$, $t = 3\text{s}$ and $t = 4\text{s}$:



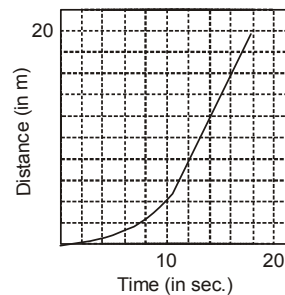
Which of the graph below is a possible graph of the position $x(t)$?



36. The graph shows position as a function of time for two trains A and B running on parallel tracks. For times greater than $t = 0$, which of the following statement is true ?

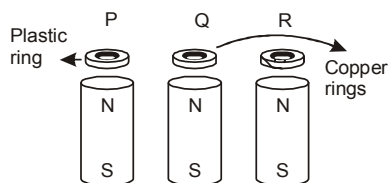


- (a) At time t_B , both trains have the same velocity.
- (b) Both trains speed up all the time
- (c) Both trains may have the same velocity at some time earlier than t_B .
- (d) Graph indicates that both trains have the same acceleration at a given time.
37. The figure shown below depicts the distance travelled by a body as a function of time.



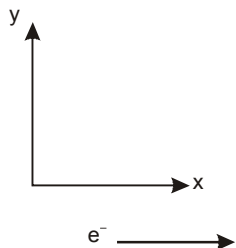
The average speed and maximum speed between 0 and 20 s are :

- (a) 1 m/s, 2.0 m/s respectively
 (b) 1 m/s, 1.6 m/s respectively
 (c) 2.0 m/s, 2.6 m/s respectively
 (d) 1.3 m/s, 2.0 m/s respectively
38. A hypothetical planet has density ρ radius R and surface gravitational acceleration g . If the radius of the planet were doubled, but the planetary density stayed the same, the acceleration due to gravity at the planet's surface would be :
- (a) $4g$ (b) $2g$
 (c) g (d) $g/2$
39. Three rings P, Q and R are dropped at the same time over identical hollow magnets as shown below:



Which of the following describes the order in which the ring P, Q and R reach the bottom of the magnet?

- (a) They arrive in the order, P, Q, R.
 (b) They arrive in the order P, R, Q
 (c) Rings P and R arrive simultaneously, followed by Q.
 (d) Rings Q and R arrive simultaneously, followed by P.
40. An electron moving with uniform velocity in x direction enters a region of uniform magnetic field along y direction. Which of the following physical quantity(ies) is (are) non-zero and remain constant ?



- I. Velocity of the electron
 II. Magnitude of the momentum of the electron
 III. Force on the electron
 IV. The kinetic energy of electron
- (a) Only I and II
 (b) Only III and IV
 (c) All four
 (d) Only II and IV

41. An open box is made from a square lamina of side 12cm, by cutting equal squares at the corners and folding up the remaining flaps. The volume of this box cannot be

- (a) 115 c.c. (b) 120 c.c.
 (c) 125 c.c. (d) 130 c.c.

42. A has a pair of triangles corresponding sides proportional, and B has a pair of pentagons with corresponding sides proportional,

$S_1 \equiv$ A's triangles must be similar

$S_2 \equiv$ B's pentagons must be similar

Which of the following statement is correct?

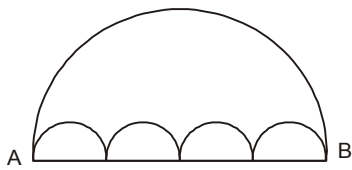
- (a) S_1 is true but S_2 is not true
 (b) S_2 is true, but S_1 is not true
 (c) Both S_1 and S_2 are true
 (d) Neither S_1 nor S_2 is true.

43. $\triangle ABC$ is an equilateral triangle of side $2\sqrt{3}$ cms. P is any point in the interior of $\triangle ABC$. If x, y, z are the distances of P from the sides of the triangle, then $x + y + z =$

- (a) $2 + \sqrt{3}$ cms (b) 5 cms
 (c) 3 cms (d) 4 cms

44. Which of the following numbers is the fourth power of a natural number?

- (a) 6765201 (b) 6765206
 (c) 6765207 (d) 6765209

45. The square of an odd integer must be of the form :
- $6n + 1$
 - $6n + 3$
 - $8n + 1$
 - $4n + 1$ but may not be $8n + 1$
46. ABCD is a square with side a . With centres A, B, C and D four circles are drawn such that each circle touches externally two of the remaining three circles. Let δ be the area of the region in the interior of the square and exterior of the circles. Then the maximum value of δ is:
- $a^2(1 - \pi)$
 - $a^2\left(\frac{4 - \pi}{4}\right)$
 - $a^2(\pi - 1)$
 - $\frac{\pi a^2}{4}$
47. The value of $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$ is:
- 0
 - 1
 - 2
 - ?
48. $ax^2 + bx + c = 0$, where a, b, c are real, has real roots if :
- a, b, c are integers
 - $b^2 > 3ac$
 - $ac > 0$ and b is zero
 - $c = 0$
49. An open box A is made from a square piece of tin by cutting equal squares S at the corners and folding up the remaining flaps. Another open box B is made similarly using one of the squares S. If U and V are the volumes of A and B respectively, then which of the following is not possible ?
- $U > V$
 - $V > U$
 - $U = V$
 - Minimum value of $U >$ maximum value of V .
50. Which of the following statements holds always?
- Every rectangle is a square.
 - Every parallelogram is a trapezium
 - Every rhombus is a square
 - Every parallelogram is a rectangle
51. Which of the following polygons are uniquely determined when all the sides are give ?
- Quadrilateral
 - Triangle
 - Pentagon
 - Hexagon
52. There are several human beings and several dogs in a room. One tenth of the humans have lost a leg. The total numbers of feet are 77. Then the number of dogs is :
- not determinable due to insufficient data
 - 4
 - 5
 - 6
53. All the arcs in the following diagram are semi-circles. This diagram shows two paths connecting A to B.
- Path I is the single large semi-circle and Path II consists of the chain of small semi-circles.
- 
- Path I is longer than path II
 - Path I of the same length of Path II
 - Path I is shorter than Path II
 - Path I is of the same length as Path II. Only if the number of semi circles is not more than 4

- 54.** One integer is chosen out of 1, 2, 3, ..., 100. What is the probability that it is neither divisible by 4 nor by 6
- (a) 0.59 (b) 0.67
(c) 0.41 (d) 0.33
- 55.** $\sqrt{(a-b)^2} + \sqrt{(b-a)^2}$ is:
- (a) Always zero
(b) Never zero
(c) Positive if and only if $a > b$
(d) Positive only if $a \neq b$
- 56.** A solid metal sphere of surface area S_1 is melted and recast into a number of smaller spheres. S_2 is the sum of the surface areas of all the smaller spheres. Then
- (a) $S_1 > S_2$
(b) $S_2 > S_1$
(c) $S_1 = S_2$
(d) $S_1 = S_2$ only if all the smaller spheres of equal radii
- 57.** Which of the following is an irrational number?
- (a) $\sqrt{41616}$
(b) 23.232323
(c) $\frac{(1+\sqrt{3})^3 - (1-\sqrt{3})^3}{\sqrt{3}}$
(d) 23.10100100010000...
- 58.** ₹ 1 and ₹ 5 coins are available (as many required). Find the smallest payment which cannot be made by these coins, if not more than 5 coins are allowed.
- (a) 3 (b) 12
(c) 14 (d) 18
- 59.** Median of a data number which has number of observations below and above it. The median set is a an equal below and of the data
1, 9, 4, 3, 7, 6, 8, 8, 12, 15 is
- (a) 7.5
(b) 7
(c) 8
(d) Any number between 7 and 8
- 60.** Suppose you walk from home to the bus stand at 4 km/h and immediately return at x km/h. If the average speed is 6 km/h then x is
- (a) 8 km/h
(b) 10 km/h
(c) 12 km/h
(d) cannot be determined unless the distance from home to bus stand is known.
- 61.** From about 13th century to the time of the French Revolution sumptuary laws were expected to be followed strictly to:
- (a) Regulate the behaviour of the royalty.
(b) Regulate the income of people by social rank
(c) Control the behaviour of those considered social inferiors
(d) Provide religious sanctity to social behaviour
- 62.** Choose the correct response from the given options.
On 3rd March 1933 the famous Enabling Act was passed to :
- (A) establish dictatorship in Germany.
(B) give Hitler the power to rule by decree
(C) ban all trade unions
(D) ban all political parties and their affiliates
- (a) only A and B are correct
(b) only C and D are correct
(c) A, B and C are correct
(d) only D is correct

- 63.** Enclosures in England were seen as:
- hindrance to agricultural expansion and crop rotation.
 - hindrance to commercialization of agriculture.
 - necessary to make long-term investment on land, agriculture and to plan crop rotation to improve the soil.
 - necessary to protect the interests of those who depended on the commons for their survival.
- 64.** The Balkans, which was a serious source of nationalist tension in Europe after 1871, was a region comprising of:
- Romania, Germany, Poland, Bulgaria.
 - Romania, Prussia, Greece, Croatia and Serbia.
 - Serbia, Austria, Bulgaria, Slovakia and Poland.
 - Serbia, Bulgaria, Greece, Croatia, Romania.
- 65.** What was Rinderpest?
- A disease of cattle plagues that spread in Africa in the 1890s.
 - Bubonic plague which spread in the region of Maharashtra in the 1890s.
 - A type of cholera that spread in Assam in the 1890s.
 - A devastating bird disease that was imported to Italy from British Asia through chicken meat.
- 66.** Which of the following is a correct match?
- Rashsundari Debi – Istri Dharma Vichar
 - Ram Chadda – Amar Jiban
 - Kashibaba – Chote Aur Bade ka Sawaal
 - Sudarshan Chakra – Gulamgiri
- 67.** Printing created possibilities of wider circulation of ideas. Who of the following hailed printing as the ultimate gift of God?
- Martin Luther
 - Menocchio
 - Roman Catholic Church
 - Gutenberg
- 68.** The forest Act of 1878 divided forests into:
- reserved and protected forests
 - protected and village forests
 - bio-sphere reserves and wild life sanctuaries
 - reserved, protected and village forests
- 69.** Consider the following statements and identify the correct response from the options given thereafter :
- Statement I :** Hitler said 'In may state the mother is the most important citizen'
- Statement II:** In Nazi Germany while boys were taught to be aggressive, muscular and steel hearted; girls were told that they had to become good mothers.
- Statement I is true but statement II is false.
 - Both statement I and statement II are true but statement II is not the correct explanation of statement I.
 - Both the statements are False.
 - Both statement I and statement II are true and statement II is the correct explanation of statement I.

70. Consider the following statements and choose the correct response from the options given thereafter:

Statement I: The major cricket tournament of colonial India, the 'Quadrangular' did not represent regions but religious communities.

Statement II: The victory of the 'Hindus' in the 'Quadrangular' cricket tournament in 1923 was equated by a cricket fan with Gandhiji's war on 'untouchability'.

- (a) Statement I is true but statement II is false.
- (b) Statement I is false but statement II is true
- (c) Both statement I and statement II are true and II is correct explanation of statement I
- (d) Both statement I and statement II are true but statement II is not the correct explanation of statement I.

71. Match the following columns :

Column A		Column B	
(I)	Ambedkar established the Depressed Classes Association	(A)	December, 1929
(II)	Gandhiji began the Civil Disobedience Movement	(B)	August, 1930
(III)	Gandhiji ended the Civil Disobedience Movement	(C)	March, 1930
(IV)	Congress adopted the demand for 'Purna Swaraj'	(D)	March, 1931

- (a) (I) – (C), (II) – (D), (III) – (B), (IV) – (A)
- (b) (I) – (B), (II) – (C), (III) – (D), (IV) – (A)
- (c) (I) – (C), (II) – (A), (III) – (B), (IV) – (D)
- (d) (I) – (D), (II) – (C), (III) – (B), (IV) – (A)

72. Consider the following statements and choose the correct response from the options given thereafter:

Statement I: The Act of Union 1707 led to the formation of the "United Kingdom of Great Britain".

Statement II: The British parliament was henceforth dominated by its English members.

- (a) Both statement I and statement II are false
- (b) Both statement I and statement II are true and statement II is the result of statement I.
- (c) Statement I is true but statement II is false
- (d) Both statement I and statement II are true but statement II is not a result of statement I.

73. Consider the following statements and choose the correct response from the options given thereafter:

Statement I: Traders and travellers introduced new crops to the land they travelled.

Statement II: Noodles most likely travelled from China through Arab traders to Sicily.

Statement III: Potato reached the West through travellers and became the staple diet of the poor.

- (a) Statement I and statement III are true.
- (b) Statement II and statement III are true.
- (c) All three statements are true
- (d) Statement I and statement II are true.

- 74. Assertion (A):** Gandhiji's idea of satyagraha emphasised on the power of truth and the need to search for truth.

Reasoning (R): Gandhiji believed that a satyagrahi could win the battle by appealing to the conscience of the oppressor.

Select the correct option from the given alternatives.

- (a) A is true and R is false.
 - (b) Both A and R are true but R not the correct explanation of A.
 - (c) Both A and R are true and R is the correct explanation of A.
 - (d) Both A and R are false.
- 75. Assertion (A):** The Civil Disobedience Movement was different from the Non-cooperation Movement.
- Reason (R):** People in the Civil Disobedience Movement were asked not only to refuse cooperation with the British but also to break colonial laws. Select the correct option from the given alternatives. —
- (a) Both A and R are true but R is not the correct explanation of A.
 - (b) Both A and R are false.
 - (c) A is false but R is true.
 - (d) Both A and R are true and R is the correct explanation of A.

- 76. Assertion (A) :** Coal is a fossil fuel.

Reason(R) : It is formed due to compression of inorganic material over millions of years.

Select the correct option from the given alternatives.

- (a) Both (A) and (R) are true, and (R) explain (A)
- (b) Both (A) and (R) are true, but (R) does not explain (A)
- (c) (A) is true and (R) is false
- (d) (A) is false and (R) is true

- 77. Assertion (A) :** The sun rises in Arunachal Pradesh about two hours before Gujarat.

Reason(R) : Arunachal Pradesh is on a higher latitude than Gujarat. Select the correct option from the given alternatives.

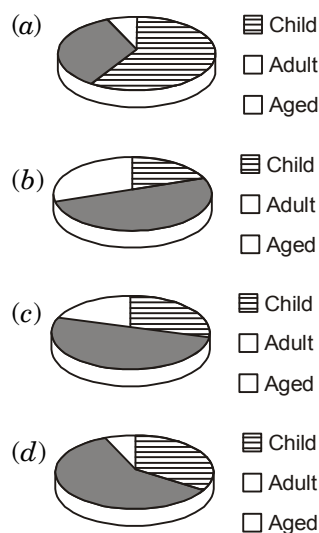
- (a) Both (A) and (R) are true, and (R) explain (A)
- (b) Both (A) and (R), are true, but (R) does not explain (A)
- (c) (A) is true and (R) is false
- (d) (A) is false and (R) is true

- 78. Assertion (A) :** In India, east coast has more seaports than the west coast.

Reason(R) : The east coast is broader and is an example of emergent coast. Select the correct option from the given alternatives.

- (a) Both (A) and (R) are true, and (R) explain (A)
- (b) Both (A) and (R) are true, but (R) does not explain (A)
- (c) (A) is true and (R) is false
- (d) (A) is false and (R) is true

- 79. Which pie diagram represents India's age composition in 2001?**



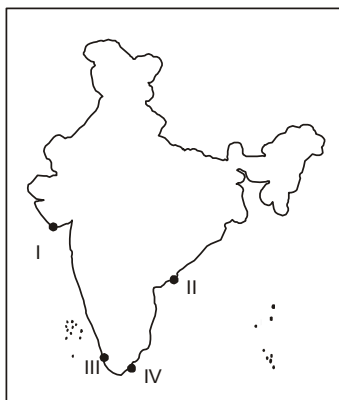
- 80. Assertion (A) :** The north western parts of India receive rainfall in winter.

Reason (R) : The winter rainfall in India occurs due to North East monsoon.

Select the correct option from the given alternatives.

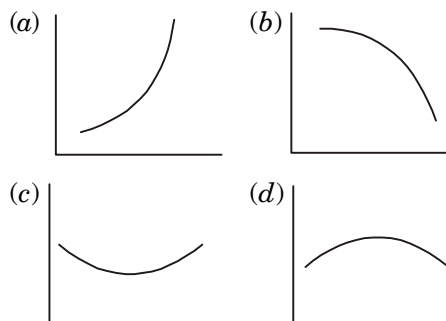
- (a) Both (A) and (R) are true, and (R) explain (A)
 - (b) Both (A) and (R), are true, but (R) does not explain (A)
 - (c) (A) is true and (R) is false
 - (d) (A) is false and (R) is true
- 81.** Which four major ports of India lie on the Golden Quadrilateral ?
- (a) Chennai, Tuticorin, Mangalore, Marmagao
 - (b) Kolkata, Chennai, Mangalore, Mumbai
 - (c) Marmagao, Mumbai, Kandla, Mangalore
 - (d) Kolata, Mumbai, Vishakhapatanam, Chennai
- 82.** Match the fishing ports indicated on the map of India (I, H, III and IV) with their respective names.

- A. Kakinada
- B. Alappuzha
- C. Porbandar
- D. Tuticorin



- (a) II-A, III-B, I-C, IV-D
- (b) I-A, II-B, III-D, IV-C
- (c) I-C, II-B, III-A, IV-D
- (d) I-D, II-B, III-A, IV-C

- 83.** Which figure relates the trend of population growth rate 1951-2001?



- 84. Assertion (A):** The Himalayan ranges show change in vegetation from tropical to tundra.

Reason (R) : In mountainous area with increase in altitude there is corresponding decrease in temperature, which leads to change in vegetation types.

Select the correct option from the given alternatives.

- (a) Both (A) and (R) are true and (R) explain (A).
 - (b) Both (A) and (R) are true but (R) does not explain (A).
 - (c) (A) is true and (R) is false.
 - (d) (A) is false and (R) is true.
- 85.** Which of the following methods are used to restrict soil erosion?
- A. Ploughing along contour lines
 - B. Strip cropping
 - C. Jhumming
 - D. Mixed farming
- (a) A and B
 - (b) A and C
 - (c) B and D
 - (d) B and C

- 86. Assertion (A) :** Although only the southern part of India lies in tropical region, the whole of India has tropical climate.

Reason (R) : Himalaya mountain ranges protect it from the northerly cold winds. Select the correct option from the given alternatives.

- (a) Both (A) and (R) are true and (R) explain (A)
 (b) Both (A) and (R) are true but (R) does not explain (A)
 (c) (A) is true and (R) is false.
 (d) (A) is false and (R) is true.
- 87.** What does the zig-zag line indicate on the map of India?



- (a) Advancement summer monsoon on 1st June.
 (b) Line dividing tropical evergreen and deciduous forest.
 (c) Water divide between east and west flowing rivers.
 (d) Line dividing annual rainfall above and below 100 cm.
- 88.** Which of the following feature has similar geological structure with Meghalaya, Karbi Anglong plateau and Cachar Hills?
- (a) Aravalli Range
 (b) Purvanchal Hills
 (c) Siwaliks
 (d) Chotanagpur Plateau

- 89. Assertion (A):** Sex Ratio in India is low.

Reason (R) : Indian society has been unfavourable to females.

Select the correct option from the given alternatives.

- (a) Both (A) and (R) are true, and (R) explain (A)
 (b) Both (A) and (R) are true, but (R) does not explain (A)
 (c) (A) is true and (R) is false
 (d) (A) is false and (R) is true
- 90.** A pilot takes off from an airport at 15°S latitude and flies 55° due North. What latitude the pilot has reached?
- (a) 55°N (b) 40°N
 (c) 70°N (d) 15°N
- 91.** Which of the following is not a feature of Indian federalism?
- (a) The Constitution creates a strong Centre.
 (b) The Constitution provides for a single judiciary
 (c) The Constitution provides for a common All India Services.
 (d) The Constitution provides equal representation to the States in the Upper House of Parliament.
- 92.** Which of these features is not a guiding value of the Indian Constitution ?
- (a) No external power can dictate to the Government of India
 (b) The head of the State is a hereditary position
 (c) All people are equal before law.
 (d) Citizens have complete freedom to follow any religion
- 93.** According to Dr. B.R. Ambedkar, which of the following is 'heart and soul' of our Constitution?
- (a) The Preamble
 (b) Right to Equality
 (c) Right against Exploitation
 (d) Right to Constitutional Remedies

- 94.** Democracy is considered to be better than other forms of government. Which of the following statements support this claim ?
- A. It is a more accountable form of government.
 - B. It improves the quality of decision making
 - C. It ensures rapid economic development of citizens
 - D. It enhances the dignity of citizens
- (a) A, B and D
 - (b) A and C
 - (c) A, B and C
 - (d) B, C and D
- 95.** The Constitution of India was amended in 1992 to make the third-tier of democracy more effective. As a result, at least one-third of all positions in the local bodies are reserved for women. This is because
- (a) women are good at managing resources.
 - (b) although women constitute nearly half of the population, they have inadequate representation in decision-making bodies.
 - (c) we have many powerful women leaders.
 - (d) women are obedient and would follow the constitutional provisions well.
- 96.** In which of the following economies are people more of a resource?
- (a) Country A with 78% of the working age population illiterate and with very low life expectancy
 - (b) Country B with 10% of the working age population illiterate and with high life expectancy
 - (c) Country C with 60% of people in the working age illiterate, but with high life expectancy
 - (d) Country D with only 10% of population is the working age illiterate, but has very low life expectancy.
- 97.** Which of the following statements is true of agriculture in Indian economy between 1973 and 2003?
- (a) The sectorial share of agriculture in employment has decreased far more than its share on total output.
 - (b) The sectorial share of agriculture in total output has decreased, but its share in employment has increased.
 - (c) The sectorial share of agriculture in total output has increased, but its share in employment has decreased.
 - (d) The sectorial share of agriculture in output has decreased far more than its share in total employment.
- 98.** Which of the following can be considered as Foreign Direct Investment made in India?
- A. The TATAs acquire Corus steel plant abroad.
 - B. Mr. Donald, an American citizen, acquires 100 shares of an Indian listed company.
 - C. The remittances sent by an Indian doctor in Dubai back to his hometown in Kerala.
 - D. The US multinational Google opens its full-fledged unit at Gurgaon, Haryana.
- (a) (A) and (D)
 - (b) (A) and (B)
 - (c) (D) Only
 - (d) (B) and (C)

- 99.** We accept paper money as a medium of exchange because
 (a) It has gold backing
 (b) the law legalizes it
 (c) Reserve Bank of India has precious metals against which it prints notes
 (d) Everyone else accepts it
- 100.** Which of the following refers to trade barrier in the context of WTO ?
 I. Restrictions on domestic trade
 II. Not allowing companies to do foreign trade beyond specific quantity
 III. Restrictions on the export and import of goods
 IV. Restrictions on the price fixed by companies
 (a) (I), (II) and (III) (b) (I), (II) and (IV)
 (c) (III) and (IV) (d) (I), (II) and (IV)

ANSWERS

MENTAL ABILITY TEST

1. (a)	2. (c)	3. (d)	4. (b)	5. (c)	6. (b)	7. (d)	8. (a)	9. (c)	10. (c)
11. (b)	12. (a)	13. (b)	14. (a)	15. (c)	16. (b)	17. (c)	18. (a)	19. (d)	20. (d)
21. (a)	22. (c)	23. (a)	24. (d)	25. (a)	26. (b)	27. (a)	28. (d)	29. (a)	30. (c)
31. (a)	32. (c)	33. (b)	34. (a)	35. (c)	36. (d)	37. (c)	38. (a)	39. (c)	40. (b)
41. (a)	42. (a)	43. (c)	44. (c)	45. (c)	46. (b)	47. (d)	48. (b)	49. (d)	50. (a)

ENGLISH LANGUAGE

1. (d)	2. (c)	3. (c)	4. (a)	5. (b)	6. (c)	7. (b)	8. (b)	9. (d)	10. (a)
11. (d)	12. (b)	13. (d)	14. (b)	15. (a)	16. (c)	17. (d)	18. (b)	19. (a)	20. (a)
21. (c)	22. (b)	23. (a)	24. (c)	25. (b)	26. (a)	27. (b)	28. (b)	29. (a)	30. (d)
31. (a)	32. (d)	33. (a)	34. (d)	35. (a)	36. (d)	37. (b)	38. (c)	39. (c)	40. (a)
41. (a)	42. (c)	43. (b)	44. (c)	45. (b)	46. (a)	47. (c)	48. (b)	49. (d)	50. (c)

SCHOLASTIC APTITUDE TEST

1. (d)	2. (b)	3. (d)	4. (c)	5. (a)	6. (b)	7. (b)	8. (b)	9. (c)	10. (d)
11. (b)	12. (d)	13. (*)	14. (a)	15. (c)	16. (d)	17. (a)	18. (d)	19. (c)	20. (a)
21. (c)	22. (a)	23. (d)	24. (b)	25. (d)	26. (c)	27. (d)	28. (c)	29. (a)	30. (b)
31. (d)	32. (c)	33. (c)	34. (d)	35. (a)	36. (c)	37. (a)	38. (b)	39. (c)	40. (d)
41. (d)	42. (a)	43. (c)	44. (a)	45. (c)	46. (b)	47. (b)	48. (d)	49. (d)	50. (b)
51. (b)	52. (c)	53. (b)	54. (b)	55. (d)	56. (b)	57. (d)	58. (c)	59. (d)	60. (c)
61. (c)	62. (a)	63. (c)	64. (d)	65. (a)	66. (c)	67. (a)	68. (d)	69. (b)	70. (c)
71. (b)	72. (b)	73. (d)	74. (c)	75. (d)	76. (a)	77. (b)	78. (a)	79. (d)	80. (b)
81. (d)	82. (c)	83. (d)	84. (a)	85. (a)	86. (d)	87. (c)	88. (d)	89. (a)	90. (c)
91. (d)	92. (b)	93. (d)	94. (a)	95. (b)	96. (c)	97. (d)	98. (c)	99. (b)	100. (d)

EXPLANATIONS**MENTAL ABILITY TEST**

1. light means pie & mie can not fly.
So, that 'light fly' means can be pie zie.

2. Given,

$$\begin{array}{ccccccc}
 S & T & U & D & E & N & T \\
 \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\
 -1 & -1 & -1 & +1 & -1 & -1 & -1 \\
 \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\
 R & S & T & E & M & D & M & S
 \end{array}$$

Similarly,

$$\begin{array}{ccccccc}
 T & E & A & C & H & E & R \\
 \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\
 -1 & -1 & -1 & +1 & -1 & -1 & -1 \\
 \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\
 S & D & Z & D & G & D & Q
 \end{array}$$

3. In option (d) T, V, W, Y, Z are not continuous.
4. Given sequence is
 $\alpha \beta \beta, \alpha \alpha \alpha, \beta \beta \beta \beta, \alpha \alpha \alpha \alpha, \beta \beta \beta \dots$
5. Missing term is 3c.
8. Given pattern is

$$5^2 + 12^2 = 13^2$$

$$8^2 + 15^2 = 17^2$$

$$7^2 + 24^2 = 25^2$$

Similarly,

$$9^2 + 40^2 = 41^2$$

9. Given pattern is

$$60 + 61 = 121$$

and $45 + 55 = 100$

$$\sqrt{(121)} = 11, \sqrt{100} = 10$$

i.e. $11 - 10 = 1$

→ $82 + 87 = 169$

and $49 + 32 = 81$

$$\sqrt{169} = 13, \sqrt{81} = 9$$

i.e. $13 - 9 = 4$

Similarly,

→ $79 + 65 = 144$

and $37 + 12 = 49$

$$\sqrt{144} = 12, \sqrt{49} = 7$$

i.e. $12 - 7 = 5$.

10. Given,

$$1^1 - 1 = 0$$

$$2^2 - 2 = 2$$

$$3^3 - 3 = 24$$

$$4^4 - 4 = 252$$

Similarly,

$$5^5 - 5 = 3120$$

11. Given pattern is

$$2^3 - 2 = 6$$

$$3^3 - 3 = 24$$

$$4^3 - 4 = 60$$

$$5^3 - 5 = 120$$

Similarly,

$$6^3 - 6 = 210$$

12. Given pattern is

$$3 + 4 + 5 = 12 = L$$

$$9 + 6 + 4 = 19 = S$$

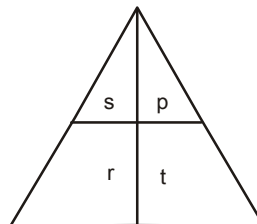
$$7 + 1 + 8 = 16 = P$$

Similarly,

$$8 + 3 + 2 = 13 = M$$

13.
$$\begin{array}{r}
 4973 \\
 \times 8 \\
 \hline
 39784
 \end{array}$$

14. Given figure is



∴ q is not a part of this figure

15. Given pattern is

$$3^1 - 1 = 2$$

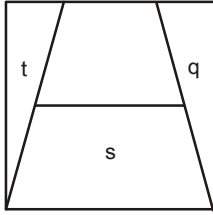
$$3^2 + 1 = 10$$

$$3^3 - 1 = 26$$

$$3^4 + 1 = 82$$

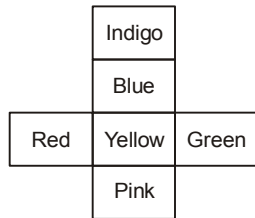
∴ $3^5 - 1 = 242$

16. Given figure is



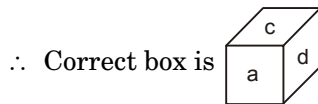
$\therefore r$ is not a part of this figure

18. Given pattern is

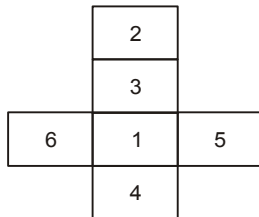


$\therefore$ Indigo is opposite to Yellow.

19. From given figure,
b is opposite to d.
a is opposite to f.
e is opposite to c.



20. Given pattern is



$\therefore$ 6 is opposite to 5.

23. Given pattern is

$$\begin{aligned}
 &108 + 17 = 125 = (5)^3 \\
 \text{and } &240 + 103 = 343 = (7)^3 \\
 \therefore &7 - 5 = 2 \\
 \rightarrow &39 + 25 = 64 = (4)^3 \\
 \text{and } &309 + 203 = 512 = (8)^3 \\
 \therefore &8 - 4 = 4
 \end{aligned}$$

Similarly,

$$\begin{aligned}
 &115 + 101 = 216 = (6)^3 \\
 \text{and } &625 + 104 = 729 = (9)^3 \\
 \therefore &9 - 6 = 3.
 \end{aligned}$$

25. After 12 sec, seconds hand will make angle of 72° .

$\therefore$ it will be 18° North of East.

26. Let lengths ℓ_1 and ℓ_2 and thickness are x_1 and x_2 of two candles respectively.

$$\therefore \ell_1 = 3.5 \text{ hr and } \ell_2 = 5 \text{ hr}$$

According to question

$$\ell_1 - 2\left(\frac{\ell_1}{3.5}\right) = \ell_2 - 2\left(\frac{\ell_2}{5}\right)$$

$$\frac{3.5\ell_2 - 2\ell_1}{3.5} = \frac{5\ell_2 - 2\ell_2}{5}$$

$$\frac{1.5\ell_1}{3.5} = \frac{3\ell_2}{5}$$

$$\frac{\ell_1}{\ell_2} = \frac{3.5 \times 3}{1.5 \times 5} \Rightarrow \frac{7}{5} \text{ or } \frac{\ell_2}{\ell_1} = \frac{5}{7}$$

27. Let total gift are x .

i.e. dolls are $= x - 6$

cars are $= x - 6$

books are $= x - 6$.

$$\therefore x = 3(x - 6)$$

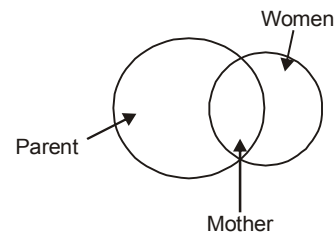
$$x = 3x - 18$$

$$18 = 2x$$

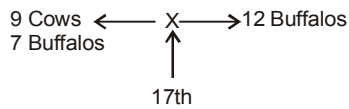
$$x = 9$$

28. From the given information we can say that $R < S$, $K < S$. But, we cannot confirm if $T < S$ or $T > S$. So we cannot determine the oldest.

29. The given relationship is represented below.



30. Cows are = 40 and Buffalos are = 20.

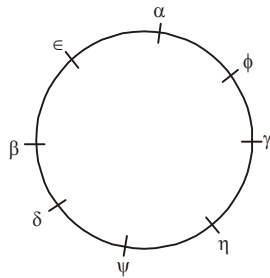


31. Mirror image of given code is

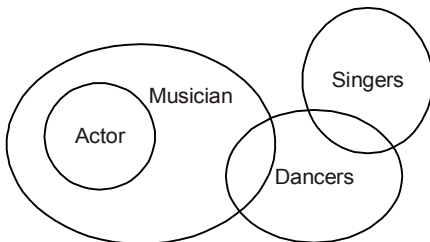
b 3 k 4 s e t d

(Solutions 32–36)

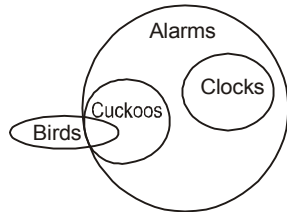
Given sitting arrangement is



32. ϕ
 33. β, ϵ
 34. Third towards right.
 35. Only ϵ
 36. 3
 38. Correct sequence is
 Sadhana < Rani < Alka < Lata < Asha.
 39. 64 matches will be played.
 40. From the given information, only conclusion III follows. I cannot follow as No Actor is a Singer (from Statement I and II).



41.



42. Cells are label as follows.

P	Q	
R	S	T
	U	V

If cross is put on the Cell V (bottom row right corner):

Case I – Circle is put in Cell U.

Then Cross puts it in Cell P. Now Circle will put either in Cell R or in Cell S. Then Cross puts it in the other one and Cross wins.

Case II – Circle puts it anywhere other than U.

Cross puts in Cell U and wins.

43. If all the switches were on the configuration 1 would be:



But the configuration 2 is given as:



There is difference only in Switches 1 and 3. So switch C is not working.

46. The correct sitting arrangement is E B A C D
 47. Leaving time = 7 hr 21 m 49 sec.
 and Returned time = 7 hr 54 m 33 sec.
 48. 21° East of South

ENGLISH LANGUAGE

1. Option *a*, *b* and *c* are partially correct. Option *d* provides the complete solution.
2. Her own courage and determination were the major factors in her success. The other options are only partially true.
3. Approached a large number of people.
4. Deeply believed in traditions and found it difficult to change themselves.
5. Created a dent in society and made people change their thinking.
6. They engage children's attention for longer periods.
7. Their attitudes, values and ethics can be easily MOULDED at this tender age.
8. Use natural materials and don't harm the environment.
9. Channapatna toy craft is an old and traditional practice.
10. Children learn and enjoy when they have fun during play.
11. They are friendly as they are always near humans.
12. The statement "children sat gazing at them..." shows it was fun to watch sparrows.
13. Farmers considered them a nuisance because they ate grain from standing crops in the fields.
14. 'Regurgitated' means digested and brought back.
15. Poets found sparrows a topic of interest 'as many poems and lyrics were written on them'.
16. The rapid growth of population is referred to by 'this' in P. Q, the next sentence gives a further detail that it is not the 'actual population' but the 'increase' that is alarming. R follows naturally and links to the last statement.
17. The first word 'but' in R provides a link to the first statement. In P, 'tedious' is another link to 'cumbersome' in R and explains further why carrying coins would be difficult. 'So the government' in Q completes the argument given in the first statement.
18. Option *b* fits in neatly after sentence A and links to what happened later in sentence *c*.
19. Option *a* 'a joy that lasts a lifetime' links with sentence *c* that tells how you change completely after the experience.
20. 'Scan' is the right word which means look through quickly to spot errors.
21. 'stare' is the right word that goes with 'blank'.
22. 'sight' is suitable for 'fixed on the horizon'.
23. 'notice' is the right word to go with 'something amiss'.
24. 'glimpse' is a fleeting look-so this is the right choice.
25. A shipwrecked person is said to be 'marooned', so this is the right word.
26. 'evicted' is the right word which means 'forced' to leave a place.
27. 'scene' is the right word that goes with 'terrifying' and 'devastation'.
28. 'resentment' is the right choice, it goes with 'angrily voiced'.
29. 'mediate' means go between two angry persons.
30. 'Pulled up' means to be scolded by someone.
31. 'keep up' means to maintain an appearance or to pretend.
32. 'carry on' has the meaning of continuing to do something.
33. 'Hand in glove' means to be a partner with someone doing evil, to be in collusion.

34. When you are 'in someone's shoes' you are imagining you are in that person's situation.
35. When you are 'pulling someone's leg' you are teasing that person.
36. 'to' goes before 'wanting'
37. 'offered' goes with a discount
38. 'a' – goes before 'packed one'.
39. 'called' – is the right choice.
40. 'buy' - goes with 'a pig in a poke'
41. 'taking' – is the right word to go before 'a risk'.
42. 'or' – goes with the earlier phrase 'might be ill'.
43. 'out' is the right word to complete the phrase 'turn out'.
44. 'kindly'-adverb to follow 'spoke'
45. 'compounded' – the right word to mean 'added to a number of problems'
46. 'Lately' – the right word meaning 'recently'
47. 'humidity' – right word for the sentence.
48. 'brave' is the opposite of 'scared'
49. 'surrender' meaning 'to give up' is the opposite of 'to conquer'.
50. 'defend' or protect oneself is the opposite of 'criticize' or attack someone.
4. The basic cause of peptic ulcers is due to growth of helicobacter pylori.
Option (c) is correct.
5. As moon has to atmosphere around it so its temperature is variable as compared to earth which is surrounded by atmosphere which helps it to retain steady temperature.
6. The chances of pollination increases when stamens are just above the stigma of a pistil in a flower.
7. If we blow air from mouth which contains mainly CO_2 will increase the rate of photosynthesis and thus the liberation of O_2 though roots will also increase.
8. A person with blood group A has only 'A' antigen and B 'antibodies' so it can donate blood to person with blood group 'A' or AB. Option (b) is correct
9. Cerebellum maintains the posture/ equilibrium of the body while in action i.e. it mainly coordinates the muscular activities so if cerebellum is damaged he will be unable to coordinate and stand properly. Option (c).
10. Tapeworm and earthworm are both hermaphrodites but self-fertilization occurs in tapeworms and cross-fertilization in earthworms so option (d) is correct.
11. Appearance of green beetles among red beetles due to natural selection.

Natural selection enables the reproduction of organisms that are more adaptive to the environment and leads to the survival of more suited organisms to the present environment, option (b).

SCHOLASTIC APTITUDE TEST

1. Animal and plant all have plasma membrane, cytoplasm ribosomes in common. (cell wall and vacuoles are present in plant cell only).
So option (d) is correct.
2. Option (b) represents striated muscles with alternate light and dark bands. These are skeletal muscles that move according to the organisms will it represents grasshoppers leg.
3. Pteridophyte are plants that has well differentiated body but does not have seed or fruits. Option (d) is correct.
12. More green beetles will survive than red as red beetles are easily visible to crows who feed on them which will reduce red beetle population as compared to green one.
13. Tertiary consumer always get less energy than primary consumer so the ques. stands irrelevant.

14. Non-degradable and fat soluble pollutant, such DDT enters the food chain and magnifies in concentration at each trophic level body to biological magnification.

15. A liquid with lower latent heat of vapourisation will give a cooler effect, so option (c) is correct.

16. Out of A, B and C, A and C are soluble in water and C is sublimable

So first sublimation (eliminates C)

Dissolution left with A and B in water

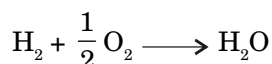
B will not be dissolved left with A

Filtration

Crystallization from water extract A is recovered.

Option (d) is correct.

17. Water molecules are formed as



$$\Rightarrow 2g \frac{(16 \times 2)}{2} g \longrightarrow 18g$$

$\Rightarrow$ 18g of water is formed by combination of 16g of O_2 with 2g of H_2 .

18. An element X has 7 electrons in L shell it means total no. of electrons $2 + 7 = 9$

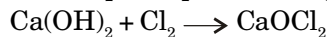
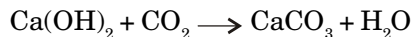
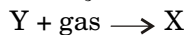
so it also has 9 protons and a valency of 7, so requires 1 electron to complete its octet to acquire noble gas configuration so option (b) is correct.

19. $\text{C}_{(s)} + \text{O}_{2(g)} \longrightarrow \text{CO}_{2(g)} + \text{heat}$

- Carbon and oxygen combines to give carbon dioxide as a product so it is a type of combination reaction.
- Carbon burns in presence of oxygen to give CO_2 gas so it is also a combustion reaction.
- Since heat is liberated during the reaction it is exothermic and not endothermic.
- In above reaction no displacement of atoms takes place,

So option (c) is correct.

20. $\text{X} + \text{mineral acid} \longrightarrow \text{gas}$.



$\therefore$ Option (a) is correct.

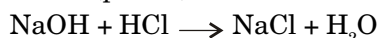
21. Weak acid + weak base $\longrightarrow$ salt + water
metal + mineral acid $\longrightarrow$ salt + Hydrogen
metal oxide + mineral acid $\longrightarrow$ salt + water
 $\therefore$ Option (c) is correct.

22. When Al is dipped in nitric acid (HNO_3) a protective layer of Al_2O_3 is formed which in turn reduces the reactivity of Al, option (a) is correct.

23. $\text{X} + \text{H}_2\text{O} \longrightarrow \text{Y} + \text{Z(g)} + \text{heat}$



(ph = 7)



$\Rightarrow$ X is Na, Y is NaOH, Z is H_2

Option (d) is correct

24. $\text{C}_2\text{H}_5\text{OH} \xrightarrow[\text{KMnO}_4]{\text{alkaline}} \text{CH}_3\text{COOH}$
(Y) (X)
 $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5$
(X) (Y) (Z)
Sweet smelling Compound

$\Rightarrow$ X is ethanoic acid CH_3COOH

Y is ethanol $\text{C}_2\text{H}_5\text{OH}$

Z is ester $\text{CH}_3\text{COOC}_2\text{H}_5$

$\Rightarrow$ Option (b) is correct.

25. Among all the given compounds C_2H_2 and C_3H_6 are unsaturated hydrocarbons which will undergo combustion as well as addition reaction.

26. $\text{X} + \text{H}_2 \longrightarrow \text{XH}_3$

Element X is N forming NH_3

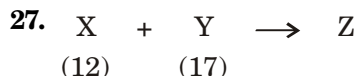
N is non-metal

Its valency is 5 and it reacts with water to form a basic compound



(base)

So option (c) is correct.



$MgCl_2$ is formed by transfer of electrons and it conducts electricity at molten state

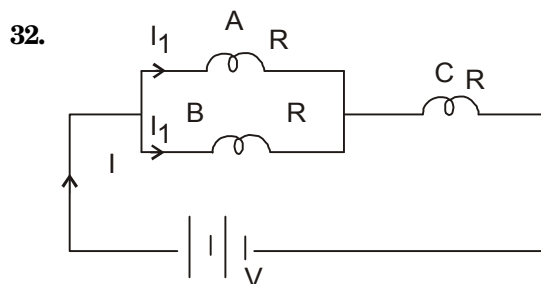
So option (d) is correct.

28. The reflected soundwave takes longer time than in previous measurement as there may be a huge air bubble in the path of the sonarwave as sonarwave speed decreases in air and so it takes longer time. Option (c) is correct.

29. Only option (a) is correct because other option doesnot fellow the basic principles of path the ray follows i.e incident rays p abutted to principal axis passes through the focus and incident ray passing through the focus emerges parallel to the principal axis.

30. The lenes an be concave of the focal length is much larger than 2.5 cm because image of distance for objects is produced by concave lens at a more than 25 cm from the eye.

31. The W.D will be zero as under the action of centripetal force one force and displacement are perpendicular to each other



It flows through the segment (A and B) and C equivalent resistance of the

$$= 1 / \left(\frac{1}{R} + \frac{1}{R} \right) + R = \frac{R}{2} + R = \frac{3R}{2}$$

$$\therefore I = \frac{V}{3R/2} = \frac{2V}{3R}$$

$$\Rightarrow I' = \frac{I}{2} = \frac{V}{3R} \Rightarrow \text{power developed in A}$$

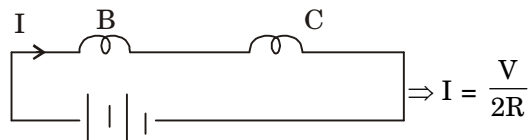
$$\text{and } B = (I')^2 R = \left(\frac{V}{3R} \right)^2 \times R = \frac{V^2}{9R}$$

whereas power developed in C = $I^2 R$

$$= \left(\frac{2V}{3R} \right)^2 \times R$$

$$= \frac{4V^2}{9R}$$

so when A is first circuit reduces to



$\therefore$ Power developed across B = $I^2 R$ 2c

$$= \left(\frac{V}{2R} \right)^2 \times R = \frac{V^2}{4R}$$

$\Rightarrow$ Power of B increases

= where as power of C decreases,

So option (c) is correct

33. Current in all the three cases be same as

$$I = \frac{E}{2R} \text{ across A and B.}$$

So option (c) is correct.

34. According to law of conservation of momentum

$$|(M_1 V_1)_{Th}| = |(M_2 V_2)_{He}| = x$$

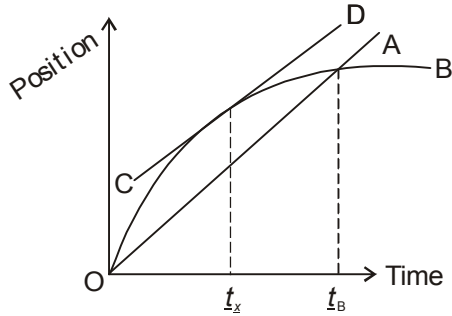
$$\Rightarrow (KE)_{Th} = \frac{x^2}{2M_1} \text{ and } (KE)_{He} = \frac{x^2}{2M_2}$$

$$\therefore M_2 < M_1 \Rightarrow KE_{Th} < KE_{He}$$

$\Rightarrow$ Option (d) is correct .

35. Option (a) represents the above data as displacement of ball decreases more rapidly at initial stage later as time passes rate of decrease in displacement reduces.

36.



Both trains A and B may have the same velocity at some time t_x earlier than t_B as it is clear from the graph, tangent CD and slope of OA are equal.

37. Average speed $= \frac{20}{20} = 1\text{m/s}$

From graph its clear maximum speed is attained between $t = 10\text{s}$ to $t = 20\text{s}$

$\Rightarrow$ Maximum speed $= \frac{16}{8} = 2\text{m/s}$.

38. Planet density $= \rho$ Radius $= R$ Acceleration to gravity $= g$ then

$$g = \frac{G\left(\frac{4}{3}\pi R^3/\rho\right)}{R^2} = \frac{d}{dx}(4x^3 - 48x^2 + 144x)$$

New radius of planet $= 2R$ New density $= \rho$ (remains same)

New Acceleration due to gravity

$$g' = \frac{G\left(\frac{4}{3}\pi(2R)^3\rho\right)}{(2R)^2}$$

$$g' = 2 \times \frac{4}{3}\pi GR\rho$$

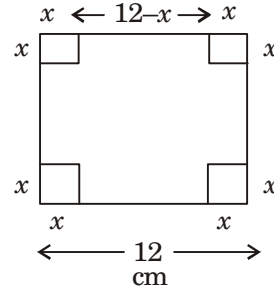
$$\Rightarrow g' = 2g$$

39. Rings pond R arrive simultaneously, followed by Q as plastic (P) and copper (R) rings will not suffer any repulsive force against the magnet.

40. Since the electron moves with uniform velocity so its momentum and K.E. remains constant but due to change in direction its velocity and force on electrons varies.

So option (d) is correct.

41. Square side is of length 12cm.



Let squares cut a corner are of side x cm

$\therefore$ Sides of remaining squares

$$= (12 - x) \text{ cm}$$

$\therefore$ Volume of the box

$$= (12 - x)^2 \times x$$

$$= (144 - x^2 - 48x)x$$

$$= 4x^3 - 48x^2 + 144x$$

For maximum volume we find $\frac{dv}{dx} = 0$

$$\Rightarrow \frac{d}{dx}(4x^3 - 48x^2 + 144x) = 0$$

$$\Rightarrow 12x^2 - 96x + 144 = 0$$

$$\Rightarrow x^2 - 6x + 12 = 0$$

$\Rightarrow x = 2$ or $6 \Rightarrow x$ can take value 2 and not 6

$$\therefore V_{\max} = (12 - 2 \times 2)^2 \times 2 = 128 < 130$$

$$\therefore V \neq 130 \text{ c.c}$$

42. On the basis of similarity of polygons the two conditions necessary for the polygons to be similar are:

1. The lengths of their corresponding sides are proportional
2. Their corresponding angles are equal.

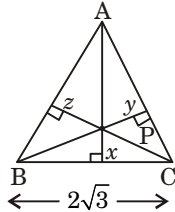
Polygons of side greater than 3 both conditions are necessary to be satisfied for the polygons to be similar but for triangle any one of the condition is enough to prove that they are similar.

So option (a) is true

43. $\triangle ABC$ is an equilateral triangle.

$$\text{Ar}(\triangle ABC) = \text{Ar}[(\triangle APB) + (\triangle APC) + (\triangle BPC)]$$

$$\Rightarrow = \frac{(2\sqrt{3})^2 \sqrt{3}}{4}$$



$$= \frac{1}{2} [2\sqrt{3} \times x + 2\sqrt{3} \times y + 2\sqrt{3} \times z]$$

$$\Rightarrow \frac{12\sqrt{3}}{4} = \frac{1}{2} \times 2\sqrt{3}(x + y + z)$$

$$\Rightarrow x + y + z = 3.$$

44. $(51)^4 - 6765201$

$\Rightarrow$ Option (a) is correct.

45. An old integer is of the form

$$4P + 1 \text{ or } 4P + 3$$

$$\therefore (4P + 1)^2 = 16P^2 + 1 + 8P$$

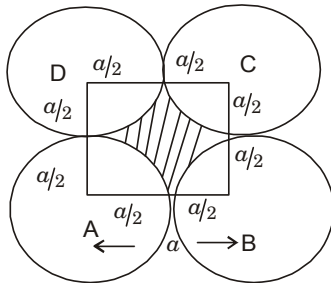
$$= 8(2P^2 + P) + 1 = 8n + 1$$

$$\therefore (4P + 3)^2 = 16P^2 + 9 + 24P$$

$$= 8(2P^2 + 3P + 1) + 1 = 8n + 1$$

Option (c) is correct.

46. ABCD is a square of side a



radius of each circle = $a/2$

If δ represents area interior of square and exterior of circle

then area δ = area of square - 4 area of sector of each circle

$$= a^2 - \frac{\pi a^2}{4} = a^2 \left[\frac{4 - \pi}{4} \right]$$

$\therefore$ Option (c) is correct.

47. $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$

$$= \tan 1^\circ + \tan 2^\circ + \dots + \cot 2^\circ \cos 1^\circ$$

$$= 1 \left(\because \tan \theta = \frac{1}{\cot \theta} \right)$$

Option (b) is correct.

48. A quadratic equation of the form

$$ax^2 + bx + c = 0$$

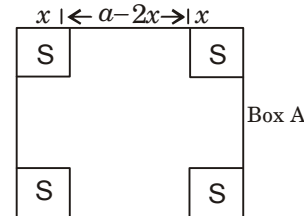
will have real roots if

$$b^2 - 4ac \geq 0$$

if $c = 0 \Rightarrow b^2 \geq 0$

$\therefore$ Option (d) is correct.

49. $\leftarrow a \rightarrow$

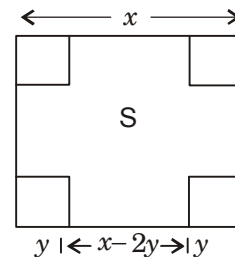


Let the tin be of side a

$\therefore$ volume of box A = U

$$\text{s.t } U = (a - 2x)^2 \cdot x$$

Now for square



Volume of box B = V

$$\text{s.t } V = (x - 2y)^2 y$$

Minimum value of U and V can be 0 also
 $U > V$, $V > U$ and $U = V$ are possible but
 minimum value of U cannot be greater
 than maximum value of V.

50. A parallelogram is a type of trapezium

so option (b) is correct.

51. A polygon which is uniquely determined
 when all the sides are given are triangles

52. Let number of men = X

Number of dogs = Y

∴ Total number of feet

$$= \left[\frac{X}{10} + \frac{2.9X}{10} \right] + 4Y = 77$$

$$\Rightarrow \frac{19X}{10} + 4Y = 77$$

$$\Rightarrow X = \frac{770 - 40Y}{19}$$

For given option if Y = 5 X = 30 satisfies the equation.

So option (c) is correct.

53. Path I and II will be same as they are independent of no. of semicircles

54. Total number of integer divisible by 4 or 6 between 1 to 100 are 33.

Probability of getting to integer which is neither divisible by

$$4 \text{ or } 6 = \frac{100 - 33}{100} = 0.67.$$

Option (b) is correct

$$55. \sqrt{(a-b)^2} + \sqrt{(b-a)^2}$$

$$= |a-b| + |b-a|$$

⇒ above value will be +ve if $a \neq b$.

56. $S_2 > S_1$ because total surface areas of all spheres will always increase when a single solid sphere is melted and recorted into number of several small spheres.

57. 23.10100100010000 is non terminally non-repeating number so it is an irrational number.

58. We find a case where more than 5 coins are consider then

$$5 + 5 + 1 + 1 + 1 + 1 = 14$$

59. 1, 3, 4, 6, 7, 8, 8, 9, 12, 15

Median will be any number between 7 and 8.

60. Walking speed 4km/h from home to bus stand

and x km/h from bus stand to home

$$\text{Average speed} = 6\text{km/h} \Rightarrow 3 = \frac{4x}{4+x}$$

$$\Rightarrow x = 12.$$

■ ■

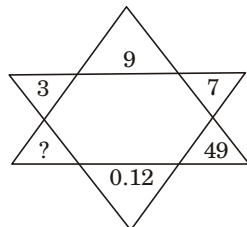
NTSE - 2012

NATIONAL LEVEL

PART I : MENTAL ABILITY TEST

Directions(Q.1–4): In the following questions, there is a relationship between the numbers / letters / figures on the left of the sign (:). The same relationship exists to the right of the sign (::), of which one is missing. Find the missing term from the alternatives.

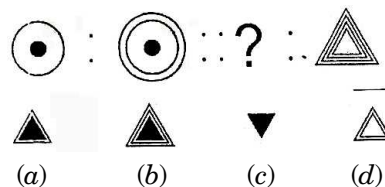
1. NOVA : OVON :: OZON : ?
 (a) OZOZ (b) ZOZO
 (c) NONO (d) ZNZN
2. BEJQ : ACGMU :: FINU : ?
 (a) EHLRZ (b) EGKQY
 (c) FHKRZ (d) EHLQW
3. BDGK : OKHF :: KMPT : ?
 (a) XTOQ (b) XOTQ
 (c) XTQO (d) OXTQ
4. BEFC : EDBF :: VYZW : ?
 (a) YXVZ (b) XYVZ
 (c) YXZV (d) VYXZ
5. Look at the following figure. Find the pattern for writing a number in the small triangles and find the missing number.



- (a) 0.1440 (b) 0.0144
 (c) 0.0014 (d) 1.444
6. Find from the alternatives the number which will replace the question mark ?

4	5	80
5	6	150
8	?	448

7. Select the correct alternative to replace the "?".
 $3\ 7\ 15\ 31 : 5\ 11\ 23\ 47 :: 7\ 15\ 31\ 63 : ?$
 (a) 9 21 41 81
 (b) 13 31 63 127
 (c) 13 29 61 125
 (d) 9 19 39 79
8. Select the correct alternative to replace the "?".
 $90 : 81 :: 120 : ?$
 (a) 144 (b) 143
 (c) 121 (d) 120
9. Select the correct alternative to replace the "?".
 $81 : 3 : 27 :: ? : ? : 125$
 (a) 225 : 25 (b) 5 : 25
 (c) 150 : 15 (d) 625 : 5
10. Select the correct alternative to replace the "?".



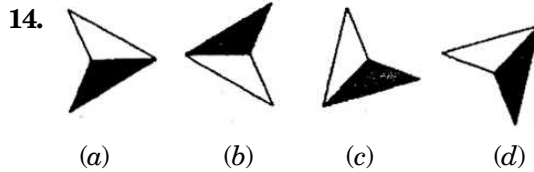
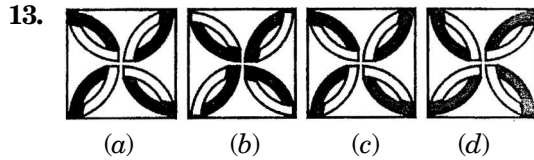
11. A pilgrim started from a shrine. After walking straight for 100m, he moved to his right and then after 500m, he again moved to his right. After walking a distance of 100m, he moved to his left and then walked 200m. He again moved to his right and walked 700m. In the end he turned to his left two times.

What is the distance of his location from the shrine ?

- (a) 1100 m (b) 1300 m
 (c) 1400 m (d) 2100 m

Directions(Q.12-14): Find the odd-one-out from the alternatives.

12. (a) 25, 5, 5 (b) 51, 3, 17
(c) 96, 6, 16 (d) 75, 5, 25



15. In the given series

1, 8, 3, 5, 1, 3, 7, 8, 1, 5, 7, 3, 5, 8, 3, 1, 5,
3, 7, 1, 8, 3, 5, 3, 7, 8, 3, 5, 1, 7, 3, 7, 5, 1,
8, 3, 1, 7, 1, 8, 3, 8, 5, 1

how many times do the two consecutive
(i.e. numbers one after the other) have a
difference of 4 ?

- (a) 6 (b) 9
(c) 11 (d) 13

16. In the given series

5, 6, 8, 2, 5, 5, 2, 5, 4, 2, 8, 5, 3, 5, 2, 8, 6,
8, 2, 5, 2, 8, 6, 2, 8, 5, 7, 2, 8

how many times the number '2' has come
before 8 but 5 has not come after 8 ?

- (a) 4 (b) 3
(c) 2 (d) 1

17. In the given series how many times the
number '6' is followed by the number '8'
but '8' should not be followed by 'T' ?

2, 5, 3, 6, 8, 4, 9, 6, 8, 1, 5, 1, 6, 8, 7, 5, 6,
2, 7, 5, 3, 6, 8, 3, 7, 6, 8, 1, 5, 6, 8

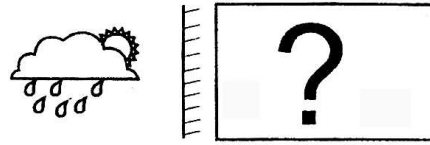
- (a) 1 (b) 2
(c) 3 (d) 4

18. In the given series how many times the
two consecutive (one after another)
number in the given sequence are square
of the previous number ?

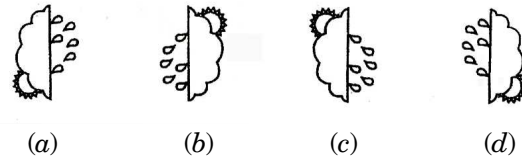
2, 5, 18, 51, 3, 9, 5, 52, 6, 36, 7, 46, 8, 64,
5, 25, 2, 4, 16, 5, 32, 4, 61, 9, 3, 4, 2

- (a) 4 (b) 5
(c) 6 (d) 7

19. Observe the figure given below.



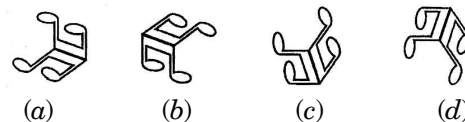
If the mirror image of the figure is rotated
to 90 degree in clockwise direction, it will
look like:



20. Observe the figure given below.



If the mirror image of the figure is rotated
to 180 degree in anti-clockwise direction,
it will look like :



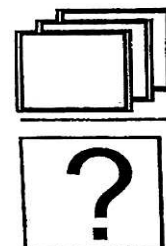
21. Observe the figure given below.



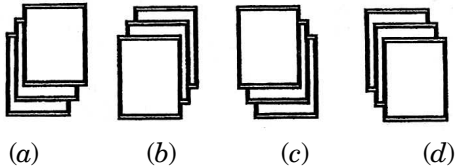
Find out the water reflection of the figure
from the given alternatives.



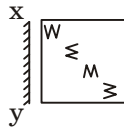
22. Observe the figure given below.



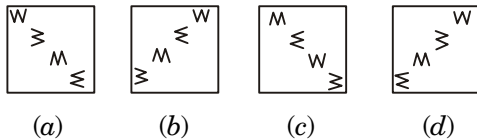
First rotate the figure by 90 degree in clockwise direction and find out its water reflection from the alternatives given below.



23. Observe the figure given below.



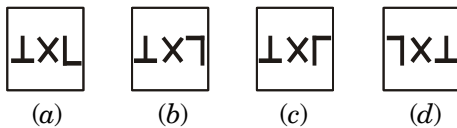
Which of the answer figures is the mirror image of the given figure when mirror is held at xy ?



24. Observe the figure given below.



Which of the answer figure is exactly the water image of the given figure when water is below the item ?



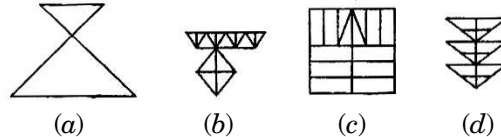
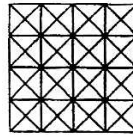
25. Gopal is elder by 4 years to Govind, After 16 years Gopal will be thrice his present age and Govind will be five times of his present age. How old is Gopal ?

(a) 4 years (b) 8 years
(c) 12 years (d) 16 years

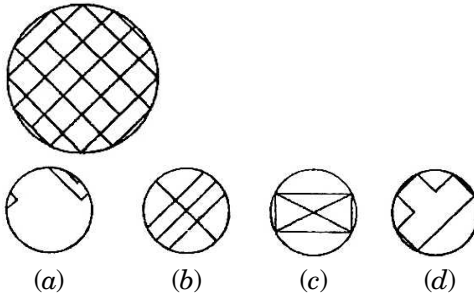
26. If in a particular year, 16th June was Friday, then the first Friday in July of that year will fall on which date ?

(a) 5th July (b) 6th July
(c) 7th July (d) 8th July

27. A problem figure is given. Find out which of the figures given as alternatives is embedded in the given problem figure.



28. Among the four answer figures which one is not there in the key figure ?



29. In a row of boys, Mukesh is 8th from the right and Suresth is also 8th from the left. When Mukesh and Suresh interchange their positions, Suresh becomes 16th from the left.

How many boys are there in the row ?

(a) 16 (b) 20
(c) 23 (d) 25

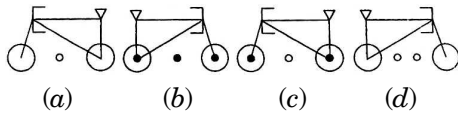
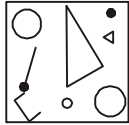
30. If C is husband of B, B is daughter of A, A is mother of D and D is a boy, then how D is related to B ?

(a) Husband
(b) Brother
(c) Son
(d) Father

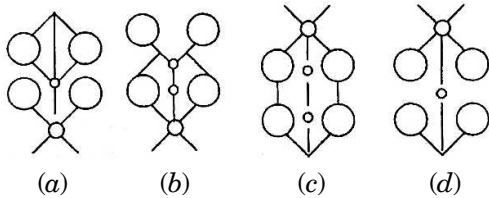
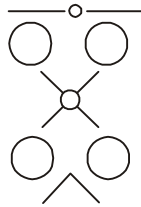
31. If C is brother of B, B is son of A, D is father of C and A is a female, then how A is related to D ?

(a) Mother (b) Father
(c) Sister (d) Wife

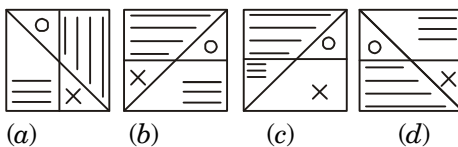
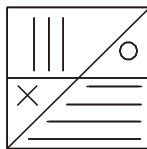
32. In which answer figure all the specified components of the key figure are found ?



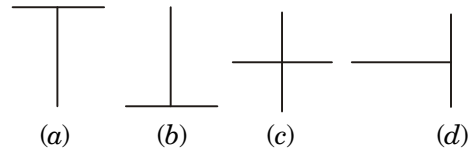
33. In which answer all the specified components of the figure are found ?



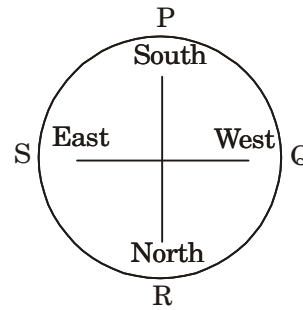
34. Identify the answer figure which can be formed by rotating the problem figure at one step anticlockwise.



35. Prakash's house is 15 metres away in the northern direction from his office, which is 10 metres West of his factory and 10 metres East of his club. Which of the given alternatives resembles the shape of the graphical representation of the positions of office, residence, factory and club ?

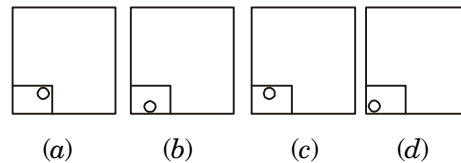
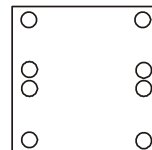


36. In a given circle directions are given and places of 'P' 'Q' 'R' 'S' have been shown. If 'P' moves one & half quarter clockwise in which direction 'P' will be ?



- (a) North - East Region
(b) North - West Region
(c) South - East Region
(d) South - West Region

37. A square paper is folded in a particular manner and a punch is made. When unfolded the paper appears as given below. Which of the following alternative shows the correct manner in which punch is made?



Directions (Q. 38 - 40) : In the following questions :

If A and C are good in Science and Mathematics
D and A are good in Science and Cricket;
C and B are good in Tennis and Mathematics;
D, B and E are good in Cricket and Tennis;
E and D are good in Cricket and Music, then

38. Who is good in Cricket, Mathematics and Science ?

- (a) A (b) B
(c) C (d) D

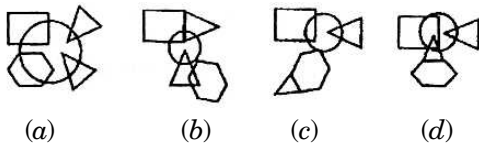
39. Who is good in Science, Tennis and Mathematics ?

- (a) B (b) C
(c) D (d) E

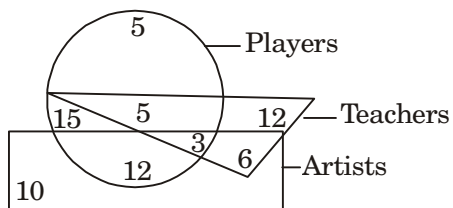
40. Who is **not** good in Science and Music ?

- (a) A (b) B
(c) C (d) E

41. In a family father is a Doctor and the Mother is an advocate. They have a son who is an $\square$ engineer and married to a Teacher and their daughter is an advocate. If $\triangle$ represents Doctor, $\circ$ represents Advocate, $\square$ represents Engineer and $\diamond$ represents Teacher, which one of the following diagram represents the family relationship and their respective positions ?

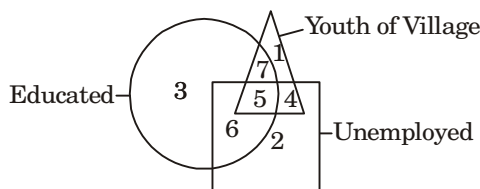


42. In the figure given below find out how many teachers are both players and Artists ?



- (a) 3 (b) 6
(c) 8 (d) 9

Directions (Q. 43 - 44) : Study the following diagram and then answer each question



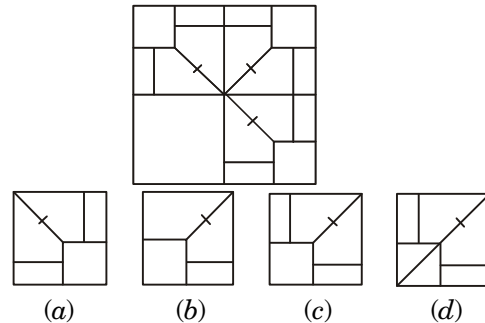
43. What is the number that represents uneducated unemployed youths in village ?

- (a) 4 (b) 5
(c) 6 (d) 7

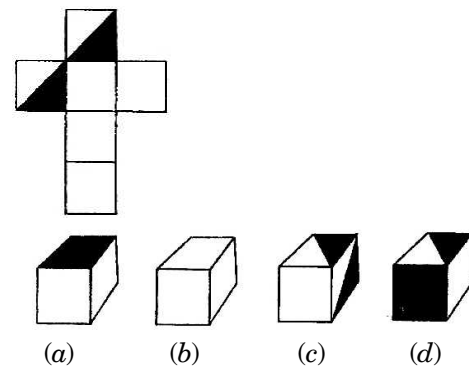
44. Which number represents employed educated youth in a village ?

- (a) 4 (b) 5
(c) 7 (d) 12

45. Which answer figure will complete the pattern in the question figure ?



46. How will the figure look like when folded along the lines into a cube ?



47. In the following list alphabet-codes for each word have been written in a jumbled manner.

CRY	DEZ
RAY	XZE
TREE	KEHK
FARE	EXKM
CAT	XDH
FAT	HMX

'DARE' will be coded as

- (a) C X E K (b) D X E K
(c) X E K B (d) Cannot say

Directions(Q.48–49): Consider the words and their codes given in the table below and answer the questions.

JOIN	GPHN
GET	JFV
EAT	FAV
GREAT	JRFAV
FOUL	EPQL

48. How many alphabets have been retained as codes ?

- (a) 2 (b) 3
(c) 4 (d) 5

49. The word 'FIGURE' will be coded as :

- (a) E H J Q R F
(b) F D E L V F
(c) F I J P R A
(d) F H J Q A R

50. In a certain language WHITE is written as DSRQV. How will BLACK be written in that, language ?

- (a) Y O Z X P (b) Y O X Z P
(c) Y Z O X P (d) Y O P X Z

Directions(Q.51–52): A table of words and their codes is given below. Analyze the pattern of transformation of code into words and answer questions based on them.

ETG	PIG
TTE	TIP
KSY	CAN
ESKP	PACE
TBE	TOP
DPY	HEN
CPY	KEY
HBG	DOG
DBT	HOT
SOAPYT	ABSENT

51. How many alphabets have not been used as codes for each other ?

- (a) 2 (b) 3
(c) 4 (d) 5

52. Which of these words can be successfully coded using the pattern based on the table ?

- (a) EXPLODE (b) DISASTER
(c) HINTED (d) SOLITARY

53. If in a code L = 20, RED = 51, then how BLUE will be written ?

- (a) 68 (b) 72
(c) 81 (d) 94

54. If in a code GO = 105, SO = 285, then how RAT will be written ?

- (a) 280 (b) 295
(c) 345 (d) 360

Directions(Q.55–57): Letters from A to Z are coded using the following cells in diagram I and sectors in diagram II. The first letter in each cell is coded by its shape while the second letter includes a dot in it. for example :

A is coded as  ; M is coded as 

K is coded as  ; P is coded as 

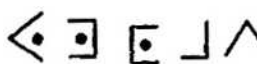
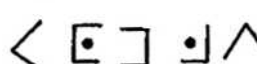
Diagram I

AM	NF	CO
BU	TV	DG
EW	IZ	XY

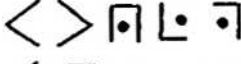
Diagram II

JC
KP HS
RQ

55. How SUGAR will be coded ?

- (a) 
(b) 
(c) 
(d) 

56. How SPICE will be coded ?

- (a) 
(b) 
(c) 
(d) 

57. How PATCH will be coded ?

- (a)
- (b)
- (c)
- (d)

58. Given -

$$\begin{array}{r} \text{T} \quad \text{A} \quad \text{R} \\ + \text{R} \quad \text{A} \quad \text{T} \quad \text{E} \\ \hline 4 \quad 4 \quad 4 \quad 4 \end{array}$$

Find out which number from the following stands for TEA

- (a) 103 (b) 130
(c) 310 (d) 413

Directions(Q. 59 - 60): In the following questions the words are coded but are not in their respective position. Study them carefully and answer the questions that follow :

- 'Mohan Wants Car' is 1, 2, 3
'Car Is Good' is 1, 4, 5
'Mohan Has Good Scooters' is 2, 4, 6, 7
'Amit Has Car' is 7, 1, 8 and
'Car Is Precious' is 1, 5, 9

59. Which digit stands for 'Good' ?

- (a) 1 (b) 4
(c) 6 (d) 7

60. What will be the code for 'Amit Wants Precious Scooter' ?

- (a) 2, 3, 6, 9
(b) 8, 3, 9, 6
(c) 8, 6, 5, 9
(d) 8, 7, 9, 1

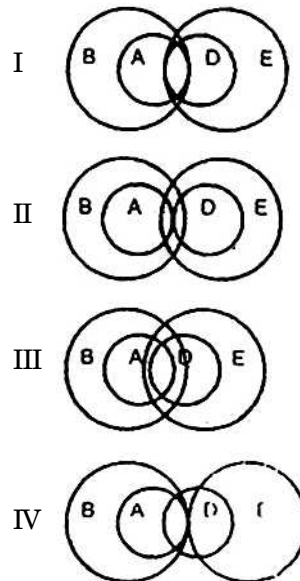
61. In the following multiplication, each of the different letters denotes a different integer. Each letter stands for the same integer through out. If 'B' stands for 6 and 'E' stands for 8, then what is difference between 'F' and 'D' ?

$$\begin{array}{r} \text{ABC} \\ \text{DE} \times \\ \hline \text{ACFB} \\ \text{EAG} \\ \hline \text{FHFB} \end{array}$$

- (a) 2 (b) 4
(c) 6 (d) 8

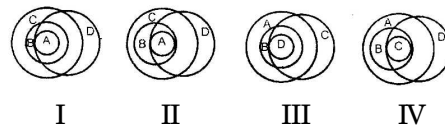
Directions(Q. 62 - 63) : Read the statement given below. Find out the diagram (s) from the given alternatives representing the statement correctly.

62. If all A are B but some A are D, and all D are E.



- (a) I and II
(b) I and III
(c) I and IV
(d) Only II

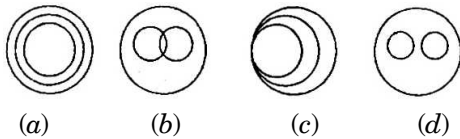
63. If all A are B and all B are C but some C are not D but all A are D.



- (a) I and II (b) I and III
(c) I and IV (d) Only H

64. Consider the following :

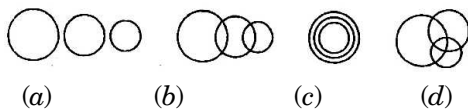
- Some teachers only teach
- Some incharges only look after work
- Some incharges are teachers
- Teachers and incharges work in colleges. Which one of the four diagrams given below represents the above data ?



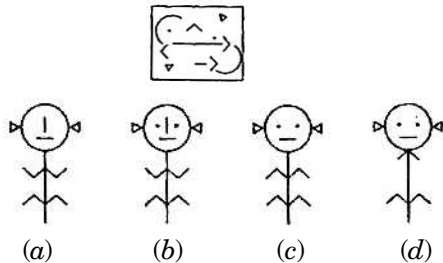
65. Consider these informations :

- 40 students studied English
- Out of them 20 students studied philosophy
- Ten students studied philosophy as well as Urdu

Which of these figures represents the above data ?



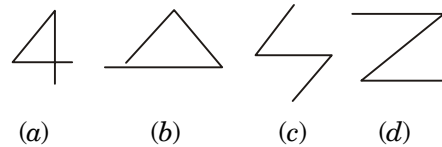
66. In which figure all the specified components of the problem figure are found ?



67. Two women and two men are playing cards and are seated North, East, South and West of a table. No woman is facing East. Persons sitting opposite to each other are not of the same sex. One man is facing South. Which direction are ladies facing ?

(a) East and West
(b) South and East
(c) North and East
(d) North and West

68. Mr. Ashok's residence is 25 metres away from that of Mr. Bhagwat towards South-West direction. Mr. Champak's house is 25 metres away from that of Mr. Ashok towards East. Mr. Deepak's house is 25 metres away from Bhagwat towards West. Which of the given alternatives resembles the shape of the above description ?



69. A group of friends are sitting in an arrangement each one at a corner of a hexagon. Rakesh is sitting opposite Rajesh, Jaya is sitting next to Suman, Neelam is sitting opposite Suman but not next to Rakesh, Amit has a person between Rajesh and himself. Who is sitting opposite Jaya ?

- (a) Rajesh
(b) Neelam
(c) Amit
(d) Suman

70. Manju is younger than Priyanka. Mukesh and Jagdish are older than Priyanka but younger than Sudha who is of the same age as Srikant. Hence, Srikant is

- (a) younger than Manju
(b) older than Manju
(c) younger than Mukesh
(d) younger than Priyanka

71. Harsh is the father of Santosh, Preeti is the daughter of Beena and Beena is the wife of Harsh. Santosh is not the daughter of Beena. Find out the relationship of Santosh and Preeti.

- (a) Father – daughter
(b) Brother – sister
(c) Husband – wife
(d) Mother – daughter

- 72.** In a row of boys, Mukesh is 8th from the right and Suresh is also 8th from the left. When Mukesh and Suresh interchange their positions, Suresh becomes 16th from the left.

What will be Mukesh's new position from the right?

- (a) 15 (b) 16
(c) 17 (d) 18

Directions(Q.73–77): Take the given statement as true and decide which of the conclusions logically follows from the statement.

- 73. Statement :** Demonstrators protested against the New Education Policy.

Conclusions :

- I. Demonstrators are anti-social beings.
II. All education policies are bad.
III. Demonstrators often protest.
(a) I and II follow.
(b) I and III follow.
(c) Conclusions I, II and III follow.
(d) Data is insufficient to draw conclusion.

74. Statements:

1. All pens are pencils.
2. No pencil is a monkey.

Conclusions :

- I. No pen is a monkey
II. Some pens are monkeys.
III. All monkeys are pens.
(a) Only I follows.
(b) I and III follow.
(c) II and III follow.
(d) Conclusions I, II and III all follow.

75. Statements:

1. All buses are trees.
2. All trees are windows.

Conclusions:

- I. All buses are windows.

II. All windows are buses.

III. All trees are buses.

- (a) I and II follow.
(b) Only I follow.
(c) II and III follow.
(d) Conclusions I, II and III follow.

76. Consider these two statements to be true :

- All ministers are law graduates.
- Some ministers are ladies.

Which of these inferences is correct ?

- (a) All lady ministers are law graduates
(b) No lady minister is a law graduate
(c) No male minister is a law graduate
(d) All law graduate ministers will be ladies

77. Consider these three statements to be true :

- All birds fly
- Hyla is a reptile
- Some reptiles fly

Which of these inferences is correct ?

- (a) Hyla flies
(b) Hyla may fly
(c) Hyla is a bird
(d) Reptiles and birds fly

Which number is wrong in the series ? 3, 8, 15, 24, 34, 48, 63

- (a) 15 (b) 24
(c) 34 (d) 48

79. Find out the missing term in the series. 4, 10, 28, ?, 244

- (a) 64 (b) 81
(c) 82 (d) 96

80. I have few pens to be distributed. If I keep 4, 5, or 6 in a pack, I am left with three pens. If I keep 7 in a pack, I am left with none. What is the minimum number of pens, I have, to pack and distribute ?

- (a) 56 (b) 61
(c) 62 (d) 63

Directions(Q.81–83): In each of the following questions, one term in the number series is wrong. Find out the wrong term.

81. 89, 78, 86, 80, 85, 82, 83

- (a) 83
(b) 82
(c) 86
(d) 78

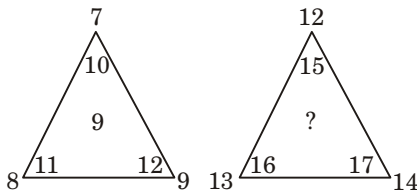
82. 4, 6, 15, 56, 280, 1644

- (a) 280 (b) 1644
(c) 56 (d) 15

83. 143, 156, 169, 182, 221, 232, 247

- (a) 182 (b) 247
(c) 232 (d) 221

84. Find out the correct value in place of ? mark in the problem figures :



- (a) 5 (b) 9
(c) 15 (d) 25

85. How many such pairs of digits are there in the number 98314625, each of which has as many digits between them in the number, as, when they are arranged in ascending order ?

- (a) 4 (b) 5
(c) 6 (d) 7

Directions(Q.86–90): A wooden cube of side 4 cm has been painted with different colours. The opposite two surfaces are painted with different colours. The opposite two surfaces are painted maroon, the other two with silver colour. Out of the remaining two surfaces one is painted orange and the other is painted green. The cube is cut into 64 equal cubes. Answer the following questions.

86. How many cubes have three colours maroon, silver and orange ?

- (a) 4 (b) 8
(c) 12 (d) 16

87. How many cubes have only two colours i.e. maroon and green ?

- (a) 2 (b) 4
(c) 6 (d) 12

88. How many cubes have only silver colour ?

- (a) 4 (b) 8
(c) 12 (d) 16

89. How many cubes have only orange colour ?

- (a) 4 (b) 8
(c) 12 (d) 16

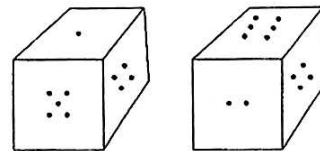
90. How many cubes do not have any coloured face?

- (a) 4 (b) 8
(c) 12 (d) 16

91. A solid cube is made using 64 small cubes. For how many small cubes only one side is seen ?

- (a) 16 (b) 24
(c) 28 (d) 32

92. Two positions of a dice are shown below. When four is at the top what number will be at the bottom ?



- (a) 2 (b) 3
(c) 5 (d) 6

93. A 5 metre long piece of cloth is cut into three smaller pieces. How long is the longest of the three pieces ? Given that:

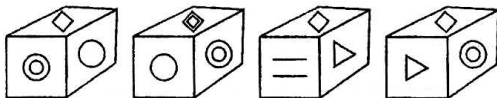
- I. One piece is 2.90 metre long.
II. One piece is 90 cm longer than another piece and the remaining piece is 20 cm long.

- (a) Statement I alone but not statement II alone is sufficient to answer the problem.
- (b) Statement II alone but not statement I alone is sufficient to answer the problem.
- (c) Statement I and II both are needed to answer the problem.
- (d) Statement I alone suffices and also statement II alone suffices to answer the problem.

94. The equal number of houses in both sides of the street are numbered 1, 2, 3, 4...up one side, then back down the other side. If opposite House No. 10 is House No. 23, then how many houses are there in the street ?

- (a) 30 (b) 32
(c) 34 (d) 36

95. Four positions of a single wooden cube, having various marking on its all the six faces are shown below. Study the positions carefully. Which symbol is opposite to the symbol =?



- (a) (b)
(c) (d)

96. In a dice 'A', 'B', C and 'D' are written on die adjacent faces, in a clockwise order and 'E' and 'F' at the top and bottom. When 'C' is at the top what will be at the bottom ?

- (a) A (b) B
(c) C (d) D

Directions(Q.97-100): Given below are two matrices containing two classes of letters. The rows and columns of Matrix I are numbered from 0 to 4 and that of Matrix II from 5 to 9. A letter from these matrices can be represented

first by its row number and next by its column number e.g. 'S' can be represented by 24, 31 etc.

	0	1	2	3	4
0	S	P	K	R	O
1	R	O	S	P	K
2	P	K	R	O	S
3	O	S	P	K	R
4	K	R	O	S	P

Matrix – I

	5	6	7	8	9
5	H	W	D	G	I
6	G	I	H	W	D
7	W	D	G	I	H
8	I	H	W	D	G
9	D	G	I	H	W

Matrix – II

97. Which set of numbers will represent the word "SHOW" ?

- (a) 12, 67, 42, 56 (b) 24, 55, 30, 55
(c) 31, 79, 22, 75 (d) 43, 56, 11, 99

98. Which set of numbers will represent the word "SHIP" ?

- (a) 00, 56, 66, 04 (b) 24, 86, 59, 43
(c) 31, 86, 66, 44 (d) 12, 98, 59, 97

99. Which set of numbers will represent the word "GROW" ?

- (a) 65, 22, 04, 57
(b) 77, 22, 42, 97
(c) 58, 10, 11, 88
(d) 96, 34, 23, 68

100. Which set of numbers will represent the word "GRID" ?

- (a) 65, 41, 85, 96 (b) 58, 41, 97, 88
(c) 65, 41, 95, 85 (d) 77, 22, 23, 85

PART II : SCHOLASTIC APTITUDE TEST

1. Which one of the following situations is likely to cause muscle cramps ?

(a) Glucose $\xrightarrow{\text{No Oxygen}}$ Lactic acid
 (b) Glucose $\xrightarrow{\text{Oxygen}}$ Lactic acid
 (c) Glucose $\xrightarrow{\text{No Oxygen}}$ Alcohol + CO₂
 (d) Glucose $\xrightarrow{\text{Oxygen}}$ CO₂ + H₂O

2. Match each item in Column I with appropriate one/s in Column II

Column I	Column II
I. Red eyed frog	A. Thick skin and strong sense of smell
II. Toucan	B. Thick skin and sensitive hearing
III. Big cats	C. Long large beak
IV. Polar bear	D. Sticky Pad

Select the correct alternatives :

(a) I B, II C, III D, IV A
 (b) I B, II C, III A, IV B
 (c) I D, II C, III B, IV A
 (d) I D, II C, III A, IV B

3. Which one of the following(s) is NOT a reason for shortage of usable water ?

(a) Over exploitation

(b) Climate change
 (c) Deforestation
 (d) Decrease in sea level

4. Match the Column I with appropriate items from Column II

Column I	Column II
I. Ginger	A. Tuber
II. Onion	B. Grafting
III. Potato	C. Bulb
IV. Bryophyllum	D. Rhizome
	E. Adventitious buds
	F. Bulbil

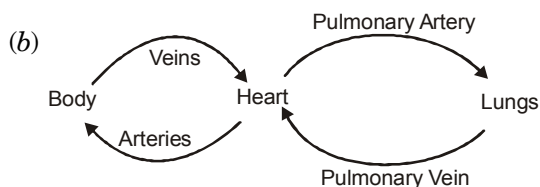
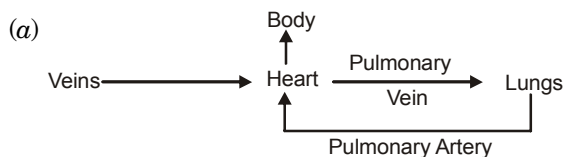
Select correct alternatives :

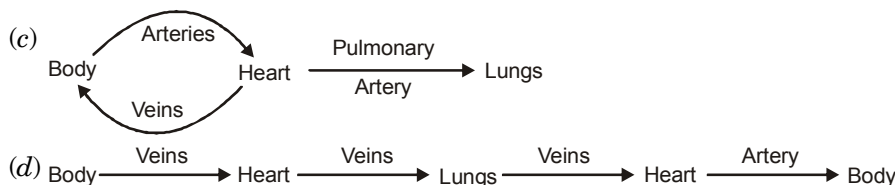
(a) I D, II C, III A, IV E
 (b) I D, II F, III E, IV C
 (c) I C, II B, III A, IV D
 (d) I D, II F, III A, IV B

5. In the waste water treatment plant (WWTP) air is pumped into water to :

(a) Support the growth of an aerobic bacteria
 (b) Support the growth of aerobic bacteria
 (c) Disinfect water
 (d) Blow human waste

6. Select the correct Schematic representation of blood circulation in human from the followings :





7. Water holding capacity of clayey soil is more than sandy soil, because
- Space between clay particles is more
 - Surface of clay particle is more
 - Space between sand particle is more
 - Clay particle can absorb more water
- Which one of the following alternatives is correct ?

(a) A, D (b) B, D
(c) B, C (d) C, D

8. Match the items in Column I with the appropriate ones in Column II

Column I	Column II
I. Winnowing	A. Irrigation
II. Threshing	B. Hoe
III. Drip system	C. Separation of grain & chaff
IV. Weeds	D. Separation of seeds & chaff

Select the correct alternative.

(a) I D, II C, III A, IV B
(b) I D, II C, III B, IV A
(c) I C, II D, III B, IV A
(d) I C, II D, III A, IV B

9. Silk fibres are secreted by
- Larva
 - Pupa
 - Cocoon
 - Adult silk moth
10. Students were taken to a museum on an educational trip. Which one of the following documents will provide the information on endangered animals and plants ?
- Data Book
 - Atlas
 - Red Data Book
 - Dictionary

11. Two sisters looked exactly same. This may be due to

(a) Mitochondrial DNA
(b) Genes
(c) Nucleoli and Nuclei
(d) Genes and RNA

12. Baker's yeast is added to aquarium for the following reason :

A. It provides minerals and metals.
B. It absorbs heavy metals present in water and purifies it.
C. It helps the plants for photosynthesis through aerobic respiration.
D. It helps the plant for photosynthesis through an aerobic respiration.

Select the correct option :

(a) A only (b) C only
(c) B and C (d) A & B

13. Match Column I with item of Column II

Column I	Column II
I. Lohi	A. Hosiery
II. Nali	B. Coarse wool
III. Patanwadi	C. Carpet wool
IV. Marwari	D. Good quality wool

Select the correct alternative :

(a) I D, II C, III A, IV B
(b) I D, II B, III A, IV C
(c) I C, II B, III A, IV D
(d) I B, II C, III A, IV D

14. After rain, tadpoles were found swimming in a pond but not frogs. This is due to –

(a) lack of pituitary hormones.
(b) lack of sex hormones.
(c) lack of thyroxine
(d) lack of iodine in water

Select the correct alternative :

- (a) A and B (b) A and C
(c) C and D (d) A, B, C and D

15. Polycot is mixture of

- (a) cotton and nylon
(b) polyster and nylon
(c) polyester and cotton
(d) wool and polyester

16. Match the item in Column I with appropriate item of Column II.

Column I	Column II
I. Malamine	A. Non-sticking cookwares
II. Nylon	B. Easily biodegradable
III. Teflon	C. Appears like silk
IV. Cotton	D. Flame resistant

Select the correct alternative :

- (a) I D, II C, III A, IV B
(b) I A, II B, III C, IV D
(c) I B, II A, III D, IV C
(d) I C, II D, III B, IV A

17. A highly reactive element (X) reacts with oxygen of air even at room temperature to give an oxide (Y). The oxide (Y) is soluble in water. The aqueous solution of (Y) does not change the colour of red litmus solution but reacts with an aqueous solution of sodium hydroxide. The (X) is

- (a) sodium (b) phosphorus
(c) carbon (d) sulphur

18. Match the items in Column I with the items in Column II.

Column I	Column II
I. Iron	A. Liquid at room temperature
II. Copper	B. Deposition of reddish-brown layer on exposure to moist air.
III. Potassium	C. Can be cut easily with a knife.
IV. Mercury	D. Formation of a greenish layer on exposure to moist air

Select the correct alternatives :

- (a) I A, II C, III D, IV B
(b) I B, II D, III C, IV A
(c) I C, II A, III B, IV D
(d) I D, II B, III A, IV C

19. Naphthalene which is used to repel moths and other insects is obtained from :

- (a) Colar tar (b) Petroleum
(c) Coke (d) Paraffin

20. What is true about natural gas ?

- A. Its main component is methane and is used as a fuel in motor cars.
B. It is used as the raw material for manufacturing of fertilizers.
C. It is used for the generation of electricity.
D. It is an inexhaustible natural source.

- (a) A, B and C (b) B, C and D
(c) C, D and A (d) D, A and B

21. Some of the substances used in making of a modern safety match box are listed below :

- A. Antimony trisulphide
B. Glass powder
C. Pottasium chlorate
D. Red phosphorus

The head of a modern safety match stick contains :

- (a) A and D (b) B and C
(c) C and D (d) C and A

22. During burning of a candle, different zones of combustion in the flame are listed below :

- A. outermost zone
B. innermost zone
C. middle zone

The correct order of temperature of zones is :

- (a) $A > B > C$
(b) $C > B > A$
(c) $B > C > A$
(d) $A > C > B$

- 23.** Read the following statements and select the correct statements about greenhouse gases :
- Carbon dioxide is the only gas in the atmosphere which causes global warming.
 - The greenhouse gases trap heat and do not allow heat to escape into outer space.
 - Water vapours do not contribute to greenhouse effect.
 - The presence of excessive greenhouse gases in the atmosphere is responsible for global warming
- (a) A and B (b) B and D
(c) C and B (d) D and A
- 24.** Calamine is used to reduce the irritating effect of ant bite/sting because it reacts with (X) released due to the bite/sting of ants with (Y) present in a calamine. The (X) and (Y) respectively are :
- Sodium hydrogen carbonate and formic acid
 - Formic acid and zinc carbonate
 - Acetic acid and common salt
 - Hydrochloric acid and zinc oxide
- 25.** A farmer has been using excess quantities of chemical fertilizer in fields for a number of years. The crop yield began to reduce in spite of using chemical fertilizers. Which of the following are correct statements ?
- The soil has become more acidic.
 - The soil has become more alkaline.
 - The yield can be improved by adding slaked lime to the soil.
 - The yield can be improved by adding some organic matter.
 - The yield can be improved by adding common salt.
- (a) A and E (b) B and C
(c) B and E (d) A and C
- 26.** Which of the following is a physical change ?
- Hammering of a red hot iron rod to make a flat sheet.
 - Formation of ice by cooling of water.
 - Rising up of water vapours from sea to make clouds.
 - Heating of charcoal in air to high temperature till it begins to glow.
- (a) A, B and C (b) B, C and D
(c) C, D and A (d) D, A and B
- 27.** Which of the following is a chemical change ?
- Bubbling of oxygen gas through water
 - Burning of wax of a candle
 - Emitting of light from an electric bulb on passing electric current
 - Passing of carbon dioxide gas through lime water
- (a) A and B (b) C and D
(c) B and D (d) A and D
- 28.** Driving a car on a wet road is difficult because water
- makes it difficult to turn the car
 - decreases the friction between the tyres and the road
 - increases the friction between the tyres and the road
 - makes friction between the road and tyres zeros.
- 29.** In the table below, column I lists various mirrors and lenses and column II their uses, qualities or properties.
- | Column – I | Column – II |
|-------------------|--|
| 1. Plane mirror | A. Feels thinner in the middle |
| 2. Concave mirror | B. Always forms virtual image of the same size |
| 3. Convex mirror | C. Always forms virtual image of smaller size |

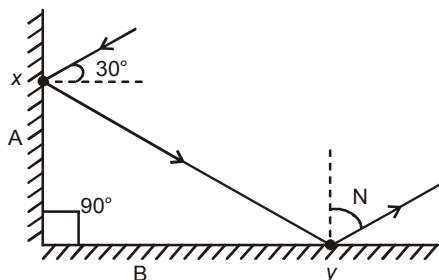
4. Convex lens D. Is used by dentists to examine teeth
 5. Convex lens E. Can be used as reading glass

The correct matching is

Code

	1	2	3	4	5
(a)	B	D	C	A	E
(b)	C	A	E	B	D
(c)	A	E	B	D	C
(d)	A	C	E	B	D

30. A ray of light falls on a plane mirror A kept at an angle 90° to mirror B as shown in the figure. The angle N is

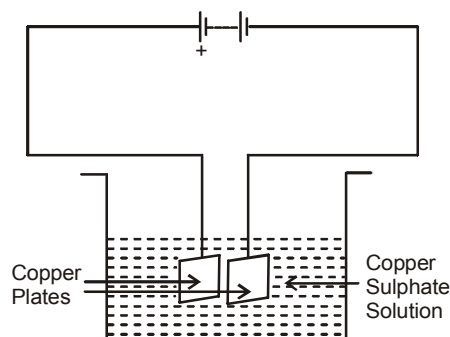


- (a) 30° (b) 45°
 (c) 60° (d) 90°

31. Atmospheric pressure in the center of a tropical cyclone is :

- (a) very low because of dense sinking air.
 (b) very low because of rising warm air.
 (c) very high because of sinking warm air.
 (d) very high because of converging winds.

32. Consider the given circuit carefully. What do you think would happen if the two copper plates are moved further apart ?



- (a) Larger amount of copper will be deposited on the plate connected to the negative electrode.
 (b) Smaller amount of copper will be deposited on the plate connected to the negative electrode.
 (c) Larger amount of copper will be deposited on the plate connected to the positive electrode.
 (d) Smaller amount of copper will be deposited on the plate connected to the positive electrode.

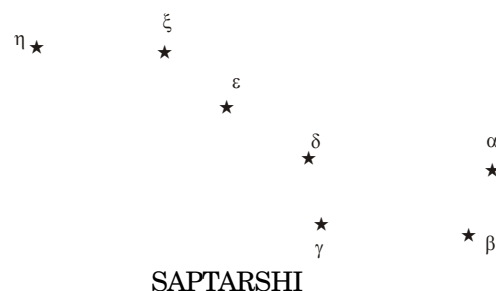
33. Two electromagnets are made by wrapping a few turns of wire on similar nails and passing the same amount of electric current through them. The number of turn of the wire wrapped over the two iron nails are in the ratio 2 : 1. The strength of

- (a) the first electromagnet will be greater.
 (b) the second electromagnet will be greater.
 (c) both the electromagnets will be equal.
 (d) electromagnet has no relation with the number of turns.

34. Electric current is passed through a straight conductor passing through the centre of a piece of cardboard. Some iron filings are sprinkled on the cardboard and tapped. The iron filings around the conductor.

- (a) settle as parallel lines.
 (b) settle as circles.
 (c) settle at one point.
 (d) do not acquire any regular pattern.

35. In which direction from Saptarshi (or Ursa Major, or Great Bear) shown in the figure do we search for Pole star ?



- (a) α to β (b) γ to δ
 (c) β to α (d) δ to γ

36. Temperature of a body can be measured on different scales, Celsius (C) and Fahrenheit (F). When thermometers measuring $^{\circ}\text{C}$ and $^{\circ}\text{F}$ were used to measure temperatures of various bodies, the following table was obtained :

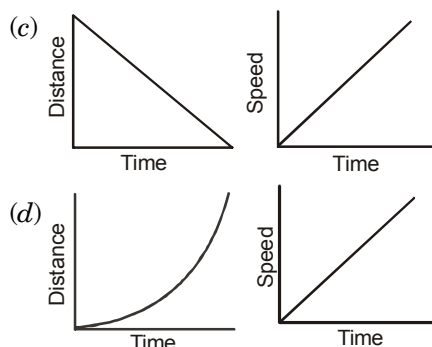
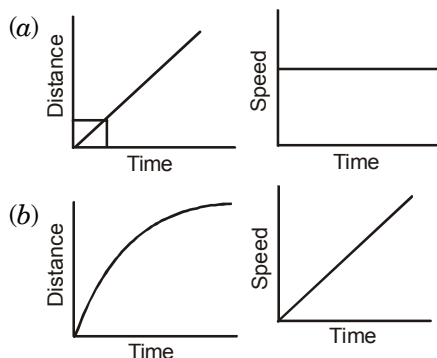
	$^{\circ}\text{C}$	$^{\circ}\text{F}$
Ice	0	32
Boiling Water	100	212
Hot Water	70	158
Tap Water	25	F_1

Then F_1 is :

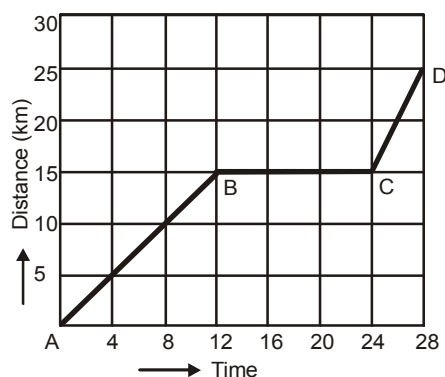
- (a) 77 (b) 57
 (c) 88 (d) 91
37. When there is lightning and
- you are in a jungle, go under a tall tree.
 - you are in a jungle, go under a canopy of small trees and bushes.
 - you are out in the open, crouch on your feet, do not stand up or lie on the ground.
 - you are in an open field, stay there rather than go inside a completely covered building.

Of these the good strategies are :

- (a) B and C (b) A and C
 (c) A, B and C (d) A, C and D
38. Which pair of the following graphs represents the same motion ?

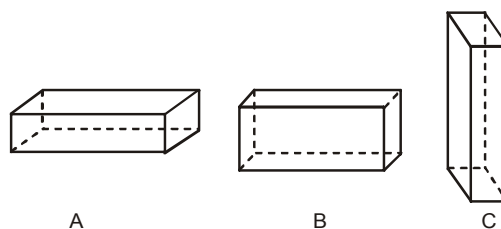


39. A car travels from A to D as shown in the graph



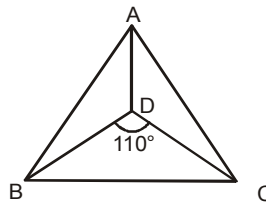
What is the average speed of the car between 4 and 20 minutes ?

- (a) $5/8$ km/min
 (b) $15/20$ km/min
 (c) $8/5$ km/min
 (d) $5/4$ km/min
40. In which of the following positions A, B and C of a cuboid will it exert maximum pressure ?



- (a) A
 (b) B
 (c) C
 (d) In all positions it will exert equal pressure

41. X buys pens and pencils at ₹ 5 and ₹ 1 per piece respectively. For every two pens, he buys three pencils. He sold pens and pencils at 12% and 10% profit respectively. If his total sale is ₹ 725, then the number of pencils exceeds the number of pens by
 (a) 25 (b) 50
 (c) 75 (d) 90
42. If tax on a commodity is decreased by 15% and its consumption increases by 10% then the percentage decrease in the revenue is
 (a) 15 (b) $8\frac{1}{2}$
 (c) $6\frac{1}{2}$ (d) 5
43. Unit's digit of the number $3^{1001} \times 7^{1002} \times 13^{1003}$ is
 (a) 1 (b) 3
 (c) 7 (d) 9
44. If the square root of a number is between 6 and 7, then its cube root lies between
 (a) 2 and 3 (b) 2.5 and 3
 (c) 3 and 4 (d) 4 and 4.5
45. If an angle of a regular polygon is 165° , then the number of sides of the polygon is
 (a) 30 (b) 24
 (c) 18 (d) 15
46. Two positive numbers x and y are inversely proportional. If x increases by 20%, then percentage decrease in y is
 (a) 20 (b) $16\frac{2}{3}$
 (c) 5 (d) $1\frac{9}{11}$
47. If in a race over a distance of d metres at uniform speed, A can beat B by 20 metres, B can beat C by 10 metres and A can beat C by 28 metres, then d , in metres, is equal to
 (a) 100 (b) 150
 (c) 200 (d) 500
48. Given a number $x = 2^{48} - 1$. Then between 5 and 10, x has/have
 (a) no factor (b) only one factor
 (c) two factors (d) three factors
49. Given two 4-digit numbers $abcd$ and $dcba$. If $a + d = b + c = 7$, then their sum is not divisible by
 (a) 7 (b) 11
 (c) 101 (d) 111
50. Half of a herd of deer are grazing in the field and three fourths of the remaining are playing nearby. If the remaining 9 are drinking water from a pond, then the difference between the number of deer who are grazing and those who are playing is a multiple of
 (a) 4 (b) 6
 (c) 8 (d) 9
51. If amongst two supplementary angles, the measure of smaller angle is four times its complement, then their difference is
 (a) 30° (b) 36°
 (c) 43° (d) 45°
52. If the angles A, B, C and D of a quadrilateral ABCD in the same order are in the ratio 3 : 7 : 6 : 4, then ABCD is a
 (a) Parallelogram (b) rhombus
 (c) trapezium (d) kite
53. If angles of a triangle are in the ratio 2 : 4 : 9, then the difference of the two smaller exterior angles of the triangle is
 (a) 24° (b) 30°
 (c) 44° (d) 60°
54. In the following figure, $\triangle ABD \cong \triangle ACD$. If $\angle BDC = 110^\circ$ and $\angle DAC = 30^\circ$, then the measure of angle DBA is



- (a) 70° (b) 40°
 (c) 30° (d) 25°
55. In a $\triangle ABC$, $AB = 4\text{ cm}$ and $AC = 8\text{ cm}$. If M is the mid point of BC and $AM = 3\text{ cm}$, then length of BC , in cm , is
 (a) $2\sqrt{26}$ (b) $2\sqrt{31}$
 (c) $\sqrt{31}$ (d) $\sqrt{26}$
56. Let C and A be the circumference and the area of a circle respectively. If x C is the circumference of another circle whose area is $2A$, then x equals
 (a) $2\sqrt{2}$ (b) 2
 (c) $\sqrt{2}$ (d) $\frac{1}{2}$
57. The area (in cm^2) of the largest triangle that can be inscribed in a semicircle of radius $r\text{ cm}$ is
 (a) $\frac{1}{3}\pi r^2$ (b) $2r^2$
 (c) r^2 (d) $\frac{1}{2}$
58. If x denotes an angle between any two lines of symmetry of a regular hexagon, then the minimum value of x is
 (a) 30° (b) 45°
 (c) 60° (d) 90°
59. The quadrilateral in a plane formed by joining the points $(2, 3)$, $(4, 6)$, $(6, 3)$ and $(4, 0)$ is a
 (a) square
 (b) rectangle
 (c) rhombus
 (d) trapezium whose opposite angles are unequal
60. The mean of the median, the mode and the range of the following data :
 $84, 56, 39, 45, 54, 39, 56, 54, 84, 21, 77, 56$ is
 (a) 55 (b) 56
 (c) 58 (d) 63

61. Match Column I with Column II and select the correctly matched alternative from the given alternatives.

Column I	Column II
I. Dhangadeva	A. Rajarajeshvara temple
II. Rajarajadeva	B. Gangaikondacholapuram
III. Rajendra I	C. Kandariya Mahadeva
IV. Babur	D. Chahar Bagh in Kabul

- (a) I B, II A, III D, IV C
 (b) I D, II B, III A, IV C
 (c) I A, II B, III C, IV D
 (d) I C, II A, III B, IV D
62. **Assertion :**
(A): The works of most of the bhakti saints became immensely popular.
Reason :
(B): Most of the works were composed in regional languages and could be sung.
 (a) A is true but R is false
 (b) A is false but R is true
 (c) Both A and R are true and R is the correct explanation of A
 (d) Both A and R are true but R is not the correct explanation of A
63. Match Column I with Column II and select the correctly matched alternative from the given.

Column I	Column II
I. Alvars	A. Saivism
II. Nayanars	B. Vaishnavism
III. Sufis	C. Basavanna
IV. Virashaivas	D. Islam

- (a) I B, II A, III D, IV C
 (b) I D, II B, III A, IV C
 (c) I A, II B, III C, IV D
 (d) I B, II C, III A, IV D

64. Match the following Mughal officials against their positions.

Column I	Column II
I. Bakhshi	A. Town Police Comm- andar
II. Faujdars	B. Military Paymaster
III. Sadr	C. Incharge of Religious and Charitable patronage
IV. Kotwal	D. Military Commander

Select the correct alternative :

- (a) I B, II D, III C, IV A
 (b) I D, II C, III B, IV A
 (c) I A, II B, III C, IV D
 (d) I B, II D, III A, IV C
65. Choose the correct sequence to indicate the following statements as True (T) or False (F)
- A. Victory in India had never been a subject of painters in Britain
 B. Many European portrait painters came to India in search of profitable commissions
 C. Mohammad Ali Khan of Arcot never commissioned any European artist to paint his portrait.
 D. Johann Zoffany, a European painter was born in London
- (a) T, F, F, F (b) F, F, F, T
 (c) F, T, F, F (d) T, F, T, F
66. Trace out the growth of Kathak as a dance form through the centuries.
- A. Kathak through the Bhakti cult.
 B. Kathak through the caste of story tellers.
 C. Kathak through the Nawab of Awadh.
 D. Kathak through the Mughals.
- (a) a, d, b, c
 (b) b, a, d, c
 (c) d, c, b, a
 (d) b, c, d, a

67. Arrange the following commercial towns and settlements in accordance with their order of antiquity.

A. Hampi B. Kanchipuram
 C. Masulipatnam D. Bombay
 (a) a, b, d, c (b) b, a, c, d
 (c) b, c, d, a (d) b, c, a, d

68. Arrange the following administrative units of the Gonds as per their hierarchical order.

A. Barhots B. Chaurasi
 C. Garh D. Village
 (a) d, b, c, a (b) c, d, a, b
 (c) a, d, c, b (d) c, b, a, d

69. About whom Minhaj-i-Siraj said that, the queen's rule went against the ideal social order created by God, in which women were supposed to be subordinate to men.

(a) Queen Didda
 (b) Raziya Sultana
 (c) Queen Rudramadevi
 (d) Queen Durgavati

70. Which of the following was the division of Indian history made by James Mill ?

(a) Early ages, middle ages and modern age.
 (b) Old age, middle age, modern age and contemporary age.
 (c) Ancient, medieval and modern.
 (d) Hindu, Muslim and British

71. Choose the correct sequence to indicate the following statements as True (T) or False (F)

A. After the battle of Buxar, the company appointed Residents in Indian states.
 B. Resident represented the imperial power in the local court.
 C. In 1765, the Mughal emperor appointed the Company as the Diwan of the provinces of Bengal.
 D. Resident exercised financial and administrative powers.

(a) F, T, F, T (b) T, F, F, T
 (c) T, T, F, T (d) T, T, T, F

72. Examine the following statements and select the correct option.

- A. Tagore felt that childhood ought to be a time of self-learning.
 B. Tagore wanted to combine elements of modern western civilization with what he saw as the best within Indian tradition.

- (a) A is false and B is true
 (b) A is true and B is false
 (c) Both A and B are true
 (d) Both A and B are false

73. Arrange the following organizations in chronological order.

- A. Rashtriya Swayamsevak Sangh
 B. All India Muslim League
 C. Indian Association
 D. Indian National Congress

- (a) d, b, c, a (b) c, d, b, a
 (c) a, b, d, c (d) b, a, c, d

74. Who said, "The streets of Delhi are not mere streets, they are like the album of a painter?"

- (a) Bahadur Shah Zafar II
 (b) Mirza Ghalib
 (c) Edward Lutyens
 (d) Mir Taqi Mir

75. Assertion :

(A): Jawahar Lal Nehru and Sardar Patel were opposed to the formation of linguistic states.

Reason :

(R): The creation of linguistic states threatened the unity of India.

- (a) A is false and R is true
 (b) A is true but R is false
 (c) Both A and R are true and R is the correct explanation of A
 (d) Both A and R are true but R is not the correct explanation of A

76. Which of the following happens to the amount of 'Energy' when it is passed on from one trophic level to another in an ecosystem ?

- (a) There is no definite relation
 (b) It decreases
 (c) It increases
 (d) It remains constant

77. Which of the following atmospheric layers is suitable for radio communication ?

- (a) Troposphere (b) Stratosphere
 (c) Ionosphere (d) Exosphere

78. Assertion :

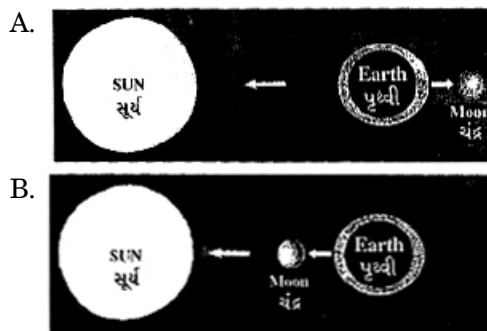
(A) : Westerlies are stronger in the northern Hemisphere than in the southern Hemisphere.

Reason :

(R) : The northern Hemisphere has more land area than the southern Hemisphere.

- (a) Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'
 (b) Both 'A' and 'R' are true but 'R' is not the correct explanation of 'A'
 (c) 'A' is true but 'R' is false
 (d) 'A' is false but 'R' is true

79. Which of the following diagrams represents Neap tide ?



Select the correct alternative :

- (a) 'A' only (b) 'B' only
 (c) Both A and B (d) Neither A nor B

80. Match Column-I with Column-II and select the correct answer from the given alternatives :

Column I	Column II
I. Melghat	A. Karnataka
II. Nandankanan	B. Madhya Pradesh
III. Kanha	C. Maharashtra
IV. Bandipur	D. Odisha

- (a) I A, II B, IIIC, IV D
 (b) I B, II C, III D, IV A
 (c) I C, II D, III A, IV B
 (d) I C, II D, III B, IV A

81. **Assertion :**

(A) : Major industrial regions on India have developed in the immediate hinterlands port of Kolkata, Mumbai and Chennai.

Reason :

(R) : The ports provide access to the raw materials available in the hinterlands of these ports as well as to the world markets

- (a) Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'
 (b) Both 'A' and 'R' are true and 'R' is not the correct explanation of 'A'
 (c) 'A' is true but 'R' is false
 (d) 'A' is false but 'R' is true

82. Consider the following statements and select the correct ones :

- A. Iron and steel industries developed around Lake Michigan in USA due to availability of good quality coal
 B. Pittsburg – Youngstown area is the leading producer of steel in USA
 C. The Lorraine area in France is significant for steel production
 D. The south Manchurian region accounts for nearly 60% of China's pig-iron production.

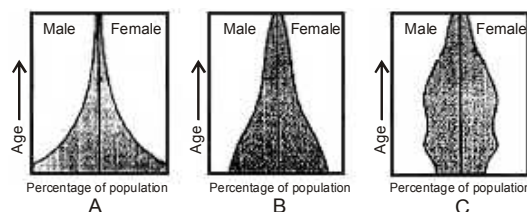
Select the correct answer from the given alternatives.

- (a) A, C, D (b) A, B, D
 (c) B, C, D (d) B, C

83. Choose the correct sequence to indicate the following statements as True (T) or False (F)

- A. Paraguay is part of Amazon Basin
 B. Niger is part of Sahara Desert
 C. Indianapolis is part of Canadian Prairies
 (a) T T F (b) F F T
 (c) T F T (d) F T F

84. Match the population pyramids with type of economies category



- I. Developing Economies
 II. Developed Economies
 III. Least Developed alternative :
 (a) III A, II B, I C (b) I A, III B, II C
 (c) II A, III B, I C (d) III A, I B, II C

85. 8 UNIT OF A + 4 UNIT OF B + 1 UNIT OF C = 1 UNIT OF STEEL

Select the correct alternative :

- (a) A-Coal B-Limestone C-Iron ore
 (b) A-Coal B-Iron ore C-Limestone
 (c) A-Limestone B-Coal C-Iron ore
 (d) A-Iron ore B-Limestone C-Coal

86. Match List-I with List-II and select the correct answer from the given alternatives :

List-I	List-II
I. Shifting cultivation	A. Pygmies
II. Patoralism	B. Eskimos
III. Hunter & Food Gatherers	C. Kirghiz
IV. Hunters	D. Rengmas

- (a) I A, II B, III C, IV D
 (b) I A, II C, III B, IV D
 (c) I D, II A, III C, IV B
 (d) I D, II C, III A, IV B

87. Match items of List I and List II and select the correct alternative :

List-I**List-II**

I. Argentina	A. Velds
II. North America	B. Downs
III. South Africa	C. Pampas
IV. Central Asia	D. Prairie
V. Australia	E. Steppes

(a) I D, II B, III E, IV A, V C

(b) I C, II D, III B, IV E, V A

(c) I C, II D, III A, IV E, V B

(d) I E, II D, III A, IV C, V B

88. What will be the correct sequence of natural vegetation in South America if one travels from North to South along 60° to 70° W longitude ?

Select the correct alternative :

(a) Gran chacos, Pampas, Llanos, Selvas

(b) Llanos, Gran chacos, Selvas, Pampas

(c) Llanos, Selvas, Gran chacos, Pampas

(d) Pampas, Selvas, Gran chacos, Llanos

89. A small coloured paper pellet is put in a beaker half-filled with water.

The beaker is placed on a tripod stand and heated.

As the water warms, the pellet moves upwards with the warm column of water and sinks back along the cool column of water.

Identify this movement.

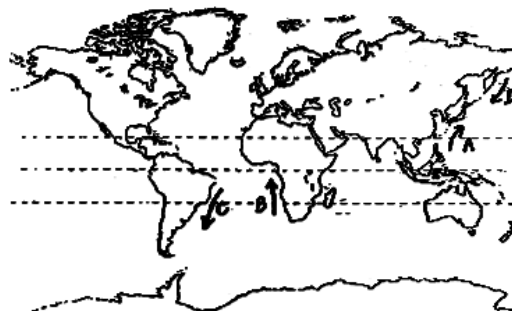
(a) Molten magma inside the earth

(b) Earth's Magnetic field

(c) Energy flow from one tropic level to another.

(d) Hydrological cycle

90. In the map given below, mark the two cold currents.



(a) A and B

(b) C and D

(c) A and C

(d) B and D

91. India is a 'Republic' because

(a) legislature is elected

(b) the Act of 1935 provided for a republic

(c) the head of the state is elected

(d) it has representative democracy

92. Under the Indian constitution which one of the following articles plays an interventionist role in the autonomy of a State Government ?

(a) Article 190

(b) Article 336

(c) Article 339

(d) Article 356

93. A : The Supreme Court of India can provide Advisory opinion to the President

B : The President of India is under obligation to accept the advise.

(a) A and B are true

(b) A and B are false

(c) A is true but B is false

(d) A is false but B is true

94. The boundaries of States can be altered by

(a) the Supreme Court of India

(b) the President of India

(c) the State Governments

(d) the Indian Parliament

- 95.** The Indian National Congress was defeated for the first time in the General Elections of Parliament in the year
 (a) 1962
 (b) 1967
 (c) 1977
 (d) 1998
- 96.** Market forces play a prominent role in those states whose ideology is based on
 (a) feudalism
 (b) capitalism
 (c) communism
 (d) confucianism
- 97.** Which one of the following pair of constitutions use the expression "We the people" in the preamble of their constitutions.
 (a) British and U.S. constitution
 (b) Indian and British constitution
 (c) Indian and U.S. constitution
 (d) French and British constitution
- 98.** The lok Sabha Secretariat functions under the direct control of
 (a) President
 (b) Prime-Minister
 (c) Secretary-General
 (d) Speaker
- 99.** The 'International Woman Day' is celebrated on
 (a) 1st March (b) 8th March
 (c) 1st May (d) 8th May
- 100.** The following persons were the President of India at one time or the other. Identify the correct chronological order in which they held the office.
 A. Dr. Sarvepalli RadhaKrishnan
 B. Dr. Zakir Hussain
 C. Dr. Rajendra Prasad
 D. Dr. V.V. Giri
 (a) C, D, B, A (b) A, B, C, D
 (c) C, A, B, D (d) B, D, C, A

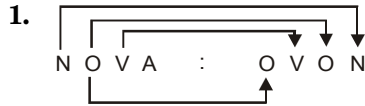
ANSWERS

MENTAL ABILITY TEST

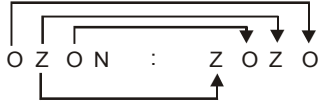
1. (b)	2. (b)	3. (c)	4. (a)	5. (b)	6. (c)	7. (d)	8. (a)	9. (d)	10. (d)
11. (c)	12. (d)	13. (b)	14. (c)	15. (a)	16. (b)	17. (d)	18. (c)	19. (b)	20. (a)
21. (a)	22. (b)	23. (d)	24. (c)	25. (b)	26. (c)	27. (a)	28. (b, c)	29. (c)	30. (b)
31. (d)	32. (c)	33. (d)	34. (a)	35. (b)	36. (b)	37. (d)	38. (a)	39. (b)	40. (b)
41. (b)	42. (a)	43. (a)	44. (c)	45. (c)	46. (b)	47. (d)	48. (b)	49. (a)	50. (a)
51. (d)	52. (c)	53. (b)	54. (d)	55. (c)	56. (a)	57. (b)	58. (a)	59. (b)	60. (b)
61. (b)	62. (b)	63. (a)	64. (b)	65. (c)	66. (c)	67. (d)	68. (d)	69. (c)	70. (b)
71. (b)	72. (b)	73. (d)	74. (a)	75. (b)	76. (a)	77. (b)	78. (c)	79. (c)	80. (d)
81. (c)	82. (a)	83. (c)	84. (b)	85. (a)	86. (a)	87. (b)	88. (b)	89. (a)	90. (b)
91. (b)	92. (b)	93. (d)	94. (b)	95. (c)	96. (a)	97. (a)	98. (c)	99. (d)	100. (b)

SCHOLASTIC APTITUDE TEST

1. (a)	2. (c)	3. (d)	4. (a)	5. (b)	6. (b)	7. (d)	8. (d)	9. (a)	10. (c)
11. (b)	12. (d)	13. (a)	14. (c)	15. (c)	16. (a)	17. (b)	18. (b)	19. (a)	20. (a)
21. (d)	22. (d)	23. (b)	24. (b)	25. (d)	26. (a)	27. (c)	28. (b)	29. (a)	30. (c)
31. (b)	32. (b)	33. (a)	34. (b)	35. (c)	36. (a)	37. (a)	38. (a)	39. (a)	40. (c)
41. (b)	42. (c)	43. (d)	44. (c)	45. (b)	46. (b)	47. (a)	48. (c)	49. (d)	50. (d)
51. (b)	52. (c)	53. (d)	54. (d)	55. (b)	56. (c)	57. (c)	58. (a)	59. (c)	60. (c)
61. (d)	62. (c)	63. (a)	64. (a)	65. (c)	66. (b)	67. (d)	68. (d)	69. (b)	70. (d)
71. (d)	72. (c)	73. (b)	74. (d)	75. (c)	76. (b)	77. (c)	78. (a)	79. (d)	80. (d)
81. (a)	82. (b)	83. (a)	84. (d)	85. (b)	86. (d)	87. (c)	88. (c)	89. (d)	90. (d)
91. (c)	92. (d)	93. (c)	94. (d)	95. (c)	96. (b)	97. (c)	98. (d)	99. (b)	100. (c)

EXPLANATIONS**MENTAL ABILITY TEST**

Similarly



2. $B \xrightarrow{-1} A$ Similarly $F \xrightarrow{-1} E$
 $E \xrightarrow{-2} C$ $I \xrightarrow{-2} G$
 $J \xrightarrow{-3} G$ $N \xrightarrow{-3} K$
 $Q \xrightarrow{-4} M$ $U \xrightarrow{-4} Q$
 $Q \xrightarrow{+4} U$ $U \xrightarrow{+4} Y$

3. $\begin{array}{c} B \quad D \quad G \quad K \\ +13 \downarrow +7 \downarrow +1 \downarrow -5 \downarrow \\ 15 \quad K \quad H \quad F \end{array}$ Similarly $\begin{array}{c} K \quad M \quad P \quad T \\ +13 \downarrow +7 \downarrow +1 \downarrow -5 \downarrow \\ X \quad T \quad Q \quad O \end{array}$

4. $\begin{array}{c} B \quad E \quad F \quad C \\ +3 \downarrow -1 \downarrow -4 \downarrow +3 \downarrow \\ E \quad D \quad B \quad F \end{array}$ Similarly $\begin{array}{c} V \quad Y \quad Z \quad W \\ +13 \downarrow +1 \downarrow -4 \downarrow +3 \downarrow \\ Y \quad X \quad V \quad Z \end{array}$

5. $3^2 = 9$, $7^2 = 49$, $(0.12)^2 = 0.0144$

6. $4 \times 5 \times 4 = 80$
 $5 \times 6 \times 5 = 150$
 $8 \times X \times 8 = 448$

$$X = \frac{448}{64} = 7$$

7. $3 \times +1 = 7$
 $7 \times 2 + 1 = 15$
 $15 \times 2 + 1 = 31$

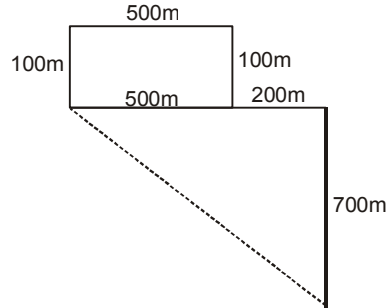
Similarly

$$\begin{aligned} 9 \times 2 + 1 &= 19 \\ 19 \times 2 + 1 &= 39 \\ 39 \times 2 + 1 &= 79 \end{aligned}$$

So, 9, 19, 39, 79

8. $90 = 9 \times 10$ and $81 = 9^2$
 Similarly $120 = 12 \times 10$ and $(12)^2 = 144$
 9. $3^4 : 3^1 : 3^3$ similarly $5^4 : 5^1 : 5^3$
 i.e. 625, 5.

11.

i.e. $700 + 700 = 1400$ m

12. Option (a)

$$5 \times 5 = 25$$

$$3 \times 17 = 51$$

$$6 \times 15 = 96$$

$$25 \times 5 \neq 75$$

13. By observation option (b) is different from other.

14. Move clockwise all figure.

Hence option (b) will be odd one out.

15. (5, 1), (7, 3), (5, 1), (7, 3), (5, 1), (5, 1)

16. (2, 8, 6) (2, 8, 6) (2, 8)

17. (6, 8, 4), (6, 8, 7), (6, 8, 3), (6, 8)

18. (3, 9), (6, 36), (8, 64), (5, 25), (2, 4), (4, 16)

19. Option (b) is correct mirror image of given figure.

20. is correct mirror and required image of

21. is correct water image a

22. is correct water and required image of

23. is correct mirror image of

24. is correct water image of

25. Let Gopal = x years and Govind = y years

$$x + 16 = 3x$$

i.e. $x = 8$ years

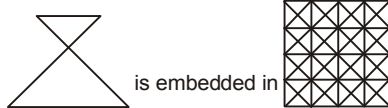
26. 16th June → Friday

23th June → Friday

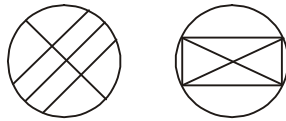
30th June → Friday

7th July → Friday

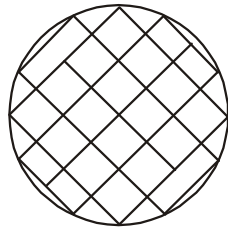
- 27.



- 28.



Both figures are not embedded in



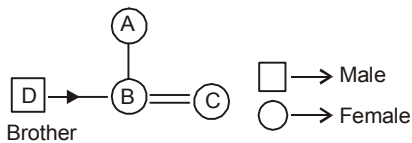
29. Left → 8th Suresh 8th Mukesh ← Right

When mukesh? suresh interchange their position, suresh becomes 16th from the left

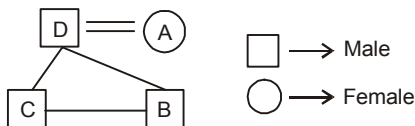
$$\text{Then total Boys} = 8 + 16 - 1$$

$$\Rightarrow 24 - 1 = 23$$

- 30.

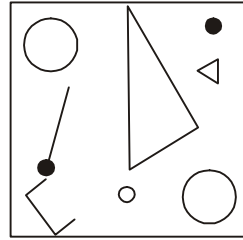


- 31.

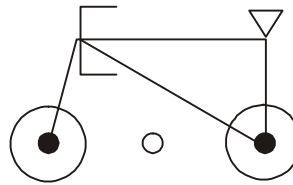


i.e. A is wife of D

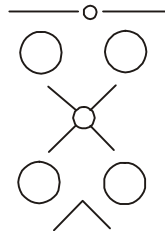
- 32.



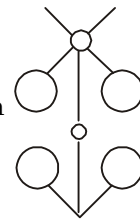
of all components found in



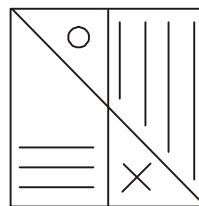
- 33.



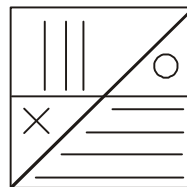
of all components found in



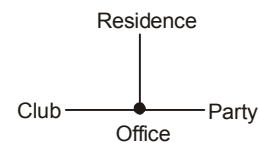
- 34.



is required form of

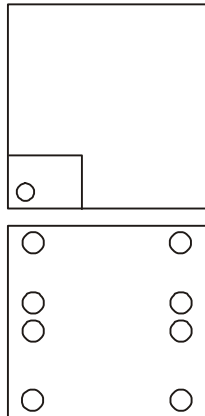


- 35.



36. If P manes one and half quarter clockwise then P an'II be in North – West.

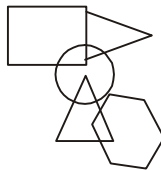
37. is folded pattern of



38-40.

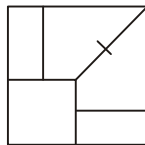
	Science	Maths	Cricket	Tennis	Misic
A	✓	✓	✓		
B		✓	✓	✓	
C	✓	✓		✓	
D	✓		✓	✓	✓
E			✓		✓

38. A is in good in cricket, Maths and Science.
 39. C is in good in Science, Tennis and Maths.
 40. B is not good in both Science and Music.
 41.

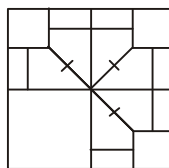


Only shows family relationship.

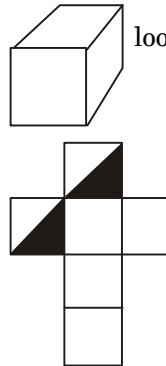
42. 3 Teachers are both player and artists.
 43. 4 represents uneducated unemployed youth in village.
 44. 7 represents employed educated youth in a village.
 45.



will complete the pattern of



46. look like unfolded as



47. Then is no code define for letter D.
 48. A is coded A, R is coded R,
 49. FIGURE will be coded as EHJQRF.

51. $W \rightarrow D$ similar $B \rightarrow Y$
 $H \rightarrow S$ $L \rightarrow O$
 $I \rightarrow R$ $A \rightarrow Z$
 $T \rightarrow G$ $C \rightarrow X$
 $E \rightarrow V$ $K \rightarrow P$

51. There are only 5 alphabet have not been used as codes for each other.

52. HINTED can be coded successfully using the given pattern.

53. $L = 12 + 8 = 20$,
 $R = 18 + 8 = 26$,
 $E = 5 + 8 = 13$,
 $E = 4 + 8 = 12$
 i.e. $RED = 26 + 13 + 12 = 51$
 $B = 2 + 8 = 10$,
 $L = 12 + 8 = 20$,
 $U = 21 + 8 = 29$,
 $E = 5 + 18 = 13$
 $BLUE = 10 + 20 + 29 + 13 = 72$

54. $GO = 7 \times 15 = 105$
 $SO = 19 \times 15 = 285$
 $RAT = 18 \times 1 \times 20 = 360$

55. $SUGAR \xrightarrow{\text{Coded}} \langle \bullet \rangle \square \square \wedge$
 56. $SPICE \xrightarrow{\text{Coded}} \langle \bullet \rangle \rangle \square \square \square$
 57. $PATCH \xrightarrow{\text{Coded}} \langle \bullet \rangle \square \square \square$

$$\begin{array}{r}
 58. \quad \text{TAR} \quad 134 \\
 +\text{RATE} \quad +4310 \\
 \hline
 4444 \quad 4444
 \end{array}$$

59. From statement 2 and 3 Good is coded as 4.

60. Amit's code = 8

Wants code = 3

Precious code = 9

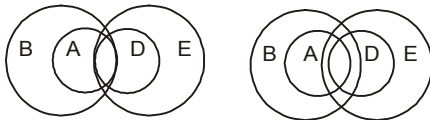
Scooter code = 6

Amit wants precious scooter will be coded as 8 3 9 6.

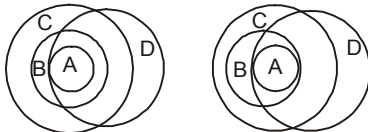
$$\begin{array}{r}
 61. \quad \text{ABC} \quad 162 \\
 \times \text{DE} \quad \times 58 \\
 \hline
 \text{ACFB} \quad 1296 \\
 \text{EAG} \times \quad 810 \times \\
 \text{FHFB} \quad 9396
 \end{array}$$

Ans. $F - D = 9 - 5$

62. First and third figure follows the all statements.



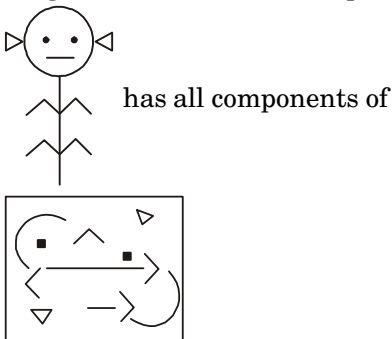
63. Both first and second figure follows the all statements.



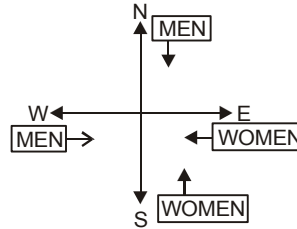
64. Correct relationship.

65. Correct relationship.

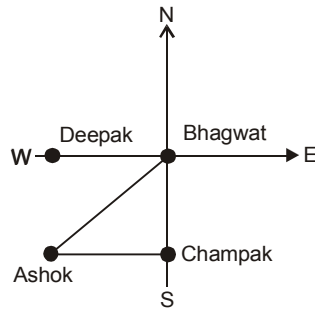
66. Diagram '3' has all the components



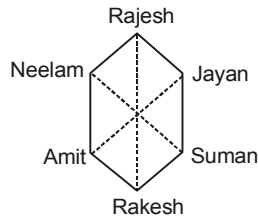
67.



68.

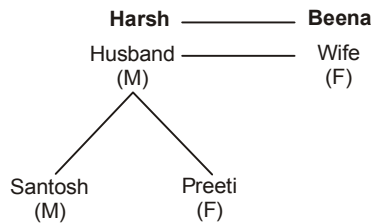


69.

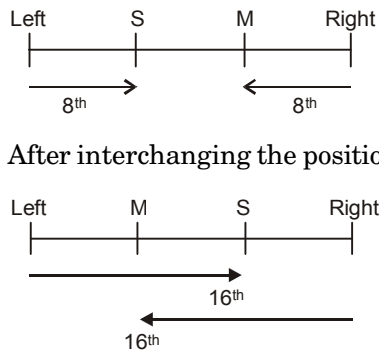


70. Sudha = Srikant > Mukesh & Jagdish > Priyanka > Manju
So, Srikant > Manju

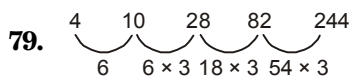
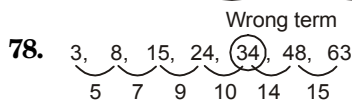
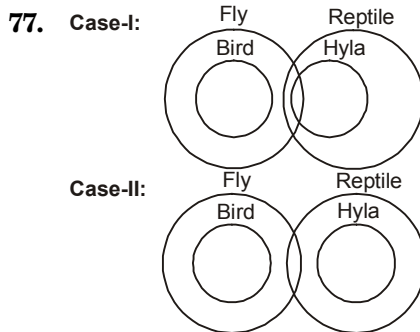
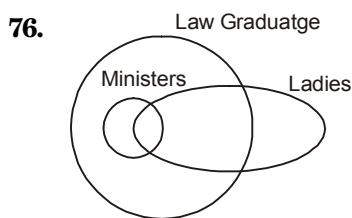
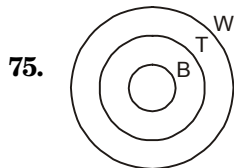
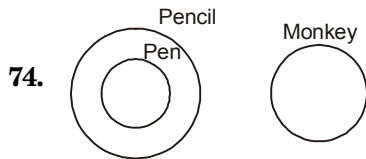
71.



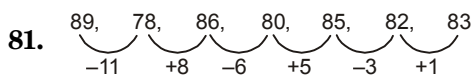
72.



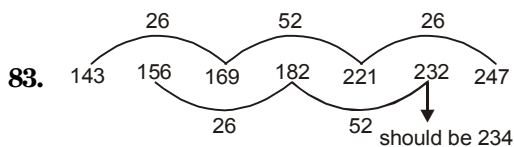
73. Data is insufficient to draw conclusion.



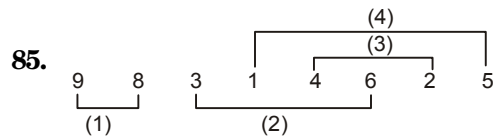
80. $(\text{LCM of } 4, 5, 6) + 3 = 60 + 3 = 63$
When $63 \div 7$,
No remainder left.



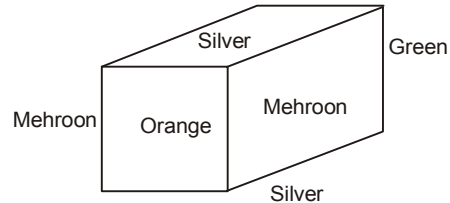
82. 4, 6, 15, 56, 280, 1644



84. $(10 + 11 + 12) - (7 + 8 + 9) = 9$
Hence $(15 + 16 + 17) - (12 + 13 + 14) = 9$



86-90



86. All such cubes will be at 4 corners so, 4 cubes

87. All such cubes will be at only two edges and each edge contains 2 such cubes. Total = 4

88. All such cubes will be at only two surfaces. One surface has 4 cubes so, total 8

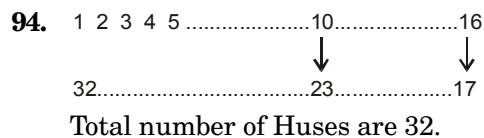
89. All such cubes will be at only one surface i.e. 4

90. Total cubes – coloured cube = $64 - 56 = 8$

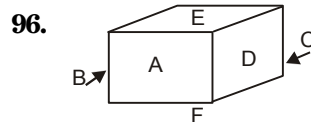
91. All such cubes will be at surface of the cube. One surface contains only '4'. So that total $6 \times 4 = 24$.

92. From given pattern of same dice 5 is opposite to 2, 6 is opposite to 1 and 4 is opposite to 3.

93. From both statements I & II we can find the longest piece of cloth.



95.



97. $S = 12, H = 67, O = 42, W = 56$

98. $S = 31, H = 86, I = 66, P = 44$

99. $G = 96, R = 34, O = 23, W = 68$

100. $G = 58, R = 41, I = 97, D = 88$.

SCHOLASTIC APTITUDE TEST

1. In anaerobic respiration in muscles lactic acid is produced which causes muscle cramps.

2. Column-I Column-II

(I) Red eyed frog	(D) Sticky Pad
(II) Toucan	(C) Long large beak
(III) Big cats	(B) Thick skin and sensitive hearing
(IV) Polar bear	(A) Thick skin and strong sense of smell

3. Decrease in sea level is not a reason for shortage of usable water.

4. Asexual reproduction in ginger, potato and onion takes place through stems and underground stem of Ginger is known as rhizome, potato-tuber, Onion-bulb. In bryophyllum adventitious buds are present on leaves reproduce asexually.

5. In Waste Water Treatment Plant air is pumped into water to support the growth of aerobic bacteria. These bacteria consume waste.

6. In human blood circulation deoxygenated blood from body enters into heart through veins. From heart it goes to lungs for oxygenation through pulmonary artery. From lungs it comes to heart through Pulmonary vein and from heart it goes to body again.

7. Clay particles are heavy as they hold more water and space between sand particles is more.

8. Column-I Column-II

(I) Winnowing	(D) Separation of grain & chaff
(II) Threshing	(C) Separation of seeds & chaff
(III) Drip system	(A) Irrigation
(IV) Weeds	(B) Hoe

9. Larva/Caterpillar when enter the next stage of its life history called pupa. During this, it swings its head from side to side in the form of the figure of eight. During

this movement of the head the caterpillars secrete fibres made of protein which harden to form silk fibres.

10. Red data books provide the information on endangered animals and plants.

11. Due to presence of same genes two sisters looked exactly same.

12. Baker's yeast is added to aquarium because it provides minerals and metals and absorbs heavy metals present in water and purifies it.

13. Column-I Column-II

(I) Lohi	(D) Good quality wool Hosiery
(II) Nali	(C) Carpet wool
(III) Patanwadi	(A) Hosiery
(IV) Marwari	(B) Coarse wool

14. In frogs change from tadpole to adult is controlled by thyroxine. Thyroxine production requires the presence of iodine in water.

15. Polycot = Polyester + cotton

16. Malamine – Flame resistant

Nylon – Appears silk like

Teflon – non sticking cookwares

Cotton – Easily biodegradable

17. $P_4 + O_2 \rightarrow P_2O_5$
 $P_2O_5 + H_2O \rightarrow H_3PO_4$ (phosphoric acid)
 $6NaOH + P_2O_5 \rightarrow 2Na_3PO_4 + 3H_2O$

18. Iron – Deposition of reddish brown layer on exposure to moist air

Copper – Formation of green layer on exposure to moist air

Potassium – Can be cut easily with a knife

Mercury – Liquid at room temperature

19. Naphtalene obtained from coaltar

20. Natural gas have main constituent CH_4 .
 It use to raw material for manufacturing of fertilizer

It also use for the generation of electricity.

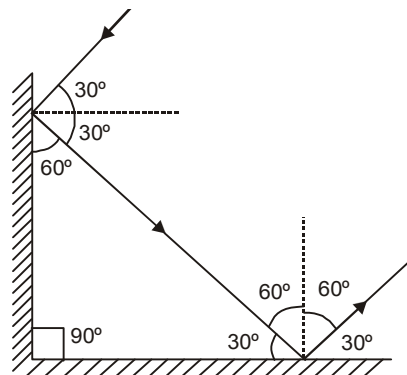
21. head of match stick

= antimony trisulphide (Sb_2S_3)
 + potassium chlorate ($KClO_3$)

- 22.** candle flame
 A. outermost zone
 B. middle zone
 C. innermost zone (decreasing order of temperature)
- 23.** 1. due to green house effect radiation trap on earth atmosphere
 2. due to green house effect earth temperature rise which known as global warming.
- 24.** sting-formic acid (HCOOH)
 calamine – zinc carbonate (ZnCO_3)
- 25.** fertilizer are acidic in nature (ammonium nitrate) so, soil become acidic when they use for a long time period
 Slaked lime also use for treatment of acidic soil.
- 26.** physical change
 A. hammering of red hot iron and make flat sheet
 B. formation of ice by cooling water
 C. vaporisation of sea water
- 27.** chemical change:
 B. burning of candle wax
 D. passing of CO_2 gas through lime water.
- 28.** The friction between the tyres of automobile and the road determines maximum acceleration of automobile and its minimum stopping distance. Driving a car on a wet road is difficult because water decreases the friction between the tyres and the road.
- 29.** 1. Plane mirror always forms virtual image of the same size of a real object
 2. Concave mirror forms virtual and enlarged image of a real object placed very near to it, so it is used by dentists to examine teeth.
 3. Convex mirror always forms virtual image of smaller size of a real object.
 4. Concave lens always form virtual image of smaller size of a real object and it is thinner in the middle.

5. Convex lens forms virtual and enlarged image of a real object placed near to it, so it is used as reading glass.

- 30.** This can be understood by looking at the following figure.



- 31.** Atmospheric pressure in the centre of a tropical cyclone is very low because of rising warm air.
- 32.** In the given situation if two copper plates are moved further apart from each other then smaller amount of copper will be deposited on the plate connected to negative electrode as ions takes more time to deposit because of large distance.
- 33.** Under the similar conditions an electromagnet having more number of turn of the wire wrapped will have greater strength.
- 34.** Magnetic field lines around a current carrying straight conductor are concentric circles (as shown in figure 1) so iron filings settle as circles (as shown in figure 2) in the situation given.



Figure 1



Figure 2

35. How to locate pole star

Look straight in the direction of the stars situated at the far end of the ladle in **Ursa Major** (stars 1 and 2). The star of medium brightness in the direction of the above stars is the pole star (as shown in figure). The stars 1 and 2 in **ursa major** which point in the direction of the pole star are called **pointer stars**.

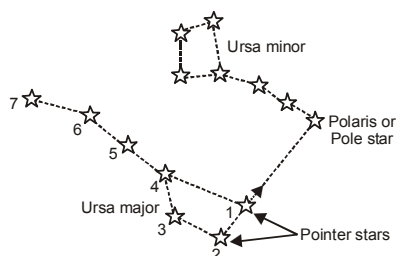


Figure: Relative positions of Ursa Major and Ursa Minor

36. As we know

$$\frac{C - 0}{100 - 0} = \frac{F - 32}{212 - 32}$$

$$\Rightarrow \frac{25 - 0}{100 - 0} = \frac{F - 32}{180}$$

$$\Rightarrow F = 77^\circ\text{F}$$

37. When there is lightning and you are in jungle, go under a canopy of small trees and bushes. If you are out in the open, crouch on your feet, do not stand up or lie on the ground.

38. Slope of distance time graph gives speed and in the given situation slope of distance time graph is constant so speed must be constant.

39. As we know

$$\text{Average speed} = \frac{\text{Total distance covered}}{\text{time taken}}$$

$$\text{Average speed}_{(t=4 \text{ to } t=20 \text{ min})}$$

$$= \frac{15 - 5}{20 - 4} = \frac{10}{16} = \frac{5}{8} \text{ km/min}$$

40. We know pressure = $\frac{\text{thrust}}{\text{area}}$ so, cuboid will exert maximum pressure when it is kept in such a way that its contact area is minimum.

41. Pen $\rightarrow$ ₹ 5 Pencils $\rightarrow$ ₹ 1

$$\text{Pen : Pencils} = 2 : 3$$

$$\text{Pen} = 2x, \text{ Pencil} = 3x$$

$$\text{Total cost of Pen} \rightarrow 10x \text{ and Pencils} \rightarrow 3x$$

$$10x \times \frac{112}{100} + 3x \times \frac{110}{120} = 725$$

$$1120x + 330x = 725 \times 100$$

$$1450x = 725 \times 100$$

$$x = 50$$

42. Let initial Tax = ₹100

after decreased by 15% new tax = ₹ 85

Consumption increased by 10% then new

$$\text{revenue} = 85 \times \frac{110}{100} = ₹ 93.50$$

Then percent decrease in revenue = 6.5%

43. $3^{1001} \times 7^{1002} \times 13^{1003}$

cyclicity of 3 and 7 are 4

$$\text{i.e. } 3^1 \times 7^2 \times 3^3$$

$$\Rightarrow 3 \times 9 \times 7 \Rightarrow 9$$

44. $6 < \sqrt{x} < 7$

i.e. number lie between 36 and 49.

i.e. cube roots of a number lie between 3 and 4.

45. Sum of interior angle = $(n - 2) \times 180^\circ$

One angle of regular polygon

$$= \frac{(n - 2) \times 180^\circ}{n}$$

$$\text{i.e. } \frac{(n - 2) \times 180^\circ}{n} = 165^\circ$$

$$180^\circ n - 360^\circ = 165^\circ n$$

$$180^\circ n - 165^\circ n = 360^\circ$$

$$15^\circ n = 360^\circ$$

$$n = 24$$

46.

$$x \propto \frac{1}{y}$$

$$x = \frac{k}{y}$$

$$xy = k$$

$$\text{i.e. } x_1 y_1 = x_2 y_2$$

Let $x_1 = 100, y_1 = 100$

$x_2 = 120, y_2 = ?$

Now $100 \times 100 = 120 \times y_2$

$$y_2 = \frac{100 \times 100}{120} = 83 \frac{40}{120}$$

$$= 83 \frac{1}{3}$$

i.e. y decreases by $16 \frac{2}{3}\%$

47.

$$\frac{A}{B} = \frac{d}{d-20}$$

$$\frac{B}{C} = \frac{d}{d-10}$$

$$\frac{A}{C} = \frac{d}{d-28}$$

$$\frac{A}{C} = \frac{d}{d-20} \times \frac{d}{d-10}$$

$$\frac{d}{d-28} = \frac{d}{d-20} \times \frac{d}{d-10}$$

$$(d-20)(d-10) = d(d-28)$$

$$d^2 - 30d + 200 = d^2 - 28d$$

$$200 = 2d$$

$$d = 100$$

48. $2^{48} - 1$

$$= (2^{24} + 1)(2^{24} - 1)$$

$$= (2^{24} + 1)(2^{12} + 1)(2^{12} - 1)$$

$$= (2^{24} + 1)(2^{12} + 1)(2^6 + 1)(2^6 - 1)$$

$$= (2^{24} + 1)(2^{12} + 1)(2^6 + 1)(2^3 + 1)(2^3 - 1)$$

$$= (2^{24} + 1)(2^{12} + 1)(2^6 + 1)(9)(7)$$

i.e. x have two factors between 5 and 10.

49. $abcd$ and $dcba$ are four digit number

here $abcd = 1000a + 100b + 10c + d$

$dcba = 1000d + 100c + 10b + a$

i.e. sum $= 1001a + 110b + 110c + 1001d$

$$= 1001(a + d) + 110(b + c)$$

$$= 1001 \times 7 + 110 \times 7$$

$$= 7(1001 + 110) = 7 \times 1111$$

$$= 7777$$

i.e. number is divisible by 7, 11, 101

but not divisible by 111.

50. Let Total number of herd $= x$

$\frac{x}{2}$ are grazing in the field

$\frac{3}{4} \left(\frac{x}{2} \right)$ are playing

i.e. $\frac{1}{4} \left(\frac{x}{2} \right) = 9$ are drinking water

i.e. $x = 9 \times 8 = 72$

i.e. no. of deer which are grazing field $= 36$

and no. of deer which are playing $= 27$

difference $= 9$

i.e. multiple of 9

51. Let $x + y = 180^\circ$

x is smaller angle $x = 4(90^\circ - x)$

$$x = 360^\circ - 4x$$

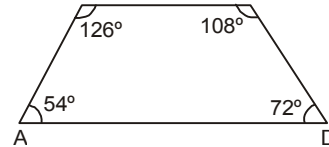
$$5x = 360^\circ$$

$$x = 72^\circ$$

Thus $y = 180^\circ - 72^\circ = 108^\circ$

Now difference $= 108^\circ - 72^\circ = 36^\circ$

52.



$$A : B : C : D = 3 : 7 : 6 : 4$$

$$3x + 7x + 6x + 4x = 360^\circ$$

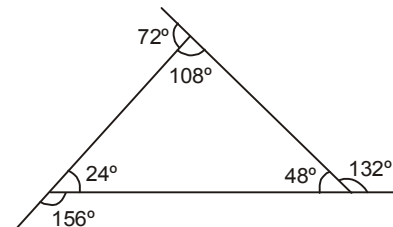
$$20x = 360^\circ$$

$$x = 18^\circ$$

$\angle A = 54^\circ, \angle B = 126^\circ, \angle C = 108^\circ, \angle D = 72^\circ$

i.e. ABCD is a trapezium.

53.



Angle $2x + 4x + 9x = 180^\circ$

$$15x = 180^\circ \Rightarrow x = 12^\circ$$

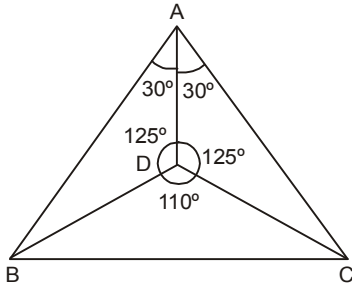
i.e. $24^\circ, 48^\circ, 108^\circ$

exterior angles are, $156^\circ, 132^\circ, 72^\circ$

difference between smallest angles

$$\rightarrow 132^\circ - 72^\circ = 60^\circ$$

54.



$$\triangle ABD \cong \triangle ACD$$

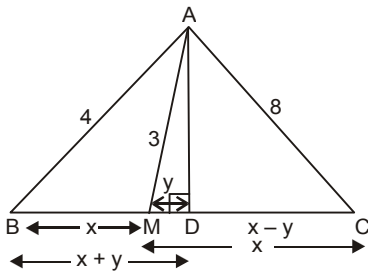
$$\angle CAD = \angle BAD = 30^\circ$$

$$\angle ADB = \angle ADC = \frac{1}{2}(360^\circ - 110^\circ)$$

$$= 125^\circ$$

$$\angle ABD = 180^\circ - 155^\circ = 25^\circ$$

55.



$$AD = \sqrt{9 - y^2}$$

$$\text{in } \triangle ABD \quad 16 = x^2 + y^2 + 2xy + 9 - y^2$$

$$7 = x^2 + 2xy \quad \dots(i)$$

$$\text{in } \triangle ADC \quad 64 = (x - y)^2 + (9 - y^2)$$

$$55 = x^2 - 2xy \quad \dots(ii)$$

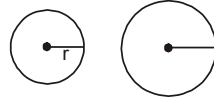
$$(i) + (ii) \quad 62 = 2x^2$$

$$x^2 = 31$$

$$x = \sqrt{31}$$

$$BC = 2x = 2\sqrt{31} \text{ cm}$$

56.



$$C = 2\pi r$$

$$A = \pi r^2$$

$$C' = x \cdot C = x2\pi r$$

$$A' = 2A = 2\pi r^2$$

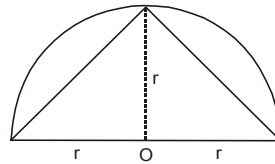
Since area doubles then radius should be $\sqrt{2}$ times

$$\text{i.e.} \quad r' = \sqrt{2}r$$

$$\text{Hence} \quad C' = \sqrt{2}(2\pi r)$$

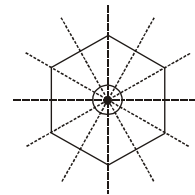
$$\text{So,} \quad x = \sqrt{2}$$

57.

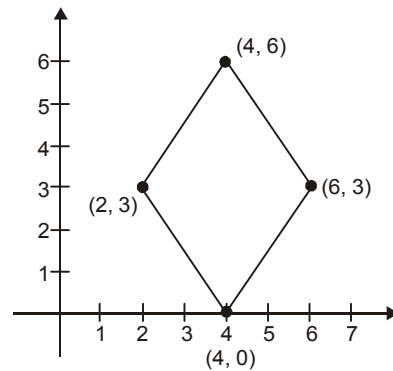


$$\frac{1}{2} \times (2r) \times r = \frac{2r^2}{2} = r^2$$

$$58. \quad x = \frac{360^\circ}{12} = 30^\circ$$



59. Rhombus



60. 21, 39, 39, 45, 54, 54, 56, 56, 56, 77, 84, 84
Mode = 56

$$\text{Median} = \frac{54 + 56}{2} = 55$$

$$\text{Range} = 84 - 21 = 63$$

$$\therefore \text{Mean} = \frac{56 + 55 + 63}{3} = \frac{174}{3} = 58$$

61. Dhangadeva built Kandariya Mahadeva temple, Rajarajadeva built Rajarajeshvara temple devoting Lord Shiva, Rajendra I built the city of Gangaikondacholapuram to commemorate victory over Ganga valley and Babur followed Chahar Bagh strategy for gardens.
62. Both A and R are true and R is the correct explanation of A.
63. Alvars saints of South India were followers of Lord Vishnu, Nayanars were worshippers of Lord Shiva.
64. During Mughal period Bakhshi was responsible for paying salaries to soldiers. Faujdar was army general. Sadr-ur-Sadar was responsible to take care of religious behaviour of people. Kotwal look after the law and order city.
65. (A) British victories in India served as rich material for history painters in Britain
(C) Portrait of Nawab Muhammad Ali Khan of Arcot, was painted by George Willisoon in 1775.
(D) Johann Zoffany, was born in Germany.
66. Kathak word evolved from the word "Katha" (Story tellers), Kathak later developed by Bhakti Saint, Nawab Wajid Ali Shah of Awadh patronaged Kathak and later by Mughals.
67. Kanchipuram was the capital of pallava nearly 1400 years ago. Later Masulipatnam emerged as an important town during Narsimhavarman. Hampi was the capital of Vijayanagara Kingdom during Sultanate period. Bombay emerged as an important town during colonial period.
68. Garh was divided into Chaurasi, into Barhots and later into smallest unit known as Village.
69. Raziya was the only women Sultan during Sultanate period.
70. James Mill divided Indian history into Hindu, Muslim and British.
71. Option *a, b, c* are correct, Residents were appointed by Britishers in respect to "Subsidiary Alliance" to look into daily affairs of administration.
72. Tagore felt that childhood ought to be a time of self-learning, outside the rigid and restricting discipline of the schooling system set up by the British. Tagore wanted to combine elements of modern western civilisation with what he saw as the best within Indian tradition.
73. (A) Rashtriya Swayamsevak Sangh – 1920
(B) All India Muslim League – 1906
(C) Indian Association – 1870
(D) Indian National Congress – 1885
75. During Shah Jahan's time Delhi was famous for Dargahs, Khanqahs and Idgahs. Open squares, winding lanes quit Cul-de-sacs and water channels. Due to this Mir Taqi Mir said the above statement.
75. Both A and R are true and R is the correct explanation of A.
76. Energy decreases by 90%
77. Ionosphere is electrically charged by ions hence radio waves are reflected back.
78. Westerlies are stronger in Southern hemisphere due to water bodies. Winds moves very fast in absence of hurdles. Northern hemisphere is occupied by landmasses.
79. Diagram represent spring tides.
80. National parks are correctly matched with their respective region.
81. Both 'A' and 'R' are true and 'R' is the correct explanation of 'A'
82. Lorraine area in France is significant for coal fields.

- 83.** Indianapolis lies in the United States of America.
- 84.** Figure 'A' show high birth rate and high death rate which is a characteristics of least developed economy. Figure 'B' show high birth rate and high life expectancy rate, a sign developing economy. Figure 'C' shows low birth rate and very high life expectancy rate, a sign of developing economy
- 85.** 8 tonnes of coal + 4 tonnes of iron ore + 1 tonne of lime stone = 1 tonne of steel.
- 86.** (1) shifting cultivation = Rengmas
(2) pastoralism = Kirghiz
(3) Hunter and food Gatherers = Pygmies
(4) Hunters – Eskimos
- 87.** Region Grasslands
1. Argentinian Pampas
2. North America Prarie
3. South Africa Velds
4. Central Asia Steppes
5. Australia Velds
- 88.** Llanos, Selvas, Gran chacos, Pampas.
- 89.** Concept is evaporation i.e. upward movement.
Condensation in upper troposphere and later precipitation i.e. downward movement.
- 90.** Both the currents i.e. D and B are coming from polar areas.
- 91.** In a Republic the head of the state is elected by people.
- 92.** Article 356 allows Governor, to have President rule in the State. If the State Government is not performing to maintain law and order.
- 93.** It comes in advisory jurisdiction of Supreme Court but President is not under obligation to accept the advise.
- 94.** The boundaries of States can be altered by the Indian Parliament.
- 95.** INC was defeated for the first time in 1977.
- 96.** In capitalist society private entrepreneurs has a prominent place.
- 97.** Indian and U.S. Constitution.
- 98.** Lok-Sabha Secretariat function under Speaker.
- 99.** "International Women Day" is celebrated on 8th March.
- 100.** Correct sequence is Dr. Rajendra Prasad, Dr. Sarvepalli Radhakrishnan, Dr. Zakir Hussain and Dr. V.V. Giri.



State Level Solved Papers 2014

(MAT+ ENGLISH + SAT)

NTSE - 2014

KARNATAKA

PART I : MENTAL ABILITY TEST

Directions (Q. 1 - 2): Find the missing number in the given matrices.

1.

7	9	4
4	3	?
6	8	9
84	108	126

- (a) 12 (b) 9
(c) 8 (d) 7

2.

8	17	67
12	15	69
16	22	?

- (a) 71 (b) 89
(c) 98 (d) 99

Directions (Q. 3 - 4): Match the numbers in Column-I with the rules in Column-II.

Column-I	Column-II
17	$2n^3 + 3$
18	$2n^2 - 1$
57	$n^2 + 2n$
28	$n^3 - 3n$
15	$3n^2 + 1$

3. Which rule the number 28 follows?
 (a) $2n^2 - 1$ (b) $3n^2 + 1$
 (c) $n^3 - 3n$ (d) $n^2 + 2n$
4. Which number follows the rule $2n^3 + 3$?
 (a) 57
 (b) 18
 (c) 17
 (d) 15

Direction : In a certain code language, 'tink log se' means 'fruits are ripe', 'so thao hay tink' means 'mangoes are not ripe', 'hay se cue tink' means 'bananas are not ripe'.

5. Which word in that code language means 'bananas' in the following?
 (a) log (b) thao
 (c) cue (d) se

Directions (Q. 6 - 7): Find the wrong number or group of letters in the given series.

6. 15, 34, 71, 134, 223, 350
 (a) 71 (b) 134
 (c) 223 (d) 350
7. ACFJ, DGKP, IMRW, PUAH, YELT
 (a) YELT (b) PUAH
 (c) IMRW (d) DGKP

Directions (Q. 8 - 10): In the given questions there are four groups of numbers / pairs of numbers / group of letters of which three are alike and one is different. Find the one which is different.

8. (a) 4 3 2 4 6
 (b) 5 6 3 5 2
 (c) 6 8 4 6 2
 (d) 7 8 2 7 4
9. (a) 686, 21
 (b) 1024, 24
 (c) 2000, 30
 (d) 2662, 39
10. (a) GAINFUL
 (b) SECTARY
 (c) FOUNDER
 (d) QUADRIC

Directions (Q. 11 - 15): Complete the following number/letter/figural series by selecting from the given choices.

11. 2, 11, 38, ?, 362, 1091

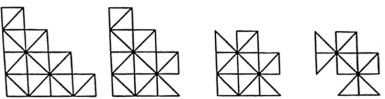
- (a) 119 (b) 121
(c) 133 (d) 197

12. 2160, ?, 72, 18, 6, 3

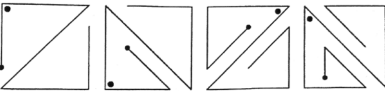
- (a) 240 (b) 300
(c) 360 (d) 400

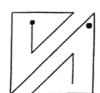
13. a b b b a a b b b a a

- (a) a a b b a (b) b b a a b
(c) a b a a b (d) a a a b b

14.  ?

- (a)  (b) 
(c)  (d) 

15.  ?

- (a)  (b) 
(c)  (d) 

Directions (Q. 16 - 17) : Take the given statements as true and decide which of the conclusions logically follow from the statements.

16. Statements:

1. All horses are dogs
2. All dogs are cats

Conclusions :

- I. All horses are cats
 - II. All cats are horses.
- (a) Only conclusion I follows
(b) Only conclusion II follows
(c) Both conclusion I and II follows
(d) Neither conclusion I nor II follows

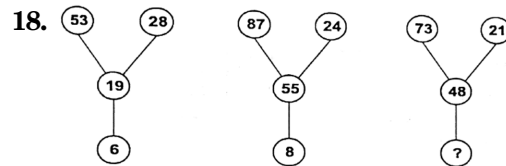
17. Statements:

1. Some apples are mangoes
2. All mangoes are bananas

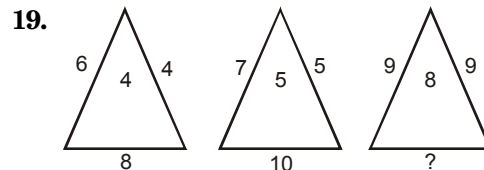
Conclusions :

- I. Some bananas are apples
 - II. An mangoes are apples
 - III. Some bananas are mangoes
 - IV. All apples are bananas
- (a) Only conclusion II follows
(b) Conclusion II and IV follows
(c) Conclusion I and III follows
(d) Conclusion I, II and III follows

Directions (Q. 18 - 19): In the questions below the numbers in the figures are related. Identify their relationship and find the missing numbers in the given figures.



- (a) 10 (b) 8
(c) 6 (d) 4



- (a) 06 (b) 15
(c) 17 (d) 19

Directions (Q. 20 - 24) : Complete the given analogy by selecting the correct answers from the alternatives.

20. 147 : 49 :: ? : ?

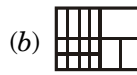
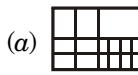
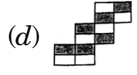
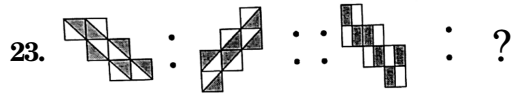
- (a) 186 : 66 (b) 189 : 33
(c) 198 : 66 (d) 201 : 33

21. 195 : 15 :: ? : 25

- (a) 575 (b) 600
(c) 625 (d) 650

22. TPLNAR : BXTVZ :: NJFHL : ?

- (a) VNRTP (b) VRNPT
(c) URMPT (d) RVPTN



Directions (Q. 25 - 27): Identify the number of specified geometric shapes in the given diagram and mark the correct answer.

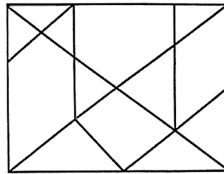
25. How many triangles are in the given figure?

(a) 21

(b) 22

(c) 23

(d) 24



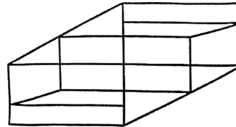
26. How many rectangles are in the given figure?

(a) 6

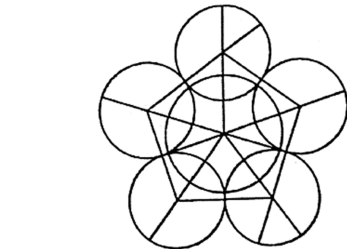
(b) 8

(c) 10

(d) 11



27. How many semicircles are in the given figure?



(a) 20

(b) 18

(c) 16

(d) 14

Directions (Q. 28 - 29):

If $>$ stands for $+$

$<$ stands for $-$

$\vee$ stands for $\times$

$\wedge$ stands for $\div$

∇ stands for $=$

28. Then which one of the following equations given below is correct?

(a) $18 < 54 \wedge 27 \nabla 9 \vee 45 > 9$

(b) $18 > 54 \wedge 27 \vee 9 \nabla 45 < 9$

(c) $18 > 54 \nabla 27 < 9 \vee 45 \wedge 9$

(d) $18 \nabla 54 < 27 \wedge 9 > 45 \vee 9$

29. Which one of the following equations is NOT meaningful by substituting the set of given mathematical signs ($+$, $-$, $=$, $\times$) sequentially in the given equations?

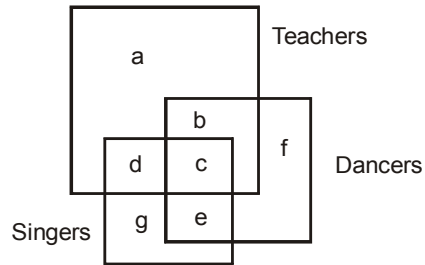
(a) $80 \div 5 + 4 = 5 \times 4$

(b) $30 \div 2 + 5 = 2 \times 10$

(c) $40 \div 10 + 4 = 10 \times 6$

(d) $60 \div 3 + 10 = 6 \times 5$

Directions (Q. 30 - 31): The following questions are based on the intersecting squares given below in which each square represents a group.



30. Which letter represents teachers who are singers and also dancers ?

(a) d

(b) c

(c) b

(d) a

31. Which letter represents dancers and singers who are not teachers ?

(a) e

(b) d

(c) c

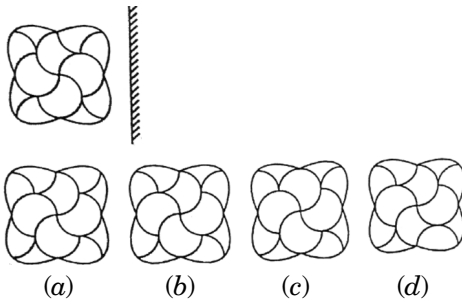
(d) b

Directions : There are five members in a family. The comparison of their ages is as follows:

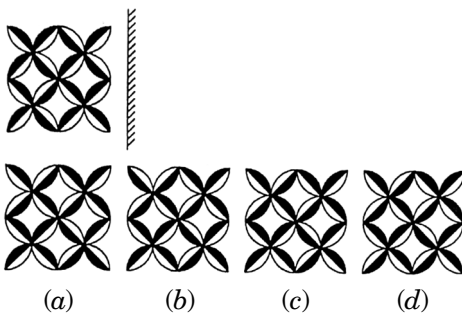
- Anju's age is twice the age of Rama, but is half the age of Harsha.
 - Balu's age is half the age of Rama, but is twice the age of Mala.
32. Which one of the following pair represents the oldest and the youngest members in the family?
- (a) Anju and Mala (b) Harsha and Balu
(c) Balu and Rama (d) Harsha and Mala

Directions : Find the correct mirror images for the following problem figures choosing from the alternatives.

33. Problem figures



34. Problem figures



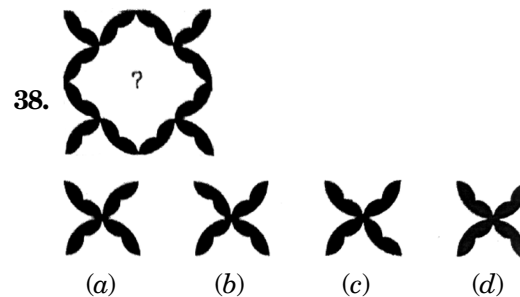
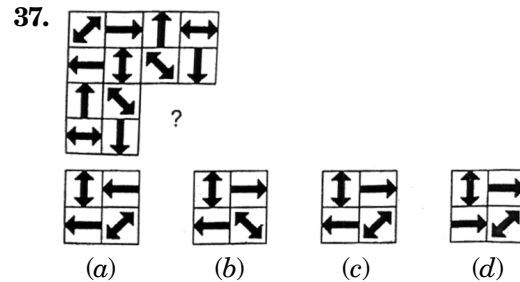
35. In a code language CHALK is written as XSZOP, in the same code BOARD can be written as :

- (a) ZLYWI (b) WIZYL
(c) YLZIW (d) YIZWL

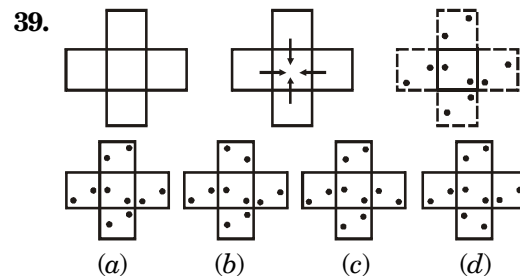
36. In a code A = 26 Z = 1 if G = 25 and MILK = 83 then, find the code for WATER

- (a) 67 (b) 68
(c) 92 (d) 93

Directions (Q. 37 - 38) : Find the missing part of the given figure from the alternatives.



Direction : A sheet of paper in the given shape is folded as shown in the figures. Then punched as shown by dots in the figure. Find how the paper appears when it is unfolded. Find the correct choice for the questions using the alternatives.



Directions : There are 25 steps to go to first floor (excluding the bottom and the top floor levels)

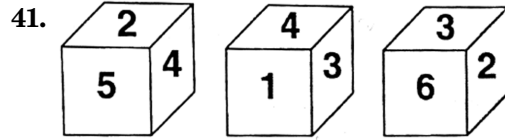
Remesh starts climbing up from the 2nd step from bottom level. Suresh starts coming down from the 4th step of the top level.

If both have started moving at the same time and with the same speed, at which step they meet counting from the first step of the top level of first floor?

40. (a) 15 (b) 14
(c) 13 (d) 12

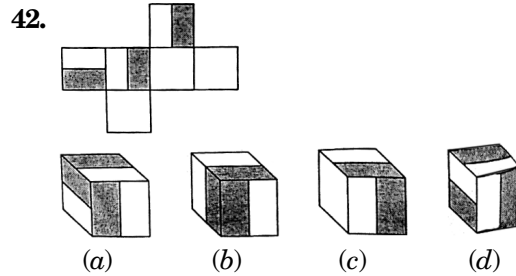
Directions : A dice is thrown thrice and its three positions are given below.

Find the opposite pairs of the faces of the cube.



- (a) (5, 4) (3, 1) (2, 6)
 (b) (2, 5) (4, 1) (3, 6)
 (c) (4, 6) (3, 5) (2, 1)
 (d) (2, 1) (3, 4) (6, 5)

Directions : When the given problem figure is folded as a cube, identify which one of the cubes with faces shown below is possible?

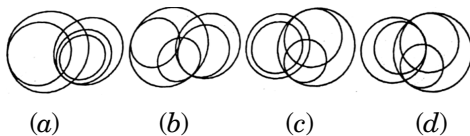
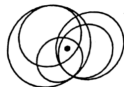


Directions : Amar has some notes of ₹ 10 and ₹ 20. The total number of notes are 70 and the total amount of money with him is ₹ 1,050. Find the number of notes of ₹ 10 and ₹ 20 with him.

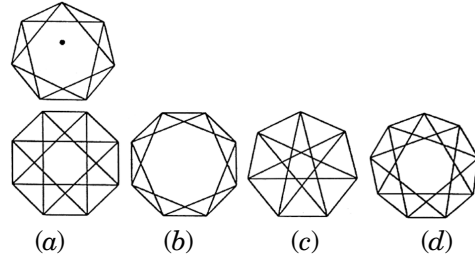
43. (a) 30 and 40
 (b) 35 and 35
 (c) 40 and 30
 (d) 45 and 25

Directions (Q. 44 - 45) : Choose the figure from the alternatives which is suitable to put the dot (•) as found in the problem figure.

44. Problem figure

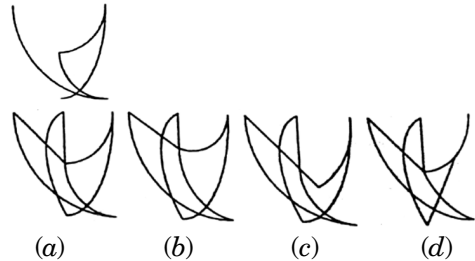


45. Problem figure



Directions : In the following question a problem figure is given. The problem figure is hidden in one of the figures given as alternatives. Find the figure in which the problem figure is hidden.

46. Problem figure



Directions (Q. 47 - 48) : Given below are two matrices containing two classes of letters. The rows and the columns of matrix I are numbered from 1 to 4 and that of Matrix II from 5 to 8. A letter from these matrices can be represented first by its row number and next by its column number

Ex : S can be represent by

11, 24, 32, 43

	1	2	3	4
1	S	A	E	R
2	R	E	A	S
3	E	S	R	A
4	A	R	S	E

Matrix I

	5	6	7	8
5	I	C	H	O
6	C	H	O	I
7	O	I	C	H
8	H	O	I	C

Matrix II

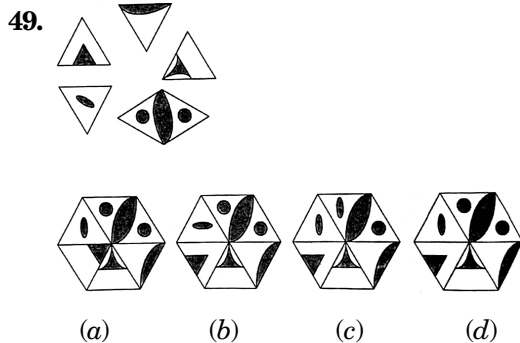
47. Which set of numbers will represent the word REACH?

- (a) 14, 31, 23, 58, 78
 (b) 21, 22, 32, 78, 85
 (c) 33, 13, 41, 88, 57
 (d) 42, 44, 34, 66, 76

48. Which set of numbers will represent the word OSIER?

- (a) 58, 24, 79, 31, 14
- (b) 67, 11, 87, 34, 21
- (c) 75, 43, 76, 44, 32
- (d) 86, 32, 68, 22, 42

Directions : Choose which one of the figures shown in the alternatives will be formed by joining the given parts of the figure.



Directions : Question below is based on three statements I, II and III. Decide whether the data in the statements is sufficient to find the answer to the given question.

50. The comparison of heights of 4 persons A, B, C and D are as follows :

Statements :

- I. A is taller than B
- II. A is shorter than C
- III. C is taller than D

Question:

To find whether B is taller than D,

- (a) Data in statement I is sufficient
- (b) Data in statement II is sufficient
- (c) Data in statements I, II and III are sufficient
- (d) Data in all the statements I, II and III are not sufficient

PART II : ENGLISH LANGUAGE

Directions (Q. 1 - 5): Read the following passage and choose the most appropriate answer to the questions:

Over four hundred years after Michelangelo's death, scholars are still unravelling the mysteries of his art. Recently one mystery that was revealed was that his famous painting of a pensive Cleopatra included a hidden drawing of a different Cleopatra on the reverse side. This hidden Cleopatra shows a tormented woman, whose eyes stare out at the viewer and whose mouth is open, screaming in horror. The two images, drawn on two sides of the same paper, can be viewed simultaneously. The second mystery concerns Michelangelo's architectural plan for the dome of St. Peter's Basilica in Rome. Did he intend the dome to look like the model he built between 1558 and 1561? Or did he change his mind after building the model and decide to elevate the dome in the way it is today? Scholars do not agree on the answer. The third mystery about this great artist was why he destroyed hundreds or thousands of his drawings before he died. Did he feel they were unimportant? Did he want posterity to see only his finished products?

1. It can be inferred from the passage that the most unusual aspect of the Cleopatra drawing is that

- (a) the figure is tormented
- (b) the figure is screaming
- (c) one drawing is hidden
- (d) one drawing is backward

2. The word 'pensive' in the passage can be best substituted with the word

- (a) angry
- (b) happy
- (c) anxious
- (d) sad

3. The dome of St. Peter's Basilica
 - (a) bears no relation to the one in the model
 - (b) was destroyed after the model was built
 - (c) is raised more than the one in the model
 - (d) follows the plan of the model
4. According to the passage, Michelangelo is
 - (a) a private person
 - (b) one of the greatest artists in the world
 - (c) the most famous architect in Rome
 - (d) a depressed man
5. Why did Michelangelo destroy so many drawings before he died ?
 - (a) Nobody knows
 - (b) They were unimportant
 - (c) They were only drafts
 - (d) He had changed the drawings

Directions (Q. 6 - 10) : Read the following passage and choose the appropriate answer to the questions:

The arrival of the train did not disturb Sir Mohan Lal's sang-froid. He continued to sip his scotch and ordered the bearer to tell him when he had moved the luggage to a first class compartment. Excitement, bustle and hurry were exhibitions of bad breeding and Sir Mohan was eminently well-bred. He wanted everything 'tickety-boo' and orderly. In his five years abroad, Sir Mohan had acquired the attitude and manners of the upper classes. He rarely spoke Hindustani. When he did, it was like an Englishman's - only the necessary words and properly anglicised. He fancied his English; finished and refined at no less a place than the University of Oxford. He was fond of conversation and like a cultured Englishman, he could talk on almost any subject, books, politics, people. How frequently had he heard English people say that he spoke like an Englishman !

6. Sir Mohan Lal is portrayed as
 - (a) a person who loves Indian culture
 - (b) a true Englishman
 - (c) a Hindu
 - (d) an Anglophile
7. When Sir Mohan Lal spoke Hindustani, it was
 - (a) Colloquial Hindi
 - (b) Literary Hindi
 - (c) Indian English
 - (d) Anglicised Hindi
8. According to Sir Mohan Lal, a well-bred person would
 - (a) remain aloof from the crowd
 - (b) like to drink only scotch in public
 - (c) always be calm and orderly
 - (d) speak like an Englishman
9. From the description in this passage, Sir Mohan Lal appears to be
 - (a) a snob
 - (b) an aristocrat
 - (c) a man of culture
 - (d) a scholar
10. According to the passage, a cultured Englishman is able to talk effortlessly on
 - (a) art and culture
 - (b) human civilization
 - (c) modern science
 - (d) almost any subject

Directions (Q. 11 - 15): Read the following poem and choose the appropriate answer to the questions:

The Lapwing

In the dark that falls before the dawn,
when the dew has settled on the thorn,
when the stars have been obscured by clouds,
A silence covers all things in shrouds.

No wind sighs in the mulberry tree,
No firefly glimmers wild and free,
A shadow has wrapped the night in gloom,
It's silent as a deserted tomb.

All of a sudden a lapwing's cry
Cuts the black silence as it flies by,
Again and again it slashes the dark
That haunts the empty, desolate park.

Anguish, sorrow pours from its throat,
It wings in the night, note after note;
I open my window so the light
Will flood the dark of this wretched night.

Why does it cry so miserably ?
Why is it so solitary ?
All I know is that loss and ache
Are left behind in the lapwing's wake.

11. When darkness falls there is
(a) complete silence everywhere
(b) a shroud covering all things
(c) the crying of the lapwing to be heard
(d) gloom and desolation
12. The lapwing comes out
(a) at dawn
(b) at night
(c) just before dawn
(d) in the morning
13. The poet opens the window because
(a) he wanted some light
(b) the light would replace the darkness
(c) he could hear the lapwing
(d) he wanted some air
14. The causes of the lapwing's misery was
(a) loneliness and gloom
(b) darkness and loss
(c) darkness and pain
(d) loss and pain
15. The pair of words which doesn't rhyme is
(a) sighs-weigh (b) gloom-tomb
(c) throat-note (d) ache-wake
16. The following five sentences come from a paragraph. The first and the last sentences are given. Choose the order in which the three sentences (PQR) should appear to complete the paragraph.
- S₁ Most people in India are farmers and they are poor.
- S₂
- S₃
- S₄

S₅ They try to put up with all these difficulties.

P : Hence what they earn from agriculture is not enough to keep them going.

Q : Sometimes floods, cyclones and famines make their lives miserable.

R : So they earn money by making baskets out of bamboo and combs out of wood.

Choose from the options given below :

- (a) RQP (b) PQR
(c) PRQ (d) QRP

17. The following question has the second sentence missing. Choose the appropriate sentence from the given options to complete it:

- A. At the age of 18 Gandhi went to college but remained there for only part of the year, as
- B.
- C. Soon after this he was advised to go to England to study to be a Lawyer.
- (a) Children at that time did not go to college.
- (b) It was difficult for him to improve relationship.
- (c) The lessons did not interest him and he did not do well.
- (d) In spite of all the difficulties, Mohandas sailed to England.

Directions (Q. 18 - 25): Choose the word which best fills the blank from the four options given :

18. You _____ a reward for saving that child's life.
(a) deceive (b) desert
(c) debt (d) deserve
19. There were a lot of _____ in the harbour sheltering from the storm.
(a) barrels (b) buckets
(c) vessels (d) trunks

20. The solicitor's clerk has to have a _____ attitude to his seniors and clients.
 (a) respective (b) receptive
 (c) reciprocal (d) reflect
21. If someone tells lies about you in a newspaper article you can take court action for
 (a) deformation (b) defamation
 (c) depreciation (d) destruction
22. She _____ the disease and died on 24th Aug. 1901.
 (a) contracted (b) appreciated
 (c) assessed (d) maintained
23. He had forgotten to _____ his house, so when it burned down, he lost all his money.
 (a) ensure (b) insure
 (c) encourage (d) reduce
24. He is a very _____ boy; whenever he crosses the road, he always looks in both directions first.
 (a) cautious (b) careless
 (c) excited (d) hasty
25. He left town at 11 a.m., so we _____ him at 2.15 p.m.
 (a) accept (b) except
 (c) expect (d) exact

Directions (Q. 26 - 29) : Select the meaning of the given phrases / idioms :

26. Do away with
 (a) progress (b) delay
 (c) include (d) abolish
27. Call for
 (a) require (b) repeat
 (c) reduce (d) relocate
28. Spill the beans
 (a) to hide a secret
 (b) to collect the secret
 (c) to reveal a secret
 (d) to find a secret
29. Green-eyed
 (a) greedy (b) jealous
 (c) hateful (d) dishonest

Directions (Q. 30 - 35): In the following passage are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the given options:

A man who confides (Q. 30) _____ a friend will not (Q. 31) _____ anything (Q. 32) _____ him, but will confer (Q. 33) _____ him (Q. 34) _____ all matters (Q. 35) _____ real importance.

30. (a) for (b) in
 (c) of (d) from
31. (a) concealed (b) concealing
 (c) conceal (d) conceals
32. (a) from (b) with
 (c) on (d) at
33. (a) by (b) with
 (c) into (d) since
34. (a) to (b) into
 (c) on (d) for
35. (a) after (b) of
 (c) over (d) before

Directions (Q. 36 - 38): Select the most appropriate option to fill in the blanks from the given alternatives :

36. He was _____ acquainted with every language of modern Europe.
 (a) intimated (b) intimates
 (c) intimating (d) intimately
37. A severe penalty was _____ on everyman who possessed that dangerous book.
 (a) inflicted (b) infection
 (c) infused (d) inducted
38. The _____ that the lower animals display is different from blind instinct.
 (a) intelligent (b) intelligently
 (c) intelligence (d) intelligible

Directions (Q. 39 and 40): Select the word which means the opposite of the given word:

39. Impudent
 (a) insolent (b) fresh
 (c) rude (d) polite
40. Cursory
 (a) thorough (b) careless
 (c) hasty (d) superficial

PART III
SCHOLASTIC APTITUDE TEST
PHYSICS

- In transformer mutual induction takes place, if the input is
 (a) AC signal (b) DC signal
 (c) Only at 11 KV (d) Only at 220 V
- During Nuclear fission
 (a) Heat is transformed into energy
 (b) Radiation is transformed into energy
 (c) Weight is transformed into energy
 (d) Mass is transformed into energy
- The spectrum which represents simple harmonic motion is
 (a) Electronic spectrum
 (b) Vibration spectrum
 (c) Hydrogen spectrum
 (d) Continuous spectrum
- When a stone is dropped into the lake, the produced waves are
 (a) Transverse waves
 (b) Sound waves
 (c) Longitudinal waves
 (d) Electromagnetic waves
- A vibrator generates the waves of the speed 330 ms^{-1} and wavelength 0.8 m . Then the frequency and time period is
 (a) 264 Hz, 0.0037 sec
 (b) 42.5 Hz, 0.0024 sec
 (c) 412.5 Hz, 1.250 sec
 (d) 264 Hz, 0.0030 sec
- In which of the following set, the materials are arranged on the basis of ascending order of their refractive index?
 (a) Air, water, silicon, diamond
 (b) Air, silicon, kerosene, diamond
 (c) Air, water, diamond, silicon
 (d) Air, alcohol, silicon, diamond

7. Match the following:

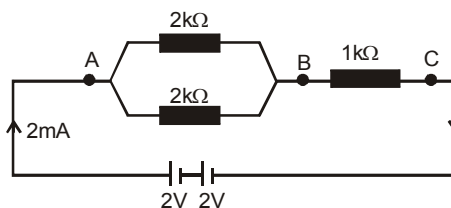
Group-I**Group-II**

i. Intake stroke	A. Air and petrol mixture is ignited
ii. Compression stroke	B. Piston moves away from the spark plug
iii. Ignition stroke	C. Outlet valves open, gases are pushed out
iv. Expansion stroke	D. Piston moves towards the spark plug
v. Exhaust stroke	E. Heat and gases are released

- (a) i – B, ii – D, iii – A, iv – E, v – C
 (b) i – D, ii – B, iii – A, iv – E, v – C
 (c) i – B, ii – D, iii – E, iv – A, v – C
 (d) i – B, ii – E, iii – D, iv – A, v – C

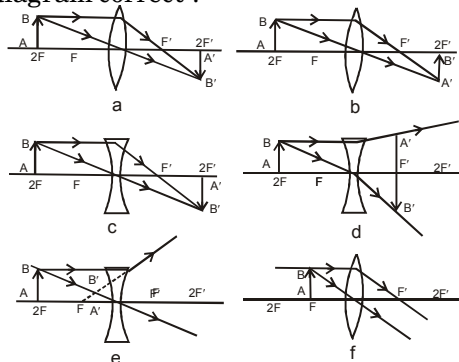
- A ray of light passes from denser medium to rarer medium, if thickness of the denser medium is doubled, then the emerging angle is
 (a) Also doubled
 (b) Reduced by its half
 (c) Not affected
 (d) Critical angle

- The current and voltage between AB and BC in the given electrical network



- (a) at AB : $I = 2 \text{ mA}$, $V = 4 \text{ V}$ and at BC : $I = 2 \text{ mA}$, $V = 2 \text{ V}$
 (b) at AB : $I < 2 \text{ mA}$, $V = 4 \text{ V}$ and at BC : $I < 2 \text{ mA}$, $V = 4 \text{ V}$
 (c) at AB : $I < 2 \text{ mA}$, $V = 4 \text{ V}$ and at BC : $I > 2 \text{ mA}$, $V = 2 \text{ V}$
 (d) at AB : $I = 2 \text{ mA}$, $V = 2 \text{ V}$ and at BC : $I = 2 \text{ mA}$, $V = 2 \text{ V}$

10. Which of the following group of the ray diagram correct ?



- (a) a, b and e (b) b, c and e
(c) d, c and f (d) a, e and f
11. An electron enters a magnetic field at right angles to it, as shown in the figure, the direction of force acting on the electron is
- (a) towards right
(b) towards left
(c) out of the page
(d) into the page
12. Who among the following is honoured by awarding 'Bharath Ratna'?
- (a) T.N.Guru Rao (b) C.N.R. Rao
(c) Ajim Premji (d) Narayana Murthy

CHEMISTRY

13. The example for non- biodegradable pollutant is
- (a) Sulphur-di-oxide
(b) Lead vapours
(c) Sewage
(d) Corrugated cardboard
14. The material which does not have fixed melting point is
- (a) Plastic (b) Metals
(c) Glass (d) Ceramics
15. The type of glass used in the manufacture of lenses is
- (a) Borosilicate glass
(b) Potash lime type glass
(c) Soda-lime glass
(d) Lead glass

16. The action of syringe is an example of
- (a) Charle'slaw (b) Graham's law
(c) Boyle's law (d) Diffusion
17. Examine the following statements and select the correct option.
- A : Electrolytic conduction is a physical change.
B : In Electrolytic conduction, positive as well as negative ions conduct electricity.
- (a) Both 'A' and 'B' are true
(b) Both 'A' and 'B' are false
(c) 'A' is true and 'B' is false
(d) 'A' is false but 'B' is true
18. If metal 'A' displaces metal 'B' from its solution, it shows
- (a) Metal 'A' is more reactive than metal 'B'
(b) Metal 'A' is less reactive than metal 'B'
(c) Metal 'A' is equally reactive as metal 'B'
(d) Metal 'A' is not at all reactive compared to 'B'
19. The example for exothermic reaction is
- (a) Melting of ice cubes
(b) Decomposition of vegetable matter into compost
(c) Cooking an egg
(d) Baking bread
20. The chips manufacturers usually flush bags of chips with this 'gas' to prevent the chips from being oxidized and become rancid.
- (a) Oxygen (b) Hydrogen
(c) Nitrogen (d) Chlorine
21. The pH value of Gastric juice, Lemon juice, Milk of magnesia, Sodium hydroxide solution respectively
- (a) 2.2, 1.2, 10, 14 (b) 1.2, 2.2, 14, 10
(c) 1.2, 2.2, 10, 14 (d) 2.2, 1.2, 14, 10

- 22.** Match the terms used in metallurgy with their meanings.

I	II
A. Roasting	i. Heating the ore just below its melting point in the absence of air
B. Calcination	ii. Unwanted impurities present in the ore
C. Gangue	iii. Heating the ore just below its melting point in the presence of air
D. Flux	iv. Process of increasing the percentage of desired component of the ore
	v. Substance added to ores to remove unwanted impurities
(a) A-i B-iii C-ii D-v	
(b) A-iii B-i C-iv D-ii	
(c) A-iii B-i C-ii D-v	
(d) A-i B-iii C-v D-ii	

- 23.** "The properties of elements are periodic functions of their atomic number" is given by

(a) Mendeleev	(b) Doberniener
(c) Newlands	(d) Moseley

BIOLOGY

- 24.** In frog oxygenated blood and deoxygenated blood gets mixed up due to

- (a) Two chambered heart
- (b) Three chambered heart
- (c) Four chambered heart
- (d) One chambered heart

- 25.** Which one of the following is correct matched set ?

I	II
A. Flower	i. Female reproductive part
B. Calyx and Corolla	ii. Reproductive whorl

C. Androecium and Gynoecium	iii. Male reproductive part
D. Ovules	iv. Reproductive part of a plant
E. Pollen grains	v. Accessory whorls
(a) A - iii B - iv C - i D - ii E - v	
(b) A - ii B - iii C - iv D - v E - i	
(c) A - iv B - v C - ii D - i E - iii	
(d) A - iii B - ii C - iv D - i E - v	

- 26.** The correct pathway of reflex arc is

- (a) Receptor → Effector → Afferent neuron → Efferent neuron → Association neuron
- (b) Receptor → Efferent neuron → Association neuron → Afferent neuron → Effector
- (c) Receptor → Association neuron → Afferent neuron → Efferent neuron → Effector
- (d) Receptor → Afferent neuron → Association neuron → Efferent neuron → Effector

- 27.** The algae which is used in the manufacture of potassium

- (a) Gelidium
- (b) Porphyra
- (c) Laminaria
- (d) Chlamydomonas

- 28.** Companion cells are important in phloem tissue because

- (a) It gives mechanical support to sieve tubes
- (b) It controls the flow of food through sieve tubes
- (c) It conducts the food through it
- (d) It holds the position of sieve cells in place

- 29.** If the platelet count in the blood reduced and redness in palms and soles are seen the disease is said to be

- (a) Dengue
- (b) Chikungunya
- (c) Bird flu
- (d) Typhoid

- 30.** Colchicine is a chemical substance used to bring about the following process artificially
- (a) Polyploidy
 - (b) Induced mutation
 - (c) Intervarietal hybridization
 - (d) Genetic modification
- 31.** The surgery called vitrectomy for human eye is done when there is
- (a) Decrease in the transparency of lens
 - (b) Decrease in the transparency of aqueous humor
 - (c) Decrease in the transparency of vitreous humor
 - (d) Loosening of elasticity in lens
- 32.** The correct path of lymph flow is
- A. Lymph capillaries → Lymph vessels → Veins
 - B. Lymph capillaries → Lymph vessels → Arteries
- (a) Only A is correct
 - (b) Only B is correct
 - (c) Both A and B are correct
 - (d) Both A and B are wrong
- 33.** Sphincter muscles help to release the food from
- A. Large intestine to outside
 - B. Small intestine to large intestine
 - C. Oesophagus to stomach
 - D. Stomach to small intestine
- (a) A and B are correct
 - (b) B and C are correct
 - (c) C and D are correct
 - (d) A and D are correct
- 34.** In Mendel's dihybrid cross experiment, he got dwarf plants with white flowers, dwarf plants with red flowers, tall plants with white flowers, tall plants with red flowers respectively. This order can be represented by the following ratio
- (a) 3 : 9 : 1 : 3
 - (b) 1 : 3 : 3 : 9
 - (c) 9 : 1 : 3 : 3
 - (d) 3 : 9 : 3 : 1
- 35.** Peripheral nervous system includes
- (a) Brain and spinal chord
 - (b) Brain and 12 pairs of nerves which start from brain
 - (c) Spinal chord and 31 pairs of nerves which start from spinal chord
 - (d) 12 pairs of nerves which start from brain and 31 pairs of nerves which start from spinal chord

HISTORY

- 36.** To establish French supremacy in India, the Governor General appointed in 1742 AD was
- (a) Dalhousie
 - (b) Hastings
 - (c) Canning
 - (d) Duplex
- 37.** Nawab Anwaruddin of Carnatic region was used as a pawn by
- (a) French and Spanish
 - (b) French and British
 - (c) French and Portuguese
 - (d) British and Dutch
- 38.** The districts that come under the region identified as Hyderabad Karnataka
- (a) Bidar, Gulbarga, Yadgir and Raichur
 - (b) Bellary, Gulbarga, Bidar and Dharwad
 - (c) Bidar, Davanagere, Raichur and Gulbarga
 - (d) Chitradurga, Bellary, Raichur and Gulbarga
- 39.** The organization formed by Bal Gangadhar Tilak in 1916
- (a) Home Rule League
 - (b) Arya Samaja
 - (c) Swaraj Party
 - (d) Prarthana Samaja
- 40.** The reason for sending Stafford Cripps Mission to India by British
- (a) To pacify Indians for war against Germany
 - (b) To form Constituent Assembly for India
 - (c) To oppose Gandhiji's Quit India movement
 - (d) To enquire about Jallianwalabagh incident

41. The meaning of 'Drain theory' as explained by Dadabai Naoroji
- Encouraging imports
 - III effects of the British rule in India
 - Transfer of Indian wealth to England
 - Reduction of military expenses
42. The establishment of the Supreme Court in India was sanctioned by
- Regulating Act in 1773
 - The Indian Council Act of 1861
 - Minto Morley Reforms of 1909
 - Government of India Act of 1935
43. The reason for the rise of trade capitalists in India in 17th century
- Discovery of new lands
 - Political monopoly
 - Market for finished goods
 - Cheap labourers
44. The objective of bringing "Lord Rippon Ilbert Bill" was
- Uniformity in the Judicial system
 - Economic Reforms
 - Religious Reforms
 - Transport improvements
45. The Communist Government in Russia was established by
- Mensheviks
 - Tsars
 - Bolesheviks
 - Nazis

GEOGRAPHY AND ECONOMICS

46. Which one of the following groups, represents neighbouring countries of India?
- Afghanistan, Pakistan, Bangladesh, Srilanka
 - Persia, Pakistan, Nepal, Maldives
 - Burma, Bhutan, Tazikistan, China
 - Malasia, Burma, Nepal, Srilanka
47. Some statements are given below
- Siwaliks are a range of low hills.
 - Shimla, Mussorie, Rani Khet and Nainital are famous hill stations of Greater Himalayas.
 - Mt. K2 is the highest peak in the world.
 - Karakoram and Mt. Kailash ranges are a part of Trans Himalayas.
- Which of the above statements are true?
- A, B and D
 - B and C
 - A and D
 - B, C and D
48. **Assertion (A)** : South West monsoons start retreating from North to South, by the end of October.
- Reason (R)**: North India is hotter than South India during the months from October to January. Select the correct option from the given alternatives.
- Both 'A' and 'R' are true and 'R' explains 'A'
 - Both 'A' and 'R' are true, but 'R' doesn't explain 'A'
 - 'A' is true and 'R' is false
 - 'A' is false and 'R' is true
49. Which of the following is/are the method/s of minimizing soil erosion ?
- Shifting cultivation
 - Construction of check-dams
 - Contour ploughing
 - Afforestation
- A only
 - B, C and D
 - B and D
 - D only
50. Match the National parks indicated on the map of India, (I, II, III and IV) with their respective names.



- Gir
 - Nagarhole
 - Jim Corbett
 - Kaziranga
- I-C, II-D, III-A, IV-B
 - I-A, II-B, III-C, IV-D
 - I-B, II-A, III-D, IV-C
 - I-D, II-B, III-C, IV-A

51. The following is the list of multipurpose river projects in India

A – Chambal B – Tungabhadra

C – Bhakra-Nangal D – Narmada

Which of the following is the correct sequence of projects from North to South ?

(a) B, C, D, A (b) B, D, C, A

(c) C, A, D, B (d) B, D, A, C

52. **Assertion (A) :** Sugar mills are located close to the area of sugar cane growing fields.

Reason (R) : Sugarcane loses sugar content rapidly after 48 hours. It has to be moved quickly.

Select the correct option from the given alternatives.

(a) Both 'A' and 'R' are true and 'R' explains 'A'

(b) Both 'A' and 'R' are true, but 'R' doesn't explain 'A'

(c) 'A' is true and 'R' is false

(d) 'A' is false and 'R' is true

53. The Orissa-Jharkhand belt is famous for one of the following varieties of iron ore.

(a) Magnetite (b) Hematite

(c) Limonite (d) Siderite

54. Consider the following industrial regions of India

A. Hooghly region

B. Mumbai - Pune region

C. Damodar valley region

D. Bangalore - Tamil Nadu region

E. Vishakhapatnam - Guntur region

F. Chotanagpur Industrial region

G. Kollam - Thiruvananthapuram region

H. Ahmedabad - Vadodara region

Which of these lie within Peninsular India ?

Choose the correct set from the following.

(a) B, D, E and G (b) A, B, D and H

(c) B, D, C and G (d) F, A, H and C

55. Sea port located in Gujarat

(a) Tuticorin (b) Kandla

(c) Kochi (d) Paradip

56. Important feature of second green revolution is

(a) high-yielding variety seeds

(b) nature-friendly techniques of production

(c) chemical fertilizers and pesticides

(d) machines in farming

57. Panchayat Raj System is based on the principle of

(a) decentralization of power

(b) concentration of power

(c) centralization of power

(d) distribution of resources

POLITICAL SCIENCE,

SOCIOLOGY & BUSINESS STUDIES

58. Total languages in the Eighth schedule of Indian Constitution

(a) 18 (b) 19

(c) 21 (d) 22

59. Which one of the following is an anti-national and economic crime ?

(a) Smuggling

(b) Communalism

(c) Corruption

(d) Economic inequality

60. In 1946, the features of Indian foreign policy was explained by

(a) Indira Gandhi

(b) Dr. B.R. Ambedkar

(c) Pandit Jawaharlal Nehru

(d) Lal Bahadur Shastri

61. In 1971, India entered into 20 years Treaty of Peace, Friendship and Co-operation with one of the following countries -

(a) USA (b) Russia

(c) Srilanka (d) Bhutan

62. The country helped India financially for economic development through five year plans

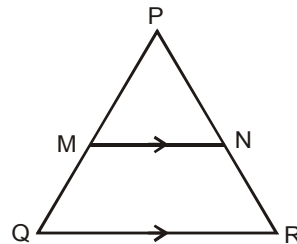
(a) Russia (b) Canada

(c) USA (d) China

63. The member of the Security Council of U.N.O.
 (a) 5 (b) 17
 (c) 15 (d) 7
64. Education is considered under which List of Indian Constitution ?
 (a) Union List (b) State List
 (c) Concurrent List (d) Residuary List
65. 'The Untouchability Crime Act' was implemented in
 (a) 1948 (b) 1950
 (c) 1956 (d) 1955
66. 'Chipko Movement' took place in 1973 under the leadership of
 (a) Sunderlal Bahuguna
 (b) Medha Patkar
 (c) Baba Amte
 (d) Shivaram Karantha
67. The Indian Government amended 'Prohibition of Dowry Act' in
 (a) 1961 (b) 1972
 (c) 1981 (d) 1986
68. The type of Account preferably opened by Businessmen in a Bank is
 (a) Savings Bank Account
 (b) Current Account
 (c) Recurring Deposit Account
 (d) Term Deposit Account
69. All the Banking transactions in India is not controlled by
 (a) Indian Bank
 (b) Reserve Bank of India
 (c) Mother's Bank
 (d) Banker's Bank
70. The Founder and Chairman of 'Jet Airways' is
 (a) Naresh Goyal
 (b) Dr. Prathap Reddy
 (c) Kiran Mazumdar Shah
 (d) Azim Premji

MATHEMATICS

71. If the line segments joining the points (a, b) and (c, d) subtends a right angle at the origin, then which of the equation is correct ?
 (a) $ac - bd = 0$ (b) $ac + bd = 0$
 (c) $ab + cd = 0$ (d) $ab - cd = 0$
72. If the pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ has infinite number of solutions then the correct condition is
 (a) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
 (c) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ (d) $\frac{a_1}{a_2} \neq \frac{c_1}{c_2}$
73. If $x = \frac{1}{2 - \sqrt{3}}$ then the value of $x^2 - \frac{1}{x^2}$ is
 (a) $12\sqrt{3}$ (b) $8\sqrt{3}$
 (c) 14 (d) 12
74. In the triangle PQR, $MN \parallel QR$ and MN divides the triangle into two parts of equal areas, then $\frac{QM}{PQ}$

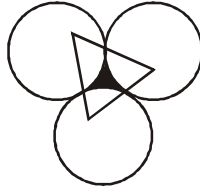


- (a) $\frac{1}{\sqrt{2} + 1}$
 (b) $\frac{2 - \sqrt{2}}{2}$
 (c) $\frac{\sqrt{2} - 1}{\sqrt{2}}$
 (d) $\frac{1}{\sqrt{2} - 1}$

- 75.** The arithmetic mean of two given positive numbers is 2. If the larger number is increased by 1, the geometrical mean of the numbers becomes equal to the arithmetic mean of the given numbers. Then, the harmonic mean of the given numbers is
- (a) $\frac{2}{3}$ (b) 2
(c) $\frac{1}{2}$ (d) $\frac{3}{2}$
- 76.** If the quotient obtained on dividing $(x^4 + 10x^3 + 35x^2 + 50x + 29)$ by $(x + 4)$ is $x^3 - ax^2 + bx + 6$, then the value of $\frac{a+b}{a-b}$ is
- (a) $\frac{25}{33}$ (b) $\frac{17}{5}$
(c) $\frac{-5}{17}$ (d) $\frac{53}{25}$
- 77.** The value of $\cos 1^\circ \cos 2^\circ \cos 3^\circ \dots \cos 179^\circ$ is
- (a) $\frac{1}{\sqrt{2}}$ (b) 0
(c) 1 (d) -1
- 78.** If the equations $x^2 + ax + b = 0$ and $x^2 + bx + a = 0$ have a common root, then the value of $a + b$ is
- (a) +1 (b) 0
(c) -1 (d) 2
- 79.** A person walked diagonally across a square plot. Approximately, what was the percentage saved by not walking along the edges?
- (a) 35% (b) 30%
(c) 20% (d) 25%
- 80.** If 9 times the 9th term in an arithmetic progression is equal to 15 times the 15th term in the arithmetic progression, what is the 24th term?
- (a) 0 (b) 9
(c) 15 (d) 23
- 81.** If $x, 2y, 3z$ are in arithmetic progression, where the distinct numbers x, y, z are in geometric progression, then the common ratio of the geometric progression is
- (a) 3 (b) $\frac{1}{2}$
(c) 2 (d) $\frac{1}{3}$
- 82.** Sets A and B have 3 and 6 elements respectively. What can be the minimum number of elements in $A \cup B$?
- (a) 9 (b) 6
(c) 3 (d) 18
- 83.** 3 balls drawn randomly from a bag containing 3 black, 5 red and 4 blue balls. What is the probability that the balls drawn contain balls of different colors?
- (a) $\frac{3}{11}$ (b) $\frac{1}{3}$
(c) $\frac{1}{2}$ (d) $\frac{2}{11}$
- 84.** The smallest number which when increased by 17 is exactly divisible by both 520 and 468 is
- (a) 4697 (b) 4656
(c) 4663 (d) 4680
- 85.** The area of a square inscribed inside a circle of radius 6 cm is
- (a) 36 square cm (b) 72 square cm
(c) 108 square cm (d) 144 square cm
- 86.** If the sum of an arithmetic progression is the same for p terms as for the q terms, find the sum for $(p + q)$ terms.
- (a) 2 (b) 4
(c) 0 (d) 1
- 87.** If ${}^{12}P_r = {}^{11}P_6 + 6 \cdot {}^{11}P_5$, then r is equal to
- (a) 5 (b) 11
(c) 7 (d) 6
- 88.** In a graph the order of the nodes A, B, C and D are respectively 5, 3, 6 and 2. Then the number of arcs and regions are respectively
- (a) 8, 6 (b) 6, 8
(c) 8, 4 (d) 4, 8

89. If 3 equal circles of radius 3 cm each touch each other, then area of the shaded portion is

- (a) $\frac{\sqrt{3}}{2}(2 - \pi)$ sq cm
 (b) $\frac{3}{2}(\sqrt{3} - \pi)$ sq cm
 (c) $\frac{9}{2}(2\sqrt{3} - \pi)$ sq cm
 (d) $\frac{9}{2}(\sqrt{3} - \pi)$ sq cm



90. 25 buses are running between two places P and Q. What is the total number of ways that a person can travel from P to Q and return by a different bus?

- (a) 625
 (b) 600
 (c) 576
 (d) 675

ANSWERS

MENTAL ABILITY TEST

1. (d)	2. (c)	3. (b)	4. (a)	5. (c)	6. (b)	7. (c)	8. (a)	9. (b)	10. (b)
11. (a)	12. (c)	13. (c)	14. (c)	15. (c)	16. (a)	17. (c)	18. (d)	19. (c)	20. (c)
21. (a)	22. (b)	23. (c)	24. (d)	25. (a)	26. (d)	27. (b)	28. (b)	29. (c)	30. (b)
31. (a)	32. (d)	33. (b)	34. (c)	35. (c)	36. (d)	37. (c)	38. (d)	39. (a)	40. (d)
41. (c)	42. (d)	43. (b)	44. (d)	45. (b)	46. (a)	47. (c)	48. (d)	49. (d)	50. (d)

ENGLISH LANGUAGE

1. (c)	2. (c)	3. (c)	4. (b)	5. (a)	6. (d)	7. (d)	8. (c)	9. (c)	10. (d)
11. (d)	12. (b)	13. (b)	14. (d)	15. (a)	16. (c)	17. (a)	18. (d)	19. (c)	20. (b)
21. (b)	22. (a)	23. (b)	24. (a)	25. (c)	26. (d)	27. (a)	28. (c)	29. (b)	30. (b)
31. (c)	32. (a)	33. (b)	34. (c)	35. (b)	36. (d)	37. (a)	38. (c)	39. (d)	40. (a)

SCHOLASTIC APTITUDE TEST

1. (a)	2. (d)	3. (b)	4. (a)	5. (c)	6. (c)	7. (b)	8. (c)	9. (d)	10. (d)
11. (c)	12. (b)	13. (b)	14. (c)	15. (d)	16. (d)	17. (d)	18. (a)	19. (d)	20. (c)
21. (c)	22. (c)	23. (d)	24. (b)	25. (c)	26. (d)	27. (c)	28. (b)	29. (a)	30. (a)
31. (c)	32. (a)	33. (c)	34. (b)	35. (d)	36. (d)	37. (b)	38. (a)	39. (a)	40. (b)
41. (c)	42. (a)	43. (a)	44. (a)	45. (c)	46. (a)	47. (c)	48. (c)	49. (b)	50. (c)
51. (c)	52. (a)	53. (b)	54. (a)	55. (b)	56. (b)	57. (a)	58. (d)	59. (c)	60. (c)
61. (b)	62. (c)	63. (c)	64. (c)	65. (d)	66. (a)	67. (a)	68. (b)	69. (a)	70. (a)
71. (b)	72. (a)	73. (b)	74. (c)	75. (d)	76. (c)	77. (b)	78. (c)	79. (b)	80. (a)
81. (d)	82. (b)	83. (a)	84. (c)	85. (b)	86. (c)	87. (d)	88. (a)	89. (c)	90. (b)

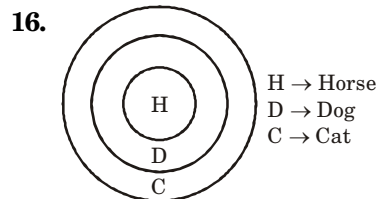
EXPLANATIONS**MENTAL ABILITY TEST**

1. $(7 \times 6) \div 2 \times 4 = 84$
 $(9 \times 8) \div 2 \times 3 = 108$
 $(4 \times 9) \div 2 \times ? = 126$
 $? = 7$
2. $(8 + 17) \times 3 - 8 = d$
 $(12 + 15) \times 3 - 12 = 69$
 $(16 + 22) \times 3 - 16 = \boxed{98}$
3. From option (a)
 $2n^2 - 1$
 Put $n = 3$
 $= 2 \cdot 3^2 - 1 = 17$
 From option (b)
 $3n^2 + 1$
 For $n = 3$
 $= 3 \cdot 3^2 + 1 = 28$
4. $2n^3 + 3$
 For $n = 3$
 $= 2 \cdot 3^3 + 3 = 57$
5. fruits are ripe $\rightarrow$ tink log se
 mangoes are not ripe $\rightarrow$ se thao hay tink
 bananas are not ripe $\rightarrow$ hay se cue tink
 are $\rightarrow$ tink or se
 ripe $\rightarrow$ se or tink
 not $\rightarrow$ hay
 bananas $\rightarrow$ cue
 So the code for bananas is 'Cue'.
6. $2^3 + 7 = 15$
 $3^3 + 7 = 34$
 $4^3 + 7 = 71$
 $5^3 + 7 = \boxed{132}$
 $6^3 + 7 = 223$
 $7^3 + 7 = 350$
7. $\begin{array}{ccccccc} A & C & F & J & D & G & K & P \\ \hline & +2 & +3 & +4 & & +3 & +4 & +5 \\ I & M & R & W & P & U & A & H \\ \hline & +4 & +5 & +5 & & +5 & +6 & +7 \end{array}$

8. $4 + 3 + 2 + 4 + 6 = 19$,
 $5 + 6 + 3 + 5 + 2 = 21$
 $6 + 8 + 4 + 6 + 2 = 26$,
 $7 + 8 + 2 + 7 + 4 = 28$

Here the sum of the group of numbers is 19, which is a prime number. So it is an odd in the given four group of numbers.

10. In the given words GAINFUL, FOUNDER and QUADRIC, there are 3 vowels while in the given word SECTARY there are only 2 vowels.
11. $2 \times 3 + 5 = 11$
 $11 \times 3 + 5 = 38$
 $38 \times 3 + 5 = \boxed{119}$
 $119 \times 3 + 5 = 362$
 $362 \times 3 + 5 = 1091$
12. $3 \times 2 = 6$
 $6 \times 3 = 18$
 $18 \times 4 = 72$
 $72 \times 5 = \boxed{360}$
 $360 \times 6 = 2160$
13. a a b b b b a a a a a b b b a a
14. Answer figure (c), is the next figure.
15. In the given question, answer figure (c) is the next figure.

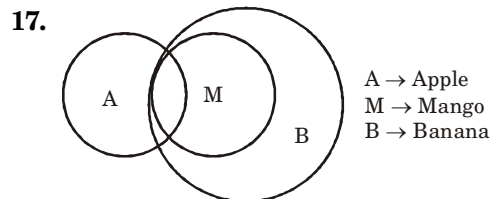


Conclusion :

(i) All houses are cats – $\checkmark$

(ii) All cats are horses – $\times$

So only conclusion I follows.



Conclusion :

I. $\checkmark$

II. $\times$

III. $\checkmark$

IV. $\times$

So only conclusion I and III follow.

18. $53 - 28 = 19 + 6$

$$25 = 25$$

$$87 - 24 = 55 + 8$$

$$63 = 63$$

$$73 - 21 = 48 + x$$

$$\therefore x = 4$$

19. $(6 \times 4) - 4^2 = 8$

$$(7 \times 5) - 5^2 = 10$$

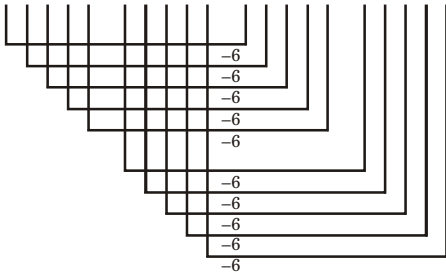
$$(9 \times 9) - 8^2 = \boxed{17}$$

20. $147 \div 49 = 3$, similarly $198 \div 66 = 3$

21. $(15)^2 - 15 \times 2 = 195$

$$(25)^2 - 25 \times 2 = \boxed{575}$$

22. T P L N R : B X T V Z :: N J F H L : V R N P T



23. Answer figure (c) is the next figure.

24. In the given figures, answer figure (d) is the required figure.

25. There are 21 triangles in the given figure.

26. There are 11 rectangles.

27. In the given figure, there are 18 semicircles.

28. From option (a)

$$\Rightarrow 18 - 54 \div 27 = 9 \times 45 + 9$$

$$16 \neq 414$$

From option (b)

$$\Rightarrow 18 - 54 \div 27 = 9 \times 45 - 9$$

$$\Rightarrow 18 + 2 \times 9 = 36$$

$$36 = 36$$

29. From option (a)

$$80 \div 5 + 4 = 5 \times 4$$

$$\Rightarrow 16 + 4 = 20$$

$$20 = 20$$

From option (b)

$$30 \div 2 + 5 = 2 \times 10$$

$$\Rightarrow 15 + 5 = 20$$

$$20 = 20$$

From option (c)

$$40 \div 10 + 4 = 10 \times 6$$

$$\Rightarrow 8 \neq 60$$

From option (d)

$$60 \div 3 + 10 = 6 \times 5$$

$$\Rightarrow 20 + 10 = 30$$

$$30 = 30$$

30. The letter that represents teachers who are singers and also dancers is 'c'.

31. The letter 'e' represents dancers and singers who are not teachers.

32. $A = 2R$ and $A = \frac{1}{2}H$

$$B = \frac{1}{2}R \text{ and } B = 2M$$

Here

$$A \rightarrow \text{Anju}$$

$$B \rightarrow \text{Balu}$$

$$H \rightarrow \text{Harsha}$$

$$M \rightarrow \text{Mala}$$

$$R \rightarrow \text{Rama}$$

Let Mala age be x , then

$$M = x$$

$$B = 2x$$

$$R = 4x$$

$$A = 8x$$

$$H = 16x$$

So from above it is clear that Harsha is the oldest and Mala is the youngest members in the family.

33. Answer figure (b) is the mirror image of the given figure. (In a mirror image, the image on the left side appear the image on the right side).

34. Answer figure (c) is the mirror image of the given figure.

35. C H A L K
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 3 8 1 12 11

(Position of alphabets, if we start from the beginning)

X S Z O P
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 3 8 1 12 11

(Position of alphabets, start at the end)

Similarly

B O A R D Y L Z I W
 $\downarrow \downarrow \downarrow \downarrow \downarrow$ $\downarrow \downarrow \downarrow \downarrow \downarrow$
 2 5 1 18 4 2 15 1 18 4

(From start)

(From end)

37. Answer figure (c) is the missing part
 38. The missing part of the given figure is answer figure (d).
 39. When it is unfolded, answer figure (a) will be obtained.
 41. In the given figure, 1, 2, 3 and 5 are the adjacent of 4, so the opposite pair of 4 will be 6. Similarly 1, 2, 4 and 6 are adjacent of 3, so the opposite pair of 3 will be 5. And therefore the opposite pair of 2 will be 1.
 42. When the given figure is folded as a cube, then answer figure (d) is obtain.
 44. Answer figure (d) is suitable to put the dot (.) as found in the given problem.
 45. Answer figure (b) is suitable to put the dot (.).
 46. In the given question, the figure in which problem figure is hidden is answer figure (a).
 47. From option (a)

14, 31, 23, 58, 78
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 R E A O H

From option (b)

21, 22, 32, 78, 85
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 R E S H H

From option (c)

33, 13, 41, 88, 57
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 R E A C H

48. From option (a)

58, 24, 77, 31, 14
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 O S C E R

From option (b)

67, 11, 87, 34, 21
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 O S I A R

From option (c)

75, 43, 76, 44, 32
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 O S I E S

From option (d)

86, 32, 68, 22, 42
 $\downarrow \downarrow \downarrow \downarrow \downarrow$
 O S I E R

49. Answer figure (d) is obtained by joining the given parts of the figure.
 50. From statement I, II and III

C $\uparrow$ C $\uparrow$ C $\uparrow$
 A D A
 B A D
 D B B

So from the above statements, it is not clear that whether B is taller than D, therefore all the statements I, II and III are not sufficient to give the answer.

SCHOLASTIC APTITUDE TEST

72. Given linear equations are

$$a_1 x + b_1 y + c_1 = 0 \quad \dots(i)$$

$$a_2 x + b_2 y + c_2 = 0 \quad \dots(ii)$$

Here the given linear equations have infinite number of solutions, then

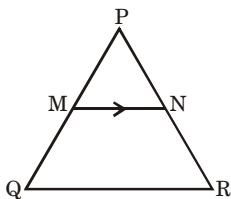
$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$\begin{aligned} 73. \text{ Given } x &= \frac{1}{2 - \sqrt{3}} \times \frac{2 + \sqrt{3}}{2 + \sqrt{3}} \\ &= \frac{2 + \sqrt{3}}{(2)^2 - (\sqrt{3})^2} = 2 + \sqrt{3} \end{aligned}$$

$$\text{So, } \frac{1}{x} = 2 - \sqrt{3}$$

$$\begin{aligned} \text{Now } x^2 - \frac{1}{x^2} &= (2 + \sqrt{3})^2 - (2 - \sqrt{3})^2 \\ &= 4 \times 2 \times \sqrt{3} \\ &= 8\sqrt{3} \end{aligned}$$

74.



Here the given $\triangle PMN$ and $\triangle PQR$ is similar
According to question,

$$\frac{\text{area of } \triangle PMN}{\text{area of } \triangle PQR} = \frac{PM^2}{PQ^2}$$

$$\frac{1}{1+1} = \frac{PM^2}{PQ^2}$$

$$\therefore \frac{PM}{PQ} = \frac{1}{\sqrt{2}}$$

$$\frac{PQ - QM}{PQ} = \frac{1}{\sqrt{2}}$$

$$\sqrt{2} PQ - \sqrt{2} QM = PQ$$

$$\therefore \frac{QM}{PQ} = \frac{\sqrt{2} - 1}{\sqrt{2}}$$

75. If a and b be the two positive numbers, then arithmetic mean of two numbers is

$$\frac{a+b}{2} = 2 \quad \dots(i)$$

Now if large number is increased by 1, then according to question

$$\sqrt{(a+1) \cdot b} = \frac{a+b}{2}$$

$$(a+1)b = \frac{(a+b)^2}{4}$$

$$(4-b+1) = 4$$

$$b^2 - 5b + 4 = 0$$

$$b = 4, 1$$

but $b = 4$ is not possible

so $b = 1$

From equation (i)

$$a = 3$$

Now harmonic mean of the given numbers

$$= \frac{2ab}{a+b} = \frac{2 \cdot 3 \cdot 1}{3+1} = \frac{3}{2}$$

$$76. (x+4)x^4 + 10x^3 + 35x^2 + 50x + 29(x^3 + 6x^2 + 11x + 6)$$

$$\begin{array}{r} x^4 + 4x^3 \\ 6x^3 + 35x^2 + 50x + 29 \\ \hline 6x^3 + 24x^2 \\ \hline 11x^2 + 50x + 29 \\ 11x^2 + 44x \\ \hline 6x + 29 \\ 6x + 24 \\ \hline 5 \end{array}$$

According to question,

$$x^3 + 6x^2 + 11x + 6 = x^3 - ax^2 + bx + 6$$

So we have

$$a = -6$$

$$b = 11$$

$$\begin{aligned} \text{Now } \frac{a+b}{a-b} &= \frac{-6+11}{-6-11} \\ &= \frac{-5}{-17} \\ &= \frac{5}{17} \end{aligned}$$

77. In the given series there are 179 terms including 45 and 90 terms that will be 45° and 90°

So, in the given series

$$\cos 1^\circ \cdot \cos 2^\circ \cdot \cos 3^\circ, \dots, \cos 45^\circ \dots \cos 90^\circ, \cos 179^\circ$$

$$= 0 \quad [\cos 90^\circ = 0]$$

78. If α be the common root, then

$$\alpha^2 + a\alpha + b = 0 \quad \dots(i)$$

$$\alpha^2 + b\alpha + a = 0 \quad (ii)$$

Subtract equation (i) and (ii),

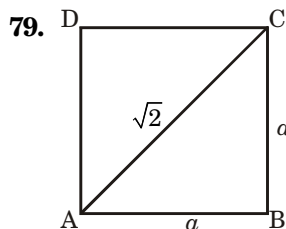
$$\alpha(a-b) = (a-b)$$

$$\therefore \alpha = 1$$

Put the value of α in equation (i), we get

$$1 + a \cdot 1 + b = 0$$

$$\therefore a + b = -1$$



In the given figure, ABCD is a square having side 'a'.

Now total distance travelled by person walking along side = $2a$

In a person walked diagonally then total distance travelled

$$\begin{aligned} AC &= \sqrt{BC^2 + AB^2} \\ &= \sqrt{2}a \end{aligned}$$

Now the percentage saved by a person not walking along the edge

$$\begin{aligned} &= \left(\frac{2a - \sqrt{2}a}{2a} \times 100 \right) \% \\ &= \left(\frac{2 - 1.414}{2} \times 100 \right) \% \\ &= 30\% \text{ (approx)} \end{aligned}$$

80. According to question,

$$\begin{aligned} 9 \times t_9 &= 15 \times t_{15} \\ 9 \times (a + 8d) &= 15(a + 14d) \\ [t_n &= a + (n - 1)d] \\ a &= -23d \quad \dots(i) \end{aligned}$$

Now $t_{24} = a + 23d$

$$= 0 \quad \text{(from (i))}$$

81. If $x, 2y, 3z$ are in arithmetic progression then

$$\begin{aligned} 2y - x &= 32 - 2y \\ 4y &= x + 32 \quad \dots(i) \end{aligned}$$

Now if x, y, z are in geometric progression, then

$$\begin{aligned} \frac{y}{x} &= \frac{z}{y} \\ y^2 &= xz \quad \dots(ii) \end{aligned}$$

From equation (i)

$$\begin{aligned} 16y^2 &= (x + 32)^2 \\ 16xz &= (x + 32)^2 \\ x^2 - 10xz + 9z^2 &= 0 \\ (x - z)(x - 9z) &= 0 \\ x = z &\text{ is not possible} \\ x - 9z &= 0 \\ \therefore x &= 9z \end{aligned}$$

From equation (ii)

$$y^2 = \frac{x^2}{9}$$

$$\therefore \frac{y}{x} = \frac{1}{3}$$

So common ratio of the geometric progression is $\frac{1}{3}$.

82. Let $A = \{a, c, e\}$
 $B = \{a, b, c, d, e, f\}$

Now $(A \cup B) = \{a, b, c, d, e, f\}$

So the minimum number of elements in $(A \cup B)$ is 6.

83. Now of ways containing 3 black, 5 red and 4 blue balls = $3!$

The probability containing 3 black balls

$$= \frac{3}{12}$$

The probability containing 5 red balls = $\frac{5}{11}$

The probability containing 4 blue balls

$$= \frac{4}{10}$$

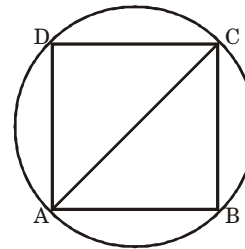
Now the probability that the balls drawn contain balls of different colors

$$\begin{aligned} &= 3! \times \frac{3}{12} \times \frac{5}{11} \times \frac{4}{10} \\ &= 6 \times \frac{3}{12} \times \frac{5}{11} \times \frac{4}{10} \\ &= \frac{3}{11} \end{aligned}$$

84. The smallest number which when increased by 17 is

$$\begin{aligned} &= \text{LCM of } 520 \text{ and } 468 - 17 \\ &= 4680 - 17 = 4663 \end{aligned}$$

85.



In the given figure, a square ABCD is inscribed inside a circle of radius 6 cm.

$$r = 6 \text{ cm}$$

$$\therefore AC = 12 \text{ cm}$$

If a be the side of a square ABCD then

$$AC = \sqrt{2} a$$

$$\therefore a = 6\sqrt{2} \text{ cm}$$

Now area of a square

$$= (6\sqrt{2})^2 = 72 \text{ cm}^2$$

86. According to question,

$$s_p = s_q$$

$$\frac{p}{2}[2a + (p-1)d] = \frac{p}{2}[2a + (q-1)d]$$

$$2a + d(p+q-1) = 0 \quad \dots(i)$$

Now sum for $(p+9)$ terms is

$$s_{p+q} = \frac{p+q}{2}[2a + (p+q+1)d]$$

$$= 0 \quad (\text{from equation (i)})$$

87.

$${}^{12}P_r = {}^{11}P_6 + 6{}^{11}P_5$$

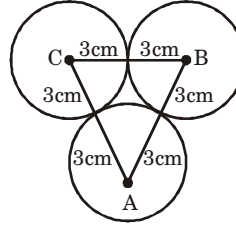
$$\frac{12!}{12-r!} = \frac{11!}{5!} + 6 \frac{11!}{6!}$$

$$\frac{12!}{12-r!} = 2 \frac{11!}{5!}$$

$$12-r = 6$$

$$\therefore r = 6$$

89.



In the given figure three circles with centres A, B and C touch each other.

Now if three centres are joined to each other, then equilateral triangle ABC is formed.

Now Area of the shaded portion

$$= \text{Area of equilateral triangle} \\ - \text{Area of three sectors A, B \& C.}$$

$$= \frac{\sqrt{3}}{4} \times (6)^2 - 3 \times \frac{\pi(3)^2 \times 60^\circ}{360^\circ}$$

$$\left(\text{Area of a sector A} = \frac{\pi r^2 \theta}{360^\circ} \right)$$

$$= 9\sqrt{3} - \frac{9\pi}{2} \text{ cm}^2 = \frac{9}{2}(2\sqrt{3} - \pi) \text{ cm}^2$$

90. Total number of ways that a person can travel from P to Q and return

$$= 2 \times \frac{n(n-1)}{2}$$

$$= 25 \times 24 = 600$$

■ ■

NTSE - 2014

ODISHA

PART I : MENTAL ABILITY TEST

1. If 'ka bi pu ya' means 'you are very industrious', 'ya lo ka wo' means 'they seem very industrious', 'la pu le' means 'you can see', 'sun pun yun ya' means 'how industrious she is', then which word could mean "industrious"?

(a) ka (b) wo
(c) ya (d) pun

2. If "mink yang pe" means "fruits are ripe", "pe lao may mink" means "oranges are not ripe", "may pe nue mink" means "mangoes are not ripe", then which word could mean "mangoes"?

(a) may (b) pe
(c) nue (d) mink

3. If "platideer" means "yellow hat", "leptodeer" means "yellow stick", "leptocat" means "woodstick", then which word could mean "yellow wood"?

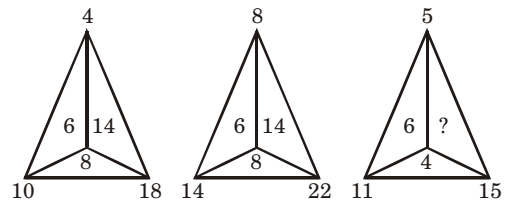
(a) leptocat (b) catdeer
(c) leptodeer (d) platicat

Directions(Q. 4–6) : Fill in the blanks from the alternatives looking at both the letter and number patterns.

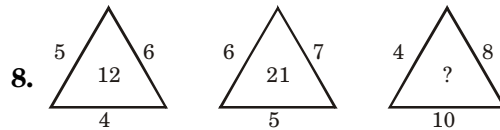
4. $ZA_5, Y_4B, XC_6, W_3D, \underline{\hspace{1cm}}$
(a) E_7V (b) V_2E
(c) VE_5 (d) VE_7
5. $P_5QR, P_4QS, P_3QT, \underline{\hspace{1cm}}, P_1QV$
(a) PQW (b) PQV_2
(c) P_2QU (d) PQ_3U
6. $DEF, DEF_2, DE_2F_2, \underline{\hspace{1cm}}, D_2E_2F_3$
(a) DEF_3 (b) D_3EF_3
(c) D_2E_3F (d) $D_2E_2F_2$

Directions(Q.7–9): Choose the correct alternative which will replace the question mark?

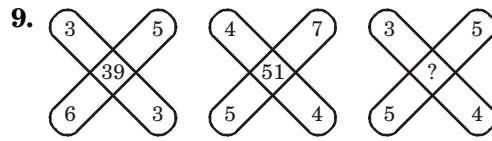
7.



(a) 10 (b) 14
(c) 8 (d) 6



8. (a) 14 (b) 22
(c) 320 (d) 32



9. (a) 37 (b) 45
(c) 47 (d) 35

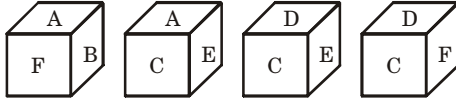
Directions(Q.10–12): The questions are based on the following information: The opposite faces of a big cube are colored with red, black and green. After that it is cut into 64 small equal cubes.

10. How many small cubes are there where one face is green and other one is either black or red?
(a) 28 (b) 16
(c) 8 (d) 24
11. How many small cubes are there which have no coloured faces?
(a) 0 (b) 4
(c) 8 (d) 16

12. How many small cubes are there whose 3 faces are coloured ?

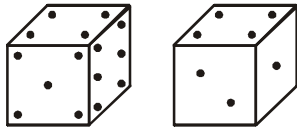
(a) 4 (b) 8
(c) 16 (d) 24

13. From the four positions of a cube shown below, which letter will be on the face opposite to face with 'A' ?



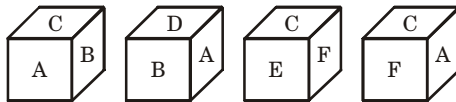
(a) D (b) B
(c) C (d) F

14. Two positions of a die are shown. If there are two dots in the bottom, then how many dots will be on the opposite top ?



(a) 2 (b) 3
(c) 6 (d) 5

15. Four positions of a cube are shown below. Which letter will be opposite to 'F' ?



(a) C (b) D
(c) B (d) E

- Directions (Q.16–17):** A is the son of B. C, B's sister has a son D and a daughter E. F is the maternal uncle of D.

16. How is A related to D ?

(a) Nephew
(b) Cousin
(c) Uncle
(d) Brother

17. How many nephews does F have ?

(a) Nil (b) Three
(c) Two (d) One

- Directions(Q.18–19) :** The sum of the income of M and N is more than that of P and Q taken together. The sum of the income of M and P is the same as that of N and Q taken together. M earns half as much as the sum of the income of N and Q.

18. Which of the following statement is not correct ?

(a) N earns more than P
(b) N earns more than Q
(c) P earns more than Q
(d) M earns more than N

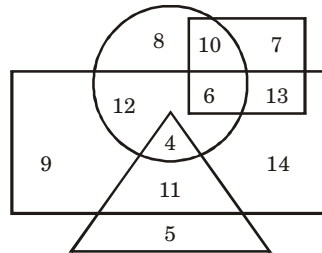
19. Whose income is the highest ?

(a) M (b) P
(c) N (d) Q

20. If 1000 cats kill 1000 mice in 1000 days, then in how many days 10 cats would kill 10 mice ?

(a) 1000 (b) 100
(c) 10 (d) 1

- Directions(Q.21–22):** In the following diagram rectangle represents men, triangle represents educated, circle represents urban and square represents government employees.



21. Which one of the following represents the educated men but not urban ?

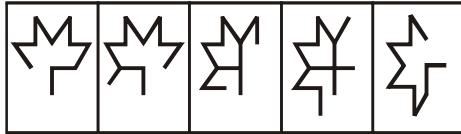
(a) 9 (b) 5
(c) 4 (d) 11

22. Which one of the following represents a woman who is urban as well as government employee ?

(a) 7 (b) 13
(c) 10 (d) 6

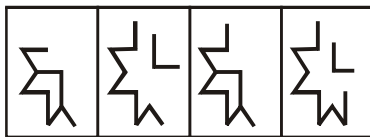
Directions (Q.23-26): Select a figure from amongst the answer figures which will continue the same series established by the five problem figures.

23. Problem Figures



(a) (b) (c) (d) (e)

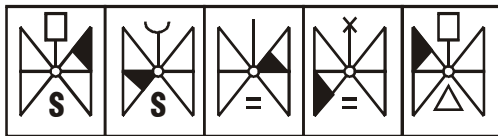
Answer Figures



(1) (2) (3) (4)

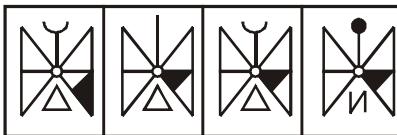
(a) 1 (b) 2
(c) 3 (d) 4

24. Problem Figures



(a) (b) (c) (d) (e)

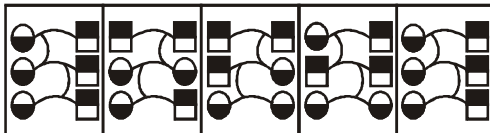
Answer Figures



(1) (2) (3) (4)

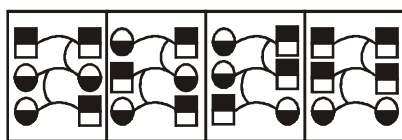
(a) 1 (b) 2
(c) 3 (d) 4

25. Problem Figures



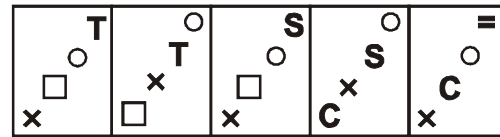
(a) (b) (c) (d) (e)

Answer Figures



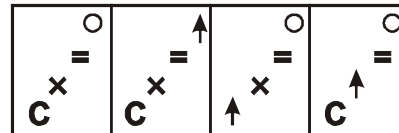
(a) 1 (b) 2
(c) 3 (d) 4

26. Problem Figures



(a) (b) (c) (d) (e)

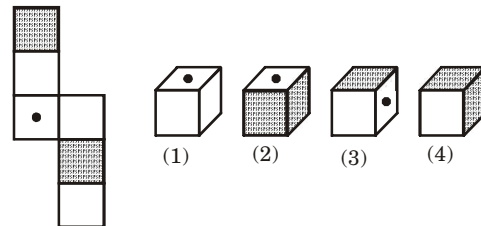
Answer Figures



(1) (2) (3) (4)

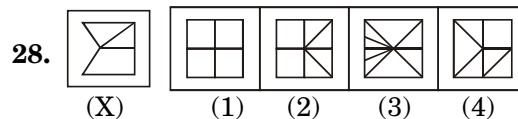
(a) 1 (b) 2
(c) 3 (d) 4

27. The left hand side figure is folded to form a box. Choose from the boxes (1), (2), (3), and (4) that are similar to the box formed



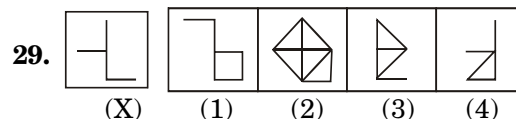
(a) (2) and (3) only
(b) (1), (3) and (4) only
(c) (2) and (4) only
(d) (1) and (4) only

Directions (Q.28-30): Find out the alternative figure from 1, 2, 3 and 4 which contains figure (X) as its part.



(X) (1) (2) (3) (4)

(a) 1 (b) 2
(c) 3 (d) 4



(X) (1) (2) (3) (4)

(a) 1 (b) 3
(c) 4 (d) 2

30.  (X)  (1)  (2)  (3)  (4)
- (a) 1 (b) 4
(c) 3 (d) 2

Directions (Q.31–33): Choose the correct mirror image of the given figure (X) from amongst the four alternatives..

31.  (X)  (1)  (2)  (3)  (4)
- (a) 1 (b) 2
(c) 3 (d) 4

32.  (X)  (1)  (2)  (3)  (4)
- (a) 1 (b) 2
(c) 3 (d) 4

33.  (X)  (1)  (2)  (3)  (4)
- (a) 1 (b) 2
(c) 3 (d) 4

34. If $P + Q = R + S$ and $P + S > Q + R$, then which one of the following is definitely wrong?

- (a) $Q > S$ (b) $P > Q$
(c) $P > R$ (d) $R > S$

35. Which of the following numbers is completely divisible by $(2^{32} + 1)$?

- (a) $(2^{16} + 1)$
(b) $(2^{16} - 1)$
(c) (7×2^{23})
(d) $(2^{96} + 1)$

36. what will be remainder when $(67^{67} + 67)$ is divided by 68 ?

- (a) 1 (b) 63
(c) 66 (d) 67

37. If $A \$ B$ means A is the brother of B ;
 $A @ B$ means A is the wife of B; $A \# B$ means A is the daughter of B and $A * B$ means A is the father of B, which of the following indicates that U is the father-in-law of P ?

- (a) $P @ Q \$ T \# U * W$
(b) $P @ W \$ Q * T \# U$
(c) $P @ Q \$ W * T \# U$
(d) $P @ Q \$ T \# W * U$

38. 1. A3P means A is the mother of P
2. A4P means A is the brother of P
3. A9P means A is the husband of P
4. A5P means A is the daughter of P
Which of the following means that K is the mother-in-law of M ?

- (a) M9N3K4J (b) M9N5K3J
(c) K5J9M3N (d) K3J9N4M

Directions (Q.39–41) : A, B, C, D, E and F are six students in a class.

B and C are shorter than F but heavier than A

D is heavier than B and taller than C

E is shorter than D but taller than F

F is heavier than D

A is shorter than E but taller than F.

39. Who is the tallest ?

- (a) A (b) B
(c) D (d) E

40. Who is the lightest ?

- (a) Data Inadequate (b) A
(c) B (d) C or D

41. Who is third from the top when they are arranged in descending order of heights?

- (a) B (b) C
(c) E (d) A

Directions (Q.42–44) : In questions three of the alternatives share a common similarity while one is different. Choose the odd one out.

42. (a) HSRI (b) MVUN
(c) OLKP (d) PJQX

43. (a) YDWB (b) TKRI
(c) QNOM (d) HLF
44. (a) BdEg (b) KmNp
(c) PrSu (d) TwXz

Directions (Q.45–47) : Which figure from the alternatives completes the pattern 'M' when put in the '?' marked space

45.  (1)  (2)  (3)  (4) 
- M (1) (2) (3) (4)
- (a) 1 (b) 2
(c) 3 (d) 4

46.  (1)  (2)  (3)  (4) 
- M (1) (2) (3) (4)
- (a) 1 (b) 2
(c) 3 (d) 4

47.  (1)  (2)  (3)  (4) 
- M (1) (2) (3) (4)
- (a) 1 (b) 2
(c) 3 (d) 4

Directions (Q.48–50) : Choose the alternative which most closely resembles the water image of the given combination.

48. NUCLEAR
(a) БУЕГCUN (b) ИИСТЕАВ
(c) ИИСТЕАВ (d) ИИСТЕАВ
49. D6Z7F4
(a) D0Z1E4 (b) D0Z1E4
(c) D0Z1E4 (d) D0Z1E4
50. FAMILY
(a) FAMILY (b) FAMILY
(c) FAMILY (d) FAMILY

PART II : ENGLISH

Directions (Q.1–5): Read the following passage carefully and answer the questions that follow it.

Gandhiji recognized that, while all men and woman should have equal opportunity, all did not have the same capacity. Some had the ability to earn more than others. But he believed that those who had talent, would be performing the work of society if they used their talent wisely and well. Gandhiji said that he would allow a man of intellect to earn more and not suppress his talent. But it was his view that the bulk of his larger earnings should go to the common fund. Those with talent and opportunity would find their fulfilment as trustees. Gandhiji extended this concept of trusteeship to cover all fields of life.

- Gandhiji believed in finding people's fulfilment as trustees when they have
 - equality of economic status for all
 - equal opportunity and talent
 - political equality
 - equal capacity for earning more
- Gandhiji's concept of trusteeship is
 - a good proposal
 - applicable to social life only
 - applicable to all fields of life
 - an example of successful performance
- According to Gandhiji, one can serve the society
 - if one is talented
 - if one earned well
 - if one used his talent wisely
 - if one worked honestly
- The title of the passage should be
 - Gandhiji's views on equality
 - Gandhiji's character
 - Gandhiji's services
 - Gandhiji's attitude

5. The meaning of "trustee" is a
- (a) state official who executes wills and trusts
 - (b) person who has to hold his property in a trust
 - (c) person having confidence
 - (d) number of trusts

Directions (Q.6–10): Read the following passage carefully and answer the questions that follow it.

Twenty five years ago it was a slum, and it is a slum today. The lanes are muddy; the huts tilted and bent. Outside one wretched hut, a woman crouching in the sun picks lice from a child's tangled hair. But in a rutted field nearby where pigs run and grunt, there is a small, two-room school house. Its walls are made of tarred bamboo matting and its gutters are shaped out of soyabean oil tins, but from within comes the low, cheerful murmur of children at their lessons.

Into this Calcutta slum, walked a woman in a white saree. She had no income, no savings, no property, only five rupees and an inspired calling to help the poorest of India's poor. She knocked on cottage doors, she put sturdy arms around ragged, bare footed children, she washed them and under a tree in the open field, she taught them. Today, Mother Teresa—the woman in the white saree is among the best known women in India.

6. The place is described as a slum, because of –
- (a) rutted field nearby
 - (b) unhygienic conditions
 - (c) tarred walls
 - (d) muddy lanes
7. The children inside the slum are
- (a) picking lice from each other's hair
 - (b) doing their lessons
 - (c) waiting for their friends
 - (d) creating unpleasant noise

8. Which one of the following suggests hope in hopelessness?
- (a) a school in that surrounding
 - (b) a woman crouching in the sun
 - (c) a rutted field nearby
 - (d) one wretched hut.
9. What changed the observant woman in the white saree into the best known woman in India ?
- (a) the sufferings of the poorest of the poor
 - (b) the lack of care for children
 - (c) the call of love to help
 - (d) her own whim
10. Mother Teresa is the most respected woman of the world because
- (a) she has received many National and International awards
 - (b) she served the destitute in spite of the depressing state of affairs
 - (c) she wore a white saree
 - (d) she believed in hard work

Directions (Q.11–15): Read the following passage and answer the questions that follow it.

The achievement of science in the twentieth century has been very great. Its influence can be felt in every sphere of life. From the small pins and needles to the huge iron sheets and joints, most of the things we require for our everyday use, come out of factories where scientific principles are utilized for practical ends. Science has enabled man to bring forces of nature under control and to use them for his own advantage. It has brought the distant parts of the world closer together. Our knowledge of the universe has been much widened on account of the untiring efforts of the astronomers like Jeans and Eddington. Remarkable cures of human diseases have been possible owing to the discovery of some wonderful medicines.

11. The main idea of the passage is
 (a) science is an anathema
 (b) the impact of science can be felt in every sphere of life
 (c) nothing is beyond the purview of science
 (d) science can work miracles
12. The mode of approach of the author is
 (a) descriptive (b) anatomical
 (c) logical (d) expository
13. What has enabled man to harness the process of nature to the advantage of mankind?
 (a) arts (b) science
 (c) bravery (d) oratory
14. Science has proved a great boon for
 (a) scientists (b) artists
 (c) explorers (d) mankind
15. The most appropriate title for the passage will be—
 (a) science a great boon for mankind
 (b) science is a curse
 (c) advancement of scientific research
 (d) none of the above

Directions (Q.16–17) : *The following five sentences come from a paragraph. The first and the last sentences are given. Choose the order in which the three sentences (P, Q and R) should appear to complete the paragraph :*

16. S1 – Most of us have become slaves of machines today
 S2 – _____
 S3 – _____
 S4 – _____
 S5 – If not properly addressed this problem can make man lose his identity
 P – machines play an ever-increasing role in our lives
 Q – they should however be servants, not masters
 R – Charlie Chaplin drew attention to this danger in his film 'Modern Times'

Choose from the options given below

- (a) PRQ (b) PQR
 (c) QPR (d) QRP

17. S1 – One cannot go through life without sorrow

S2 – _____

S3 – _____

S4 – _____

S5 – Many people become distressed and torment themselves about the mystery of existence

P – Our existence is so complex that sorrow and suffering is a must

Q – There can be no sunshine without a shade

R – We must not complain that roses have thorns

Choose from the options given below

- (a) PQR (b) PRQ
 (c) RPQ (d) QPR

Directions (Q.18–19): *The following questions have the second sentence missing. Choose the appropriate sentence from the given options to complete it*

18. 1 – It was clear like day light that he no longer loved me

2 – _____

3 – For I had all along, considered him my guardian Angel

Choose from the options given below

- (a) He was so nice to me always
 (b) What a fool I had been !
 (c) He gave me choicest of gifts
 (d) He was always sugar and honey.

19. 1 – Law, to be operational, must be acceptable

2 – _____

3 – However, as someone has said, commonsense is not so common

- (a) People often break more laws than obey them
 (b) Laws, like rules, can be many
 (c) A good law is often based on strong commonsense
 (d) there are laws and laws to be followed

Directions(Q.20-29): Choose the word or phrase which best fills the blank from the four options given below

20. They are _____ your support
 (a) counting on (b) expecting
 (c) looking for (d) hoping
21. It is raining hard _____ last night
 (a) throughout (b) from
 (c) across (d) since
22. His car _____ on way to office
 (a) broke in (b) broke
 (c) broke down (d) drifted
23. He dispensed _____ my services
 (a) at (b) with
 (c) upon (d) on
24. She has taken _____ her grandfather
 (a) up (b) after
 (c) with (d) on
25. Please _____ your dress
 (a) put out (b) put in
 (c) put off (d) put on
26. He is _____ in this city for ten years
 (a) living (b) stopping
 (c) staying (d) boarding
27. She is certainly not one can rely _____
 (a) with (b) upon
 (c) at (d) in
28. Will you please _____ the grass
 (a) keep (b) keep off
 (c) keep on (d) keep out
29. Please _____ a claim for damages
 (a) prepare (b) put with
 (c) put in (d) put about

Directions(Q.30-35): Select the meaning of the given phrases / idioms

30. Look up
 (a) move (b) consult
 (c) ascertain (d) get

31. Hold on
 (a) find out (b) step down
 (c) locate (d) cling to
32. Keep up
 (a) maintain (b) catch
 (c) run after (d) hold
33. Put out
 (a) throw away (b) fling out
 (c) extinguish (d) show off
34. Fall back upon
 (a) oppose (b) depend upon
 (c) catch up (d) fall down
35. Set in
 (a) reach (b) pause
 (c) stay (d) begin

Directions(Q.36-40): In the following passage there are some numbered blanks. Fill in the blanks by selecting the most appropriate tense of the verb for each blank from the given options.

When the esteemed Greek Philosopher, Eudemos (36) _____ seriously ill with a fever, the most famous Physician of Rome (37) _____ every remedy but to no avail. Death (38) _____ knocking at his door when Eudemos (39) _____ in Galen, a young Greek Physician who (40) _____ recently arrived in the city.

36. (a) was becoming
 (b) became
 (c) had become
 (d) was to become
37. (a) did try (b) was trying
 (c) tried (d) had tried
38. (a) were (b) being
 (c) was (d) is
39. (a) called
 (b) had called
 (c) did call
 (d) was calling
40. (a) did (b) was
 (c) had (d) had been

PART III : SCHOLASTIC APTITUDE TEST

1. A person is excreting about 10 litres of urine per day. Which of the following endocrine gland is responsible for this ?
 (a) Pituitary
 (b) Thyroid
 (c) Parathyroid
 (d) Adrenal
2. Which one of the following does not enter into the Calvin cycle ?
 (a) Carbon Dioxide (b) Enzyme
 (c) ATP (d) NADP
3. Which one of the following is not applicable to vein ?
 (a) Movement of blood is slow
 (b) Thin walled
 (c) Valves present
 (d) Transport deoxygenated blood
4. Detoxification of drugs and toxic substances occur in :
 (a) Lysosome
 (b) Ribosome
 (c) Golgibody
 (d) Endoplasmic reticulum
5. An animal with a soft body has a hard cover for its protection. Name the phylum to which it belongs
 (a) Echinodermata (b) Arthropoda
 (c) Mollusca (d) Annelida
6. A person is unable to swallow food. Which part of the brain is responsible for this ?
 (a) Cerebral hemisphere
 (b) Diencephalon
 (c) Midbrain
 (d) Hindbrain
7. Which one of the following organisms secretes enzymes from its body to simplify the complex food for ingestion ?
 (a) Round worm (b) Mushroom
 (c) Head louse (d) Loranthus
8. Which of the following are the components of Phloem tissue ?
 (a) Tracheid and Companion cell
 (b) Vessel and Sieve tube
 (c) Companion cell and Sieve tube
 (d) Vessel and Companion cell
9. Taking their number into account, select the correct pair
 (a) Ureter and Urinary bladder
 (b) Kidney and Urinary bladder
 (c) Urethra and Urinary bladder
 (d) Urethra and Kidney
10. Pick up the in correct pairing
 (a) Mouth cavity – Carbohydrate digestion
 (b) Small intestine – Fat digestion
 (c) Pancreas – Fat digestion
 (d) Liver– protein digestion
11. In which of the following pair, Uric acid is present in the excreta ?
 (a) Bird – Shark
 (b) Frog – Lizard
 (c) Man – Insect
 (d) Insect – Shark
12. Which one of the following pair is not a factor for respiration ?
 (a) Water and Oxygen
 (b) Food and Concentration of Carbon dioxide
 (c) Oxygen and Concentration of Carbon dioxide
 (d) Temperature and Food
13. A ball is dropped from the top of a tower of height 100 m. Simultaneously, another ball was thrown upward from the bottom of the tower with a speed of 50 m/s. ($g=10\text{m/s}^2$). These two balls would cross each other after a time ;
 (a) 1 second (b) 2 seconds
 (c) 3 seconds (d) 4 seconds

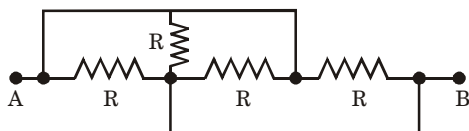
14. A body of mass 10 kg slides down an inclined plane from rest. Its height from the ground level is 10 m. The inclined plane is not smooth. When the body reaches the ground its speed is 14m/s. Then how much work is done against friction ? ($g = 10\text{m/s}^2$)

(a) 980 J (b) 1000 J
(c) 20 J (d) 100 J

15. A hollow spherical object weighs 25 gm in air. Its material density is 5 gm/c.c. If it weighs 15 gm in water, find the volume of the hollow space in it.

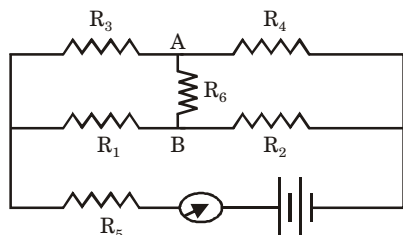
(a) 5c.c (b) 10c.c
(c) 15c.c (d) 20c.c

16. Four resistances each of value R in ohms are connected as shown in the figure below. What would be the net resistance between A and B ?



(a) $4R/3$ (b) $R/4$
(c) $R/2$ (d) $3R/2$

17. Six resistances are to be connected to a battery. After connecting a particular set of five resistances with values R_1, R_2, R_3, R_4 and R_5 as shown in the figure, the sixth one R_6 was to be connected between A and B. It was observed that the current in the circuit is independent of the value of R_6 . Then what should have been the relations between these resistances.



(a) $R_1 R_2 R_3 = R_4 R_5 R_6$
(b) $\frac{1}{R_5} + \frac{1}{R_6} = \frac{1}{R_1 + R_2} + \frac{1}{R_3 + R_4}$
(c) $R_1 R_4 = R_2 R_3$
(d) $R_1 R_3 = R_2 R_4 = R_5 R_6$

18. Resistance of a platinum wire is 2Ω at 0°C and 2.5Ω at 100°C . Then at what temperature its resistance would be 2.3Ω ?

(a) 60°C (b) 30°C
(c) 50°C (d) 45°C

19. A heater coil is cut in to two equal parts and only one part is now used in the heater instead of the original one. Heat generated by one half of the coil would be how much in comparison to that of the full length coil ?

(a) 4 times (b) 2 times
(c) Half (d) $\frac{1}{4}$ th

20. A current of 'i' ampere flows along an infinitely long straight thin walled tube of radius r. Then the magnetic induction at any point inside the tube is;

(a) $\frac{\mu_0}{4\pi} \frac{2i}{r}$ tesla (b) zero
(c) $\frac{\mu_0}{4\pi} \frac{i}{r}$ tesla (d) $\frac{\mu_0}{4\pi} \frac{4i}{r}$ tesla

21. A convex spherical mirror is considered as a suitable rear view mirror for automobiles because

(a) it always produces virtual, erect and diminished images
(b) it always produces real, erect and magnified images
(c) it always produces real, inverted and diminished images
(d) it always produces virtual, inverted and magnified images

22. The image of a candle formed by a convex lens is found to be real and inverted. What change would be found in the nature of this image if the lower half of the lens is covered by black paper ?

(a) Only the upper half of the candle will be found in the image
(b) There would be no change in the image of any kind

- (c) The image would now be real and erect at the same location
 (d) The image would now be real and inverted at the same location but its intensity would be reduced to half.
- 23.** The refractive index of glass with respect to air is 1.53 and that of water with respect to air is 1.33. Then a convex lens whose focal length in air is 20cm, when fully immersed in water would have the focal length.
 (a) 20 cm (b) 3.9 cm
 (c) 70.49 cm (d) 7.8 cm
- 24.** A charged particle is moving in a circular path of radius R in a region of constant magnetic field B perpendicular to the plane of the circle. The magnitude of B is suddenly changed to $(B + \Delta B)$. Then what changes in the motion of the charged particle will be noticed ?
 (a) Radius of the circular path remains unchanged but the frequency changes
 (b) Radius of the circular path changes but the frequency remains unchanged
 (c) Both frequency and radius of the circular path would change
 (d) Both frequency and radius of the circular path remain unchanged.
- 25.** Pick up the odd one out
 (a) Air
 (b) Brass
 (c) A crystal of green vitriol
 (d) Gun powder
- 26.** P^H of $10^{-6}N$ KOH solution is :
 (a) 6 (b) 0.6
 (c) 8 (d) 0.8
- 27.** An example of the condensation method for the preparation of a colloid is :
 (a) Hydrolysis
 (b) Mechanical disintegration
 (c) Electrical dispersion
 (d) Peptization
- 28.** The 'd' block elements in the Periodic Table form alloys among themselves because
 (a) their atomic sizes are nearly the same
 (b) they have unpaired electrons
 (c) their ionization potentials are similar
 (d) they are all metals
- 29.** In alkaline medium H_2O_2 reacts with Fe^{3+} and Mn^{2+} separately to give
 (a) Fe^{3+} and Mn^{4+}
 (b) Fe^{2+} and Mn^{2+}
 (c) Fe^{2+} and Mn^{4+}
 (d) Fe^{3+} and Mn^{2+}
- 30.** Acetic acid may be prepared by the:
 (a) Reduction of acetone
 (b) Oxidation of ethanol
 (c) Destructive distillation of soft coal
 (d) Polymerization of ethylene
- 31.** Which of the following statements is false about a soap ?
 (a) the soap solution in water is neutral and can be used to wash all kinds of fabrics
 (b) Soap forms lather only in soft water
 (c) Soap is a metallic salt of higher fatty acids
 (d) Soap cannot be used in slightly acidic medium
- 32.** Identify the final product Z in the series of chemical reactions.

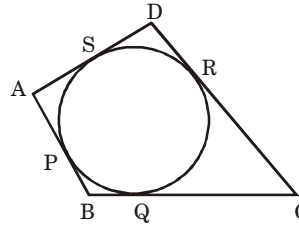
$$CH_3CN \xrightarrow{Na/C_2H_5OH} X \xrightarrow{HNO_2} Y \xrightarrow{Cu/573K} Z$$

 (a) CH_3COOH
 (b) CH_3CH_2NHOH
 (c) CH_3CONH_2
 (d) CH_3CHO
- 33.** One of the constituents in Portland Cement is Iron Oxide (Fe_2O_3). Its function is :
 (a) to impart soundness to cement when present in small amount
 (b) to make the cement high quality
 (c) to impart characteristic grey colour strength and hardness to the cement
 (d) to increase the strength and reduce the setting time

34. Which of the following is not a suspension?
 (a) Aluminium paint
 (b) Dust storm
 (c) Muddy water
 (d) Milk
35. The number and type of bonds between carbon atoms in CaC_2 are
 (a) One sigma (σ) and one pi (π) bond
 (b) One sigma (σ) and two pi (π) bonds
 (c) One sigma (σ) and one half pi (π) bond
 (d) Two sigma (σ) bonds and one pi (π) bond
36. A copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18m of uniform thickness. The thickness of the wire is
 (a) 0.67 mm
 (b) $\frac{1}{30}$ cm
 (c) 0.5 mm
 (d) 0.7 cm
37. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents of P and Q intersect at a point T. Then the length of TP is
 (a) $10\frac{2}{7}$ cm
 (b) 24.5 cm
 (c) $\frac{20}{3}$ cm
 (d) 12 cm
38. The value of $\sqrt{8+2\sqrt{8+2\sqrt{8+2\sqrt{8+2\sqrt{8}}}}}$ is
 (a) 4
 (b) 6
 (c) 8
 (d) 10
39. The sum of the deviations of a set of n scores $x_1, x_2, \dots, x_n$ measured from 50 is -10 and when measured from 46 is 70. Then the mean is
 (a) 46
 (b) 48
 (c) 49.5
 (d) 50
40. The ascending order of $\sqrt{2}, \sqrt[3]{4}, \sqrt[4]{6}$ is
 (a) $\sqrt{2}, \sqrt[3]{4}, \sqrt[4]{6}$
 (b) $\sqrt{2}, \sqrt[4]{6}, \sqrt[3]{4}$
 (c) $\sqrt[3]{4}, \sqrt{2}, \sqrt[4]{6}$
 (d) $\sqrt[4]{6}, \sqrt[3]{4}, \sqrt{2}$
41. The angle of depression of a Car moving with uniform speed towards the building as observed from the top of the building is found to be 30° . The same angle of depression changes to 60° after 12 seconds. Then at what time it will reach the base
 (a) 6 sec
 (b) 8 sec
 (c) 4 sec
 (d) 12 sec
42. The value of $S = \frac{1}{2 \times 7} + \frac{1}{7 \times 12} + \frac{1}{12 \times 17} + \dots + \frac{1}{252 \times 257}$ is
 (a) $\frac{5}{257}$
 (b) $\frac{25}{2 \times 257}$
 (c) $\frac{35}{2 \times 257}$
 (d) $\frac{51}{2 \times 257}$
43. The lines $x + \sqrt{3}y = 4$ and $\sqrt{3}x + y = 4$ are
 (a) Parallel to each other
 (b) Perpendicular to each other
 (c) identical
 (d) equidistant from the origin
44. The radius of a cylindrical box is 8 cm and the height is 3 cm. The number of cm that may be added to either the radius or the height so that in either case the volume of the cylinder increases by same magnitude is
 (a) 1
 (b) $5\frac{1}{3}$
 (c) $7\frac{1}{2}$
 (d) 24
45. The roots of the equation $lx^2 + nx + n = 0$ are in the ratio $p : q$. Then
 (a) $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{l}} = 0$
 (b) $\sqrt{\frac{p}{q}} - \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{l}} = 0$
 (c) $\sqrt{\frac{p}{q}} - \sqrt{\frac{q}{p}} - \sqrt{\frac{n}{l}} = 0$
 (d) $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{l}} = 4$

46. The straight line $3x + y = 9$ divides the segment joining the points (1, 3) and (2, 7) in the ratio
 (a) 2 : 4 (b) 4 : 2
 (c) 4 : 3 (d) 3 : 4
47. $\sqrt{999 \times 1000 \times 1001 \times 1002 + 1}$ is
 (a) 1001001 (b) 1001999
 (c) 1000999 (d) 1000989
48. Two dice are thrown at the same time. Then the probability of getting the total of at least 8 is
 (a) 0 (b) $\frac{5}{12}$
 (c) $\frac{5}{6}$ (d) $\frac{5}{36}$
49. The value of $\tan 6^\circ \cdot \tan 42^\circ \cdot \tan 66^\circ \cdot \tan 78^\circ$ is
 (a) 0 (b) $\frac{1}{2}$
 (c) 1 (d) -1
50. The value of $\operatorname{cosec} 10^\circ - \sqrt{3} \sec 10^\circ$ is
 (a) 4 (b) 2
 (c) 1 (d) $\frac{1}{4}$
51. A motor cycle and a scooter were sold for ₹ 12000 each. The motor cycle was sold at a loss of 20% of the cost and the scooter at a gain of 20% of the cost. The entire transaction resulted in
 (a) no loss or gain
 (b) loss of ₹ 1000
 (c) gain of ₹ 1000
 (d) gain of ₹ 2000
52. A man invested part of ₹ 4500 at 4% interest and the rest at 6% interest per annum. If his annual return on each investment is the same, then the average rate of interest which he gets on the whole of ₹ 4500 is
 (a) 5% (b) 4.8%
 (c) 5.2% (d) 4.6%

53. A boat whose speed is 18km/hr in still water takes 1 hr more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream
 (a) 8 km/hr (b) 6km/hr
 (c) 10 km/hr (d) 5.5 km/hr
54. In $\triangle ABC$, $\angle A = 2 \angle B$ then $BC^2 = ?$
 (a) AB. AC (b) AB(AB+ AC)
 (c) AC (AB + BC) (d) $AB^2 + AC^2$
55. In the given figure, the incircle touches the sides of the quadrilateral ABCD at the points P, Q, R and S. If $BC = 38\text{cm}$, $CD = 25\text{cm}$ and $BP = 27\text{cm}$ then the radius of the incircle is



- (a) 19 cm (b) 14 cm
 (c) 13 cm (d) 12 cm
56. The old alluvial soil found in the Ganga Valley is called
 (a) Regur (b) Khadar
 (c) Bhangar (d) Loess
57. Which one of the following states of India is the leading producer of paper ?
 (a) Bihar (b) Kerala
 (c) Odisha (d) West Bengal
58. Which mineral is extracted from Monazites ?
 (a) Thorium (b) Lithium
 (c) Uranium (d) Plutonium
59. Which one of the following is a large scale map ?
 (a) Atlas map
 (b) Wall map
 (c) Topographical map
 (d) Cadastral map

60. Which type of forest is found where the rainfall is between 100 and 200 centimeters ?
 (a) Alpine (b) Coniferous
 (c) Evergreen (d) Deciduous
61. What type of rock marble is ?
 (a) Volcanic
 (b) Metamorphic
 (c) Plutonic
 (d) Sedimentary
62. On which river bed the Satakosia gorge is found ?
 (a) Mahanadi (b) Brahmani
 (c) Baitarani (d) Rushikulya
63. What type of agriculture is mostly practised in india ?
 (a) Commercial
 (b) Shifting
 (c) Intensive subsistence
 (d) Plantation
64. Which one of the following crops is different from others according to its type ?
 (a) Groundnut (b) Mustard
 (c) Soyabin (d) Maize
65. Which one of the following is called the 'Ruhr of India' ?
 (a) Kanpur (b) Chhotanagpur
 (c) Ahmedabad (d) Mumbai
66. Where was Ferdinand, the Crown Prince of Austria, murdered ?
 (a) Solferino (b) Vienna
 (c) Sarajevo (d) Berlin
67. What was the name of the revolutionary party formed by Mazzini ?
 (a) Jacobin club
 (b) Girondist club
 (c) Carbonary Organization
 (d) Young Italy
68. Which Organization was formed on 24th October 1945 ?
 (a) NATO
 (b) United Nations Organization
 (c) SEATO
 (d) League of Nations
69. Who had introduced Perestroika and Glasnost ?
 (a) Lenin (b) Stalin
 (c) Gorbachov (d) Yeltsin
70. Who had told 'After me deluge'?
 (a) Louis XIV (b) Louis XV
 (c) Louis XVI (d) Louis XVIII
71. Who was the 1st president of USA ?
 (a) Thomas Jefferson
 (b) Benjamin Franklin
 (c) George Washington
 (d) Abraham Lincon
72. Rabindranath Tagore gave up his Knighthood because of____
 (a) Jallianawalla Bagh Tragedy
 (b) Suppression of Civil Disobedience
 (c) Execution of Bhagat Singh
 (d) Chauri Chaura incident
73. The woman regiment of INA was founded under the leadership of
 (a) Capt. Laxmi
 (b) Anita Bose
 (c) Aruna Asaf Ali
 (d) Rajkumari Amrit Kaur
74. Which of the following acts is known as the 'Black act' ?
 (a) Ilbert bill
 (b) Rowlatt act
 (c) Hunter act
 (d) Act of 1909
75. Which was the first national news agency of India ?
 (a) The Indian Review
 (b) The Free Press of India
 (c) The Hindustan Review
 (d) The Associated Press of India
76. Read the following statements and indicate which one is correct
 (i) India is called a 'Quasi Federal State' because more power has been given to the Union Government.
 (ii) In India the Union and the State Governments enjoy co-equal powers

- (a) (i) is true, (ii) is false
 (b) (i) is false, (ii) is true
 (c) Both (i) and (ii) are true
 (d) Both (i) and (ii) are false
- 77.** India is called Republic because
 (a) it is a democratic country
 (b) its head of the State is elected
 (c) there is Parliamentary Democracy
 (d) there is Universal Adult Franchise
- 78.** Within how many days of its reassembly the Parliament is to approve and Ordinance made by the President ?
 (a) 2 weeks (b) 4 weeks
 (c) 6 weeks (d) 8 weeks
- 79.** Who can remove a member of the State Public Service Commission ?
 (a) President
 (b) Prime Minister
 (c) Governor
 (d) Chief Minister
- 80.** Which of the following Union Territories has a Legislative Assembly ?
 (a) The Andaman and Nicobar Islands
 (b) Lakshadweep
 (c) Dadra and Nagar Haveli
 (d) Pondicherry
- 81.** Who is the Chairperson of the National Development Council ?
 (a) Prime Minister
 (b) Union Finance Minister
 (c) Union Home Minister
 (d) Leader of the Opposition
- 82.** Which of the following words was added to the Preamble in the year 1976 ?
 (a) Sovereign (b) Liberty
 (c) Republic (d) Integrity
- 83.** Which of the following has 'Recall' system ?
 (a) Monarchy
 (b) Direct Democracy
 (c) Dictatorship
 (d) Indirect Democracy
- 84.** Which of the following is not a function of the opposition party ?
 (a) Formation of Public Opinion
 (b) Creation of Political instability
 (c) Making the Government responsible
 (d) Criticising the Government
- 85.** Which one is not a feature of India's Foreign Policy ?
 (a) Peaceful co-existence
 (b) Peaceful Resolution of Conflicts
 (c) Formation of Military Alliance
 (d) Principle of Non-interference
- 86.** Which of the following is not taken into account in the measure of human development as give by UNDP ?
 (a) Per capita income
 (b) Literacy rate
 (c) Life expectancy at birth
 (d) Provision of safe drinking water
- 87.** Which of the following is true of MGNREGA ?
 (a) It is a self employment programme
 (b) It is a State Government programme
 (c) It is a Central Government programme
 (d) It provides employment to a willing worker for 300 days in a year
- 88.** Which of the following banks creates credit ?
 (a) The Central Bank
 (b) Commercial Banks
 (c) Co-operative Banks
 (d) The world Bank
- 89.** Social infrastructure does not include
 (a) railways (b) hospital
 (c) schools (d) cinema halls
- 90.** Which of the following sectors contributes the least to India's national income ?
 (a) Agriculture
 (b) Industry
 (c) Services
 (d) Foreign trade

ANSWERS

MENTAL ABILITY TEST

1. (c) 2. (d) 3. (b) 4. (c) 5. (d) 6. (c) 7. (b) 8. (d) 9. (d) 10. (a)
11. (d) 12. (c) 13. (c) 14. (d) 15. (b) 16. (a) 17. (d) 18. (a) 19. (b) 20. (c)
21. (d) 22. (a) 23. (c) 24. (b) 25. (b) 26. (c,d) 27. (d) 28. (b) 29. (b) 30. (c)
31. (a) 32. (d) 33. (a) 34. (c) 35. (b) 36. (d) 37. (d) 38. (a) 39. (c) 40. (d)
41. (b) 42. (c) 43. (d) 44. (b) 45. (b) 46. (a) 47. (b) 48. (c) 49. (d) 50. (a)

ENGLISH

1. (c) 2. (d) 3. (c) 4. (b) 5. (c) 6. (d) 7. (a) 8. (a) 9. (c) 10. (d)
11. (a) 12. (b) 13. (d) 14. (b) 15. (c) 16. (a) 17. (d) 18. (b) 19. (c) 20. (c)
21. (b) 22. (a) 23. (a) 24. (d) 25. (d) 26. (d) 27. (c,d) 28. (b) 29. (c) 30. (b)
31. (a) 32. (b) 33. (d) 34. (c) 35. (c) 36. (a) 37. (a) 38. (c) 39. (d) 40. (b)

SCHOLASTIC APTITUDE TEST

1. (d) 2. (b) 3. (b) 4. (d) 5. (c) 6. (d) 7. (a) 8. (c) 9. (c) 10. (d)
11. (a) 12. (d) 13. (b) 14. (a) 15. (a) 16. (b) 17. (c) 18. (a) 19. (b) 20. (a)
21. (a) 22. (d) 23. (c) 24. (c) 25. (c) 26. (c) 27. (d) 28. (a) 29. (a) 30. (b)
31. (a) 32. (*) 33. (c) 34. (d) 35. (b) 36. (b) 37. (c) 38. (a) 39. (c) 40. (b)
41. (a) 42. (d) 43. (d) 44. (b) 45. (a) 46. (d) 47. (c) 48. (b) 49. (c) 50. (a)
51. (b) 52. (b) 53. (b) 54. (*) 55. (*) 56. (c) 57. (d) 58. (a) 59. (b) 60. (d)
61. (b) 62. (a) 63. (c) 64. (d) 65. (b) 66. (c) 67. (d) 68. (b) 69. (c) 70. (b)
71. (c) 72. (a) 73. (a) 74. (b) 75. (b) 76. (a) 77. (b) 78. (c) 79. (c) 80. (d)
81. (a) 82. (a) 83. (b) 84. (b) 85. (c) 86. (d) 87. (c) 88. (b) 89. (d) 90. (a)

Note : ‘*’ No option is matching

EXPLANATIONS**MENTAL ABILITY TEST**

1. The code for

you → pu

very → ka

are → bi

industrious → ya

2. The code for

are → pe or mink

ripe → mink or pe

not → may

mangoes → nue

3. The code for

lepto → stick

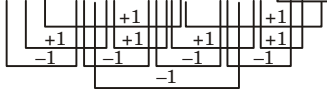
deer → yellow

plati → hat

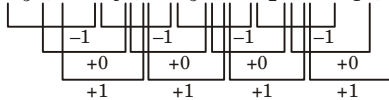
cat → wood

So, for yellowwood the word catdeer will be used.

- 4.
- $ZA_5, Y_4B, XC_6, W_3D, \boxed{VE}_7$



- 5.
- $P_5QR, P_4QS, P_3QT, P_2QU, P_1QV$



6. Answer figure (d) is the next pattern.

7. $10 - 4 = 6, \quad 18 - 10 = 8, \quad 18 - 4 = 14$
 $14 - 8 = 6, \quad 22 - 14 = 8, \quad 22 - 8 = 14$
 $11 - 5 = 6, \quad 15 - 11 = 4, \quad 15 - 5 = \boxed{10}$

- 8.
- $(4 \times 5 \times 6) \div 10 = 12$

$$(5 \times 6 \times 7) \div 10 = 21$$

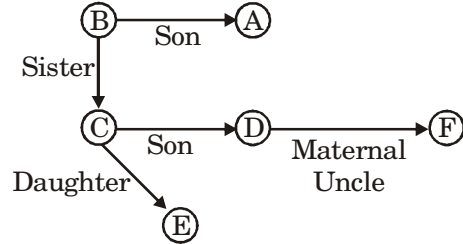
$$(4 \times 8 \times 10) \div 10 = 32$$

- 9.
- $(3 \times 3) + (6 \times 5) = 39$

$$(4 \times 4) + (7 \times 5) = 51$$

$$(5 \times 5) + (4 \times 3) = \boxed{37}$$

- 16-17 :



16. So, from above it is clear that A is the cousin of 'D'.

17. 'F' have two nephews

$$20. \quad \frac{W_1}{N_1 D_1} = \frac{W_2}{N_2 D_2}$$

$$\frac{1000}{1000 \times 1000} = \frac{10}{10 \times D_2}$$

$$\therefore D_2 = \frac{1000 \times 1000}{1000} = 1000 \text{ days}$$

21. In the given diagram, it is clear that '11' represents the educated men but not urban.

22. The number that represents a woman who is urban as well as government employee is '10'.

23. Answer figure (c) will be the next pattern.

28. Answer figure (c) contains figure (X) as its part.

29. The part of the given question figure (X) is the answer figure (2)

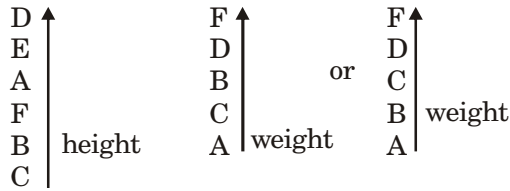
$$35. \quad (2^{96} + 1) = (2^{32})^3 + 1 \\ = (2^{32} + 1)(2^{14} - 2^{32} + 1)$$

So, $(2^{96} + 1)$ is completely divisible by $(2^{32} + 1)$

$$36. \quad \frac{(67^{67} + 1) + 66}{(67 + 1)} = \frac{67^{67} + 1}{67 + 1} + 66 = 0 + 66$$

(If $\frac{a^n + 1}{a + 1}$ then remainder is 0 if n is an odd)
 remainder = 66

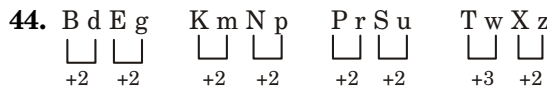
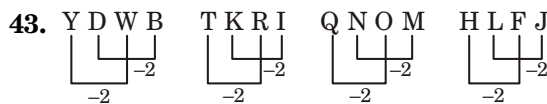
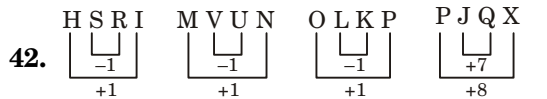
39-41 :



39. So, D is the tallest among all.

40. From the above statement it is not clear that who is the lightest, so data is inadequate.

41. From the given statement it is clear that 'A' is the third from the top when they are arranged in descending order of heights.



48. Answer figure (c) is the water image.

49. From the given question, answer figure (A) is the water image.

50. The water image of the given question is answer figure (B).

SCHOLASTIC APTITUDE TEST36. Let the thickness of the wire be d cm.

According to question,

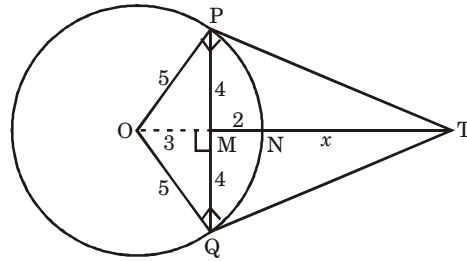
$$\pi(1)^2 \times 8 = \pi(d)^2 \times 18 \times 100$$

$$d^2 = \frac{8}{18 \times 100}$$

$$\therefore d = \frac{2}{30} \text{ cm} = \frac{2}{3} \text{ mm}$$

 $\therefore$ The thickness of the wire = 0.67 mm

37.

In $\triangle PMT$

$$\begin{aligned} PT^2 &= PM^2 + MT^2 \\ &= (4)^2 + (MN + NT)^2 \\ PT^2 &= 16 + (x + 2)^2 \quad \dots(i) \end{aligned}$$

Again in $\triangle POT$

$$\begin{aligned} OT^2 &= PT^2 + OP^2 \\ (ON + NT)^2 &= 16 + (x + 2)^2 + 25 \\ (5 + x)^2 &= 41 + x^2 + 4 + 4x \\ 25 + x^2 + 10x &= 45 + 4x + x^2 \\ 6x &= 20 \end{aligned}$$

$$\therefore x = \frac{10}{3} \text{ cm}$$

$$\begin{aligned} \therefore MT &= NT + MN \\ &= 2 + \frac{10}{3} = \frac{16}{3} \end{aligned}$$

From equation (i), we get

$$\begin{aligned} PT^2 &= 16 + \left(\frac{16}{3}\right)^2 \\ &= 16 + \frac{256}{9} = \frac{400}{9} \text{ cm} \end{aligned}$$

$$\therefore PT = \frac{20}{3} \text{ cm}$$

38. Let $x = \sqrt{8 + 2x}$

Squaring on both sides, we get

$$\begin{aligned} x^2 &= 8 + 2x \\ x^2 - 2x - 8 &= 0 \\ x^2 - 4x + 2x - 8 &= 0 \\ x(x - 4) + 2(x - 4) &= 0 \\ (x + 2)(x - 4) &= 0 \end{aligned}$$

 $\therefore x = 4$ but $x = -2$ is not possible

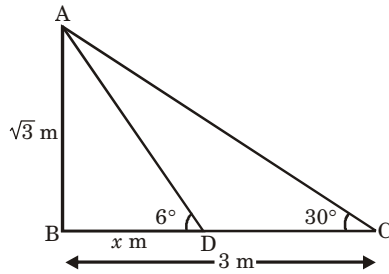
40. Taking the LCM of the given base 2, 3 and 4 = 12

$$\begin{aligned}\text{Now } \sqrt[2]{2} &= \sqrt[12]{2^6} = \sqrt[12]{64} \\ \sqrt[3]{4} &= \sqrt[12]{4^4} = \sqrt[12]{256} \\ \sqrt[4]{6} &= \sqrt[12]{6^3} = \sqrt[12]{216}\end{aligned}$$

Arrange in increasing order

$$\begin{aligned}\sqrt[12]{64} &> \sqrt[12]{216} > \sqrt[12]{256} \\ \sqrt{2} &> \sqrt[4]{6} > \sqrt[3]{4}\end{aligned}$$

41.



In $\triangle ABC$

$$AB = \sqrt{3} \text{ m (say)}$$

$$BC = 3 \text{ m (say)}$$

Again in triangle ABD

$$\tan 60^\circ = \frac{AB}{BD}$$

$$\sqrt{3} = \frac{\sqrt{3}}{BD}$$

$$\therefore BD = 1 \text{ m}$$

$$\text{So } CD = (3 - 1) \text{ m} = 2 \text{ m}$$

Now a car covered a distance 2 m in 12 sec

$$\therefore 1 \text{ m distance covered in } = \frac{12}{2} = 6 \text{ sec}$$

43. Given lines are

$$x + \sqrt{3}y = 4 \quad \dots(i)$$

$$\sqrt{3}x + y = 4 \quad \dots(ii)$$

From option (a), lines are parallel to each other, then

$$m_1 = m_2 \quad (m_1 \text{ \& } m_2 = \text{slope})$$

$$m_1 = -\frac{1}{\sqrt{3}}$$

$$m_2 = -\sqrt{3}$$

so,

$$m_1 \neq m_2$$

From option (b), lines are perpendicular to each other, then

$$m_1 \cdot m_2 = -1$$

$$\Rightarrow 1 \neq -1$$

So, lines are not perpendicular to each other

From option (d), lines are equidistant from the origin, then

$$\begin{aligned}d_1 &= \frac{|C_1|}{\sqrt{a_1^2 + b_1^2}} \\ &= \frac{|4|}{\sqrt{(1)^2 + (\sqrt{3})^2}} = \frac{4}{2} = 2\end{aligned}$$

$$\begin{aligned}d_2 &= \frac{|C_2|}{\sqrt{a_2^2 + b_2^2}} \\ &= \frac{4}{\sqrt{(\sqrt{3})^2 + (1)^2}} = 2\end{aligned}$$

$$\text{So, } d_1 = d_2$$

$\therefore$ the given lines are equidistant from the origin.

44. Let the number that may be added to either the radius or the height be x cm.

According to question

$$\pi(x+8)^2 \times 3 = \pi \times 64(x+3)$$

$$(x^2 + 64 + 16x) \times 3 = 64x + 192$$

$$3x^2 + 192 + 48x = 64x + 192$$

$$3x = 16$$

$$\therefore x = \frac{16}{3} = 5\frac{1}{3}$$

46. Let the point $P(x, y)$ divided the segment joining the points $A(1, 3)$ and $B(2, 7)$ in the ratio $\lambda : 1$.

$$\therefore P(x, y) = \left(\frac{2\lambda + 1}{\lambda + 1}, \frac{7\lambda + 3}{\lambda + 1} \right)$$

$$\therefore 3 \left(\frac{2\lambda + 1}{\lambda + 1} \right) + \left(\frac{7\lambda + 3}{\lambda + 1} \right) - 9 = 0$$

$$6\lambda + 3 + 7\lambda + 3 - 9\lambda - 9 = 0$$

$$\therefore \lambda = 3 : 4$$

48. Here $n(E) = (1,6), (1,5), (1,4), (1,3), (1,2), (1,1)$
 $(2,6), (2,5), (2,4), (2,3), (2,2), (2,1)$
 $(3,6), (3,5), (3,4), (3,3), (3,2), (3,1)$
 $(4,6), (4,5), (4,4), (4,3), (4,2), (4,1)$
 $(5,6), (5,5), (5,4), (5,3), (5,2), (5,1)$
 $(6,6), (6,5), (6,4), (6,3), (6,2), (6,1)$
 $= 15$

$$n(s) = 6 \times 6 = 36$$

Now $P(\text{the total of at least } 8)$

$$= \frac{n(E)}{n(s)}$$

$$= \frac{15}{36} = \frac{5}{12}$$

50. $\operatorname{cosec} 10^\circ - \sqrt{3} \sec 10^\circ$

$$= \frac{1}{\sin 10^\circ} - \frac{\sqrt{3}}{\cos 10^\circ}$$

$$= \frac{\cos 10^\circ - \sqrt{3} \sin 10^\circ}{\sin 10^\circ \cdot \cos 10^\circ}$$

$$= \frac{2 \left(\frac{1}{2} \cdot \cos 10^\circ - \frac{\sqrt{3}}{2} \cdot \sin 10^\circ \right)}{\sin 10^\circ \cdot \cos 10^\circ}$$

$$= \frac{2(\sin 30^\circ \cdot \cos 10^\circ - \cos 30^\circ \cdot \sin 10^\circ)}{\sin 10^\circ \cdot \cos 10^\circ}$$

$$= \frac{2 \sin(30^\circ - 10^\circ)}{\sin 10^\circ \cdot \cos 10^\circ}$$

$$= \frac{2 \times 2 \sin 20^\circ}{2 \sin 10^\circ \cdot \cos 10^\circ}$$

$$= \frac{4 \sin 20^\circ}{\sin 20^\circ} \quad [2 \sin \theta \cdot \cos \theta = \sin 2\theta]$$

$$= 4$$

51. The cost price of motor cycle

$$= \frac{100}{(100 - 20)} \times 12000$$

$$= ₹ \frac{100}{80} \times 12000$$

$$= ₹ 15000$$

Cost price of scooter

$$= \frac{100}{(100 + 20)} \times 12000$$

$$= ₹ \frac{100}{120} \times 12000$$

$$= ₹ 10000$$

Total cost price = ₹ (15000 + 10000)

$$= ₹ 25000$$

Total selling price = ₹ (12000 + 12000)

$$\therefore \text{loss} = ₹ (25000 - 24000)$$

$$= ₹ 1000$$

52. Average rate of interest

$$= \left(\frac{2xy}{x+y} \right) \%$$

$$= \left(\frac{2 \times 4 \times 6}{4+6} \right) \%$$

$$= 4.8\%$$

53. Let the speed of the stream be x km/hr.

According to question

$$\frac{24}{18-x} - \frac{24}{18+x} = 1$$

$$24 \left(\frac{18+x-18+x}{(18)^2 - (x)^2} \right) = 1$$

$$48x = 324 - x^2$$

$$x^2 + 48x - 324 = 0$$

$$x^2 + 54x - 6x - 324 = 0$$

$$x(x+54) - 6(x+54) = 0$$

$$(x-6)(x+54) = 0$$

$\therefore x = 6$ $x = -54$ is not possible

So, the speed of the stream is 6 km/hr.



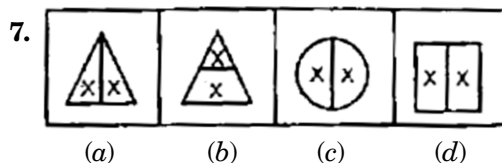
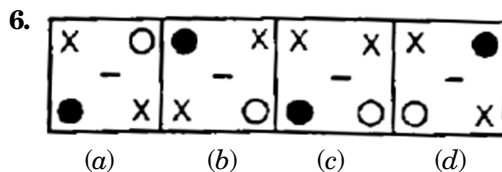
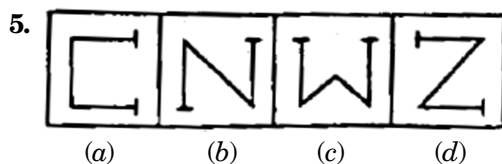
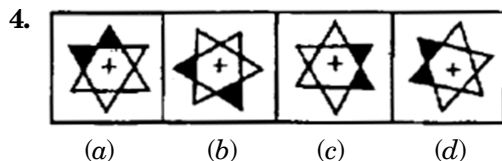
NTSE - 2014

UTTAR PRADESH

PART I : MENTAL ABILITY TEST

Directions (Q. 1 – 7) : Each question has four terms. Three terms are alike in some way. One term is different from three others. Find out the correct terms which is different from three others and write its alternative number on your answer sheet against the proper question number.

1. (a) B-8 (b) J-1000
(c) G-343 (d) K-1333
2. (a) Steel (b) Brass
(c) Mercury (d) Copper
3. (a) DGJM
(b) KOSW
(c) BEHK
(d) ILOR



Directions (Q. 8 – 14) : There are four terms in each question. The terms right to the symbol :: have same relationship as the two terms of the left of symbol :: out of the four terms one term is missing which is shown by (?) and which is one of the four alternatives given below. Find out the correct alternative and write its number against the corresponding question on your answer sheet.

8. Parliament : Great Britain :: Congress : ?

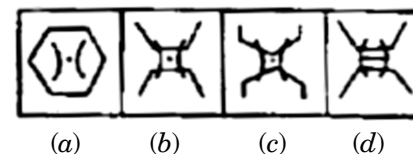
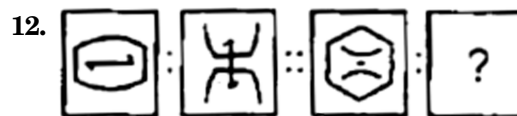
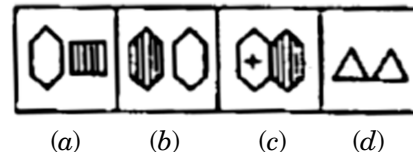
- (a) Canada
(b) Japan
(c) United States of America
(d) South Korea

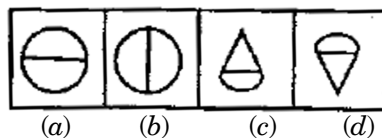
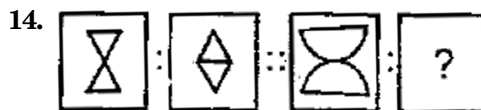
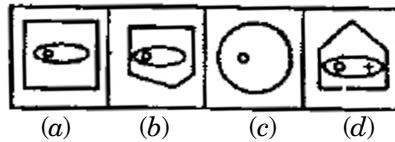
9. 6 : 222 :: 8 : ?

- (a) 520 (b) 596
(c) 496 (d) 529

10. CEJP : FGMR :: FKRU : ?

- (a) HNVX (b) JNXO
(c) JMVY (d) IMUW





Directions (Q. 15 – 17) : Following questions are based on number or letter series. One, two term is missing in each series and indicated by question mark (?) find out the missing term out of the four alternative given below and write its alternative number against the correct question number on your answer sheet.

15. 2, 10, 30, 68, 130, ?

- (a) 240 (b) 196
(c) 222 (d) 226

16. 6, 2, 12, 6, 20, 12, 30, 20, ??

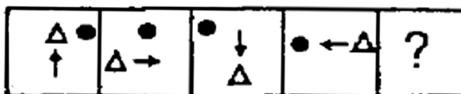
- (a) 49, 36 (b) 42, 30
(c) 36, 42 (d) 48, 54

17. 5, 34, 10, 51, 17, 68, 26, ??

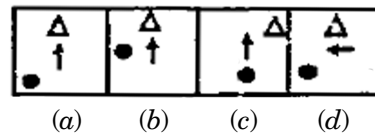
- (a) 102, 39 (b) 76, 35
(c) 85, 37 (d) 35, 86

Directions (Q. 18 – 21) : Problem figures are given at the left hand side consisting four figures in a definite series and the place for fifth figure is vacant which as been shown by question mark (?). Four answer figure are given against each problem figure. Find out the correct answer figure and write its alternatives number against the proper question number on your answer sheet—

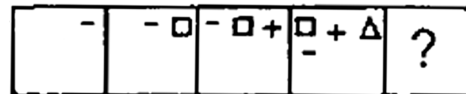
18. Problem Figures



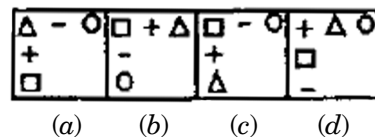
Answer Figures



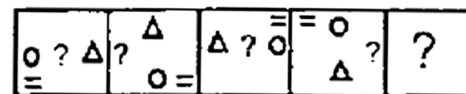
19. Problem Figures



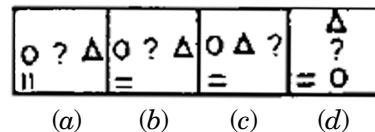
Answer Figures



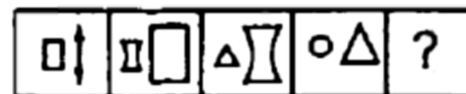
20. Problem Figures



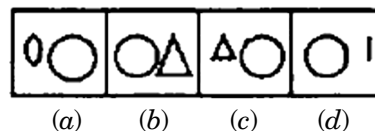
Answer Figures



21. Problem Figures



Answer Figures



Directions (Q. 22 – 28) : The letters in column-I are coded in the form of numbers. Which are written in column-II, but the order of numbers is different. Study the code of letters and find out the correct answer for each question from given four alternative and write its numbers. (alternative numbers) against the proper questions number on your answer sheet.

Column-I

EJP
REL
SOV
PRO
LOS

Column-II

325
143
769
645
176

22. What will be code of OPR—
 (a) 419 (b) 367
 (c) 654 (d) 536
23. What will be code of SLV—
 (a) 719 (b) 576
 (c) 134 (d) 742
24. What will be code of EJL—
 (a) 763 (b) 541
 (c) 179 (d) 321
25. What will be code of RES—
 (a) 176 (b) 437
 (c) 941 (d) 275
26. If in a code language CLPT written as EOTY. In the same code language FJNR will be written as—
 (a) IMPW (b) GLPV
 (c) HMRW (d) GNRX
27. If in a code language FLNS written as DGLP. In the same code language ILPV will be written as—
 (a) FIMS (b) GINS
 (c) HJNR (d) GHOP
28. If in a code language OMJC written as KJLB. In the same code language TJGE will be written as—
 (a) PGED (b) OGFE
 (c) RHFC (d) SGDE

Directions (Q. 29–33) : Are based on letter series, In each question some letter are missing shown by (–). The missing letter are given in a proper sequence as one of the four alternative given under each question. Find out the correct alternative and write its number against corresponding question number on your answer sheet—

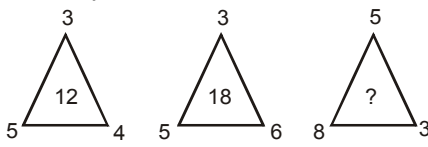
29. — B — TM — BA — MO — A —
 (a) MTOBTAM (b) MOAOTBT
 (c) OABTMOA (d) TMOABTM
30. — TP — N — P — — — PC
 (a) CNPTNT (b) NCPTCN
 (c) PNTCPT (d) NCTCNT

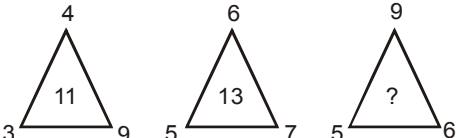
31. — L — C — LM — T — — —
 (a) CTMCLMC (b) MCTLMCT
 (c) TMTCLMC (d) TMLCTCL
32. K — C — B — KB —
 (a) BKCC (b) CBKC
 (c) BCKB (d) BCKC
33. — — C — BM — — B — CK
 (a) CMKBMK (b) BCMKCM
 (c) BMKCKM (d) CBMKBC

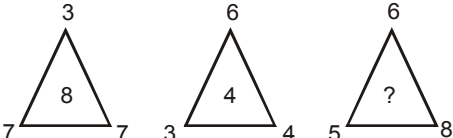
Directions (Q. 34–38) : The equations have become wrong because of the wrong order of signs. Choose the correct order of signs from the four options given below so as to make the equations right. Write the alternative number of the correct option on the answer sheet against the corresponding question number—

34. $24 = 6 + 2 \div 6$
 (a) $\div + =$ (b) $= \div +$
 (c) $+ \div =$ (d) $\div = +$
35. $3 - 5 = 7 \times 8$
 (a) $- \times =$ (b) $= - \times$
 (c) $= \times -$ (d) $\times - =$
36. $24 \div 6 = 2 + 6$
 (a) $= + \div$ (b) $\div + =$
 (c) $+ = \div$ (d) $+ \div =$
37. $6 + 4 = 5 \times 29$
 (a) $+ \times =$ (b) $= + \times$
 (c) $\times + =$ (d) $= \times +$
38. $17 + 7 - 3 = 13$
 (a) $- + =$ (b) $+ = -$
 (c) $- = +$ (d) $= - +$

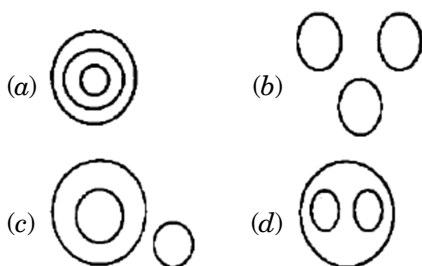
Directions (Q. 39–41) : Numbers are placed in figure on the basis of some rules. One place is vacant which is indicated as (?). Find out the correct alternative for the vacant place and write its number against the proper question number on your answer sheet—

39. 
 (a) 27 (b) 21
 (c) 29 (d) 24

40. 
 (a) 21 (b) 26
 (c) 15 (d) 19

41. 
 (a) 17 (b) 10
 (c) 15 (d) 18

Directions (Q. 42 – 44) : Each of the following questions has a group of the three words which are related to each other in some way. This relationship can be represented by one of the four figure alternative given in the beginning. Find out the correct figure alternative and write its number against the corresponding questions on your answer sheet—



42. History, Physics, Psychology

- (a) 3 (b) 4
 (c) 1 (d) 2

43. Jharkhand, Ranchi, Nagpur

- (a) 2 (b) 4
 (c) 1 (d) 3

44. India, M.P., Bhopal

- (a) 4
 (b) 1
 (c) 2
 (d) 3

Directions (Q. 45 – 47) : Following questions are based on information given below. Read the following information carefully and answer the question given below. There are four alternative for each question. Find out the correct alternative and write its number on your answer sheet against the proper question number—

Information—

- Radha went to school on Wednesday and Monday.
 - Suman did not go to school on Saturday.
 - Seeta went to school on Wednesday and Thursday.
 - Geeta did not go to school on Friday and Tuesday.
 - Reeta did not go to school on Tuesday, Saturday and Monday.
45. On which day all the girls went to school—
 (a) Monday (b) Wednesday
 (c) Saturday (d) Tuesday
46. How many girls went to school on Thursday—
 (a) Two (b) Four
 (c) Three (d) One
47. Which of the girls did not go to school on Monday—
 (a) Radha – Suman (b) Seeta – Reeta
 (c) Geeta – Radha (d) Suman – Seeta
48. Rohan ranks 7th from the top and 26th from the bottom in class. How many students are there in the Class—
 (a) 32 (b) 33
 (c) 34 (d) 27
49. Tarun is the father of Rohit. Rohit is the brother of Kala. Kala is the wife of Dilip. How Dilip is related to Rohit—
 (a) Uncle (b) Brother in-law
 (c) Father in-law (d) Son
50. A man starts from his house walks 2 km towards North. He turns right and walk 3 km. Then he turns left and travels 3 km. What is the direction he is facing—
 (a) East (b) West
 (c) North (d) South

PART II : ENGLISH LANGUAGE

Directions (Q. 51 – 55) : *Read the following passage and answer the question that follow-*

The sun was getting warm as Philip put on his shoes and prepared to go for a run. At the edge of the lake the ice was still quite hard, and he did not seem to realize there was any danger, but nearer the middle of the lake the warm sun had already begun to melt the ice.

After making a few practice turns, Philip set out with long sweeping strides to cross the lake at its widest point. In order to make himself go faster, he tried to race his own shadow as it fell on the ice ahead of him, when he was about half way across, crunch ! the weak ice suddenly broke beneath his weight, and with a splash he fell through it. All the air was sucked out of his lungs by the shock, of the freezing water biting into his body, so that for twenty or thirty seconds afterwards he was not even able to scream. Then at last he found his voice, shouted for help, and almost immediatly afterwards blacked out.

When he opened his eyes again, he was lying in bed in his own home, with his father bending anxiously over him. 'You should have known better than to do a silly thing like that,' were the first comfortless words he heard after his narrow escape.

51. Philip skated across the lake-

- (a) to save his father
- (b) for fun
- (c) because he was in danger
- (d) to race someone

52. Philip fell through the ice-

- (a) at the edge of the lake
- (b) in any part of the lake
- (c) in the middle of the lake
- (d) on the other side of the lake

53. Which of these statements about the sun is correct? It was-

- (a) shining from behind him as he skated
- (b) behind him as he skated but not shining
- (c) shining from in front of him as he skated
- (d) in front of him as he skated but not shining

54. Philip fell into the water because-

- (a) the lake was too wide
- (b) he was too heavy for the ice
- (c) all the air was sucked out of his lungs
- (d) he made a hole in the ice with the practice turns

55. 'blacked out' means-

- (a) it was dark under the water
- (b) he put on dark clothes
- (c) he got out of the water backwards
- (d) he didn't know what was happening to him

Directions (Q. 56 – 60) : *Read the following passage and answer the questions given below it.*

Every reader of this passage must spend the whole of his waking life looking at things, Looking, like breathing, is natural; we do it without noticing it. Looking is passive- but seeing is active. Once you start seeing things you really begin to wake up. People who see things which others have only looked at, and seeing, draw conclusions from what they see, can add to man's knowledge and help progress.

Someone recently discovered a place where metal had been worked continuously longer than anywhere else in England. He 'saw' a wall in the Forest of Dean. Thousands of people must have looked at it without really seeing it, but this man noticed that among the usual stones of that place were bits and pieces of a different colour; they also felt different to the hand. A closer sight showed that those pieces had been left behind in the fires of ancient peoples who had smelted rocks to get metals. Looking around, he found more and more information, until the history of what men had done at that place over tens of centuries was known.

56. 'his waking life' means-
- (a) the time when he is waking up
 - (b) all the time he is awake
 - (c) all the time he is alive
 - (d) all the time he is breathing
57. For this writer 'seeing' means-
- (a) noticing things which need explaining
 - (b) doing something natural
 - (c) looking at things
 - (d) doing something without noticing it
58. The man found a place where-
- (a) men are starting to work metal
 - (b) men built walls of metal
 - (c) men smelted metal for tens of centuries
 - (d) men first learned to make fire with stones
59. The man who 'saw' the wall got more and more information-
- (a) from thousands of people who had looked at it
 - (b) from a history book
 - (c) from the usual stones of that place
 - (d) from the unusual stones of that place
60. The man's discovery was useful because it gave us more knowledge about-
- (a) colours
 - (b) stones
 - (c) walls
 - (d) the Forest of Dean

Directions (Q. 61 – 62) : In the questions given below, you are provided with the first part of a sentence. The remaining sentence is broken into four parts labelled (P), (Q), (R) and (S). You are required to arrange these parts so as to form a complete meaningful sentence and then choose the correct combination.

61. While arranging shelves-
- P - Where I work
Q - I came across a book called
R - at the library
S - Finding God in Mysterious places
- (a) QRPS
 - (b) PQSR
 - (c) RPQS
 - (d) RQSP

62. We cannot perform-
- P - some principles of science
Q - brought into play
R - without having
S - the simplest act
- (a) SRPQ
 - (b) QRPS
 - (c) RQSP
 - (d) PQRS

Directions (Q. 63 – 64) : The following five sentences come from a paragraph. The first and the last sentence are given. Choose the order in which the three sentences (PQR) should appear to complete the paragraph.

63. S1 A rainbow is red on one edge.
violet on the other
- S2
S3
S4
S5 Now, although we are unable to see ultra-violet light, bees can do so; for them ultraviolet is a colour.
- P - This colour beyond the violet, invisible to us, is called ultra-violet.
Q - Outside the violet of the rainbow there is another colour which we cannot see at all.
R - Although it is invisible, we know that ultra-violet is there because it affects a photographic plate.

Choose from the options given below :-

- (a) PRQ
 - (b) RPQ
 - (c) RQP
 - (d) QPR
64. S1 Nigel had been born an only child.
S2
S3
S4
S5 Nature had made her the sort of person to captain industry or an army; instead, she was Nigel's mother
- P - While she lived, all decisions about his daily life, his friendship, his fortune, had been taken by that overbearing woman.

Q - His father had died when he was small, and when his mother, although still not old, died too, he was like a man lost, a car without a steering-wheel, a prisoner set free after a lifetime in prison.

R - In all things her word had been law.

Choose from the options given below:

- (a) RPQ (b) PRO
(c) QPR (d) PQR

Directions (Q. 65 – 69): Choose the word which best fills the blank from the four options given-

65. I was out on a morning walk on a quiet, ... path which ran through the wood.
(a) separated (b) isolated
(c) secluded (d) unusual
66. Everyone was.....by a device small enough to fit on a desk-
(a) interested (b) fascinated
(c) satisfied (d) scrutinized
67. The previous owner of our house a burglar alarm system in the house but we never used it-
(a) installed (b) established
(c) executed (d) implemented
68. Rajeev was discussing his..... flight with his friends when I reached his home-
(a) linking (b) connecting
(c) joining (d) arriving
69. What if he.....everything and returned the clock which he was still carrying in' his bag-
(a) delegated (b) confiscated
(c) delivered (d) confessed

Directions (Q. 70 – 75) : Select the meaning of the given phrases / idioms-

70. A bolt from the blue-
(a) A criminal act
(b) A shocking event
(c) A complete surprise
(d) A dangerous deal

71. A hard nut to crack-

- (a) A bad, tasteless nut
(b) A difficult act
(c) A person hard to tackle
(d) A person difficult to please

72. A man of letters-

- (a) A scholar
(b) A man who knows ABC
(c) A literate man
(d) An intelligent person

73. From hand to mouth-

- (a) leading a simple life
(b) barely making two ends meet
(c) working hard for one's living
(d) hardly doing any work

74. In a nutshell-

- (a) in a lavish lifestyle
(b) in a simple way
(c) in detail
(d) briefly

75. To get rid of-

- (a) to get freedom from
(b) to get involved in
(c) to get into difficulty
(d) to get comfort from

Directions (Q. 76 – 83): In the following passage there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the options given below-

Elizabeth was waiting 76 a bus. She was going to buy a German dictionary and a German grammar 77. She wanted to learn the language before 78 holiday in Australia. 79 it began to rain. She had neither umbrella not raincoat, and she was soon wet. A man in a car 80 and gave her a 81 into the town. The sun came out again 82. She was in the car, and, when she got out, she stood in the 83 sun till she was dry.

76. (a) of (b) from
(c) for (d) in

77. (a) book (b) diary
(c) register (d) notebook
78. (a) their (b) her
(c) his (d) its
79. (a) incidentally (b) accidentally
(c) consequently (d) suddenly
80. (a) stopped (b) started
(c) supported (d) supplied
81. (a) a life (b) a book
(c) a dictionary (d) a car
82. (a) when (b) while
(c) where (d) what
83. (a) hot (b) bright
(c) warm (d) dull
- Directions (Q. 84 – 87) :** *Select the most appropriate option to fill in the blanks from the given alternatives.-*
84. Granny.....her book every where-
(a) looked out (b) looked for
(c) looked up (d) looked into
85. The wind blew out the.....-
(a) lamp (b) light
(c) bulb (d) candle
86. I'll think.....your idea carefully before I take a final decision-
(a) over (b) about
(c) on (d) upon
87. The travellers were delayed because the bus had broken.....
(a) out (b) down
(c) away (d) up

Directions (Q. 88 – 90): *Select the word which means the opposite of the given word :-*

88. Abundance-
(a) much (b) shortage
(c) enough (d) less
89. Ferocious-
(a) meek (b) wild
(c) brave (d) coward
90. Compulsory-
(a) unwilling (b) mandatory
(c) necessary (d) voluntary

PART III : SCHOLASTIC APTITUDE TEST SCIENCE

91. A body of mass 20 kg. falls through a distance of 50 cm. Then the loss in potential energy is-
(a) 98 Joule (b) 392 Joule
(c) 980 Joule (d) 5000 Joule
92. Calorimeters are generally made of-
(a) Copper (b) Brass
(c) Aluminium (d) Zinc
93. 1 Calorie is able to raise the temperature of 1 gm of copper through approximately-
(a) 1°C (b) 5°C
(c) 10°C (d) 20°C
94. A particle in a medium completes 20 vibrations in 2.5 seconds. The frequency of wave is-
(a) 20 Hz (b) 200 Hz
(c) 50 Hz (d) 8 Hz
95. The value of 1 Kilowatt power in terms of horse power will be-
(a) 1.34 H.P. (b) 746 H.P.
(c) 786 H.P. (d) 4.36 H.P.
96. A myopic eye can be corrected by using a –
(a) Convex lens
(b) Concave lens
(c) Plane mirror
(d) Cylindrical lens
97. In a solution of CuSO_4 , a piece of Zn is dropped. The solution becomes colourless. This reaction will be-
(a) Substitution reaction
(b) Decomposition reaction
(c) Addition reaction
(d) Dissociation reaction
98. Decibel is-
(a) a sound apparatus
(b) a sound tone
(c) The unit of intensity of sound
(d) The wave length of noise

99. The renewable source of energy is—
(a) Coal
(b) Uranium
(c) Natural gas
(d) Geothermal power
100. The first artificial satellite was—
(a) Sputnik-1 (b) Explorer-1
(c) Aryabhata (d) Luna-3
101. Titan is the largest moon or satellite of—
(a) Mars (b) Venus
(c) Jupiter (d) Saturn
102. A concave mirror of focal length is 10 cm produces an image five times large and real. The distance of object from the mirror will be—
(a) 10 cm. (b) 12 cm.
(c) 16 cm. (d) 20 cm.
103. International unit of atomic weight is—
(a) Carbon-12 (b) Oxygen-16
(c) Hydrogen-1 (d) Nitrogen-14
104. Which of the following isotopes of Uranium is unstable—
(a) U-234 (b) U-235
(c) U-238 (d) All the above
105. An element have atomic number 19 and mass number 39. The number of neutron in its nucleus is—
(a) 20 (b) 58
(c) 19 (d) 39
106. Mass percentage of nitrogen in the compound N_2O_3 is—
(a) 36.84 (b) 46.70
(c) 82.40 (d) 63.60
107. A metal M has its Chloride formula MCl_3 and equivalent weight of metal is 9. Atomic weight of element is—
(a) 9 (b) 18
(c) 27 (d) 3
108. Atomic weight of an element is 30, Its equivalent wt. is 10. The valency of element will be—
(a) 1 (b) 2
(c) 3 (d) 4
109. Specific heat of any element is 0.1, The nearest atomic wt. of that element will be—
(a) 32 (b) 64
(c) 62 (d) 48
110. The number of molecules in one mole of gas is—
(a) 6.023×10^{23} (b) 6.023×10^{22}
(c) 6.023×10^{21} (d) 6.023×10^{20}
111. In the given below MnO_2 is catalyst as—
(a) Positive Catalyst
(b) Negative Catalyst
(c) Auto Catalyst
(d) Induced Catalyst
112. How much MgO is obtained on heating 5 gm of $(MgCO_3)$ Magnesium Carbonate—
(a) 2.4 gm. (b) 2.38 gm.
(c) 2.8 gm. (d) 3.28 gm
113. Valency of Cr in $CrPO_4$ is—
(a) 4 (b) 3
(c) 2 (d) 1
114. Quinine is obtained from—
(a) Bark (b) fruit
(c) leaves (d) roots
115. Nocturnal bird is—
(a) Pigeon (b) Sparrow
(c) Owl (d) parrot
116. Body temperature of human body is—
(a) $42^\circ C$ (b) $40^\circ C$
(c) $34^\circ C$ (d) $37^\circ C$
117. Budding is found in—
(a) Mango (b) Yeast
(c) Papaya (d) Banana
118. The unit of classification is—
(a) Class
(b) Order
(c) Species
(d) Genus

- 119.** Which of the following is a micronutrient element—
 (a) Mg (b) K
 (c) Ca (d) Zn
- 120.** Pencillin obtained from—
 (a) Cycus (b) Fungi
 (c) Fern (d) Algae
- 121.** Cotton fibre is obtained from—
 (a) Seeds (b) Phloem
 (c) Leaves (d) Roots
- 122.** Vessel are absent in—
 (a) Pinus wood (b) Shishum wood
 (c) Teak wood (d) Sal wood
- 123.** A substance produced in liver which prevents the freezing of blood is called—
 (a) Ptylin (b) Heparin
 (c) Trypsin (d) Insulin
- 124.** Which of the following contains phytochrome—
 (a) Algae (b) Fungi
 (c) Yeast (d) Angiosperm
- 125.** Auxin hormone was discovered by—
 (a) Vent (b) Moore
 (c) Mehta
 (d) Mendal
- 129.** The Founder of 'Brahm Samaj' was—
 (a) Rajaram Mohan Rai
 (b) Swami Vivekanand
 (c) Dayanand Saraswati
 (d) Ramkrishna paramhans
- 130.** Among the following who is called 'Light of Asia'—
 (a) Mahavir (b) Buddha
 (c) Akbar (d) Ashoka
- 131.** The book written by Gandhi ji is—
 (a) Common will
 (b) India Wins Freedom
 (c) Discovery of India
 (d) My Experiment with Truth
- 132.** Kabir was disciple of—
 (a) Ramanand (b) Ramanuja
 (c) Tukaram (d) Chaitanya
- 133.** The attainment of complete Independance was declared as the ultimate goal by Indian National Congress in—
 (a) 1929 AD. (b) 1939 AD.
 (c) 1940 AD. (d) 1946 AD.
- 134.** Cabinet Mission comes to India in—
 (a) 1945 AD. (b) 1946 AD.
 (c) 1947 AD. (d) 1948 AD.
- 135.** Who coined the famous slogan 'Inquilab Zindabad'—
 (a) Ashfaq Ullah Khan
 (b) Chandra Shekhar Azad
 (c) Bhagat Singh
 (d) Abul Kalam Azad

SOCIAL SCIENCE

- 126.** The First governer of the Portuguese in India was—
 (a) Albuquerque
 (b) De-Almeida
 (c) Vasco-da-Gama
 (d) Bortholomew Diaz
- 127.** When was the battle of Plasi Fought—
 (a) 1526 AD. (b) 1556 AD.
 (c) 1757 AD. (d) 1761 AD.
- 128.** Rani Laxmibai is associated with city—
 (a) Kanpur (b) Awadh
 (c) Jhansi (d) Delhi
- 136.** The southern most point of India is—
 (a) Kanya Kumari (b) Indira Point
 (c) Point Calimer (d) Rameshwaram
- 137.** Which one of the following states has the longest coast line—
 (a) Gujrat (b) Maharashtra
 (c) Kerla (d) West Bangal

- 138.** On which river is the Hirakund dam constructed—
 (a) Narmada (b) Godavari
 (c) Mahanadi (d) Kaveri
- 139.** 'The Vally of Flower' lies in—
 (a) Jammu and Kashmir
 (b) Uttarakhand
 (c) Himanchal Pradesh
 (d) Kerala
- 140.** The minimum rainfall place in India is—
 (a) Mathura (b) Delhi
 (c) Jaisalmar (d) Leh
- 141.** Laterite Soil is found in—
 (a) Uttar Pradesh
 (b) Himanchal Pradesh
 (c) Kerala
 (d) Punjab
- 142.** Damodar is tributary of river—
 (a) Ganga (b) Hugli
 (c) Suvarnrekha (d) Yamuna
- 143.** 'Titan' is the largest moon or satellite—
 (a) Mars (b) Venus
 (c) Jupiter (d) Saturn
- 144.** Longest River in the world is—
 (a) Missisip (b) Kango
 (c) Nile (d) Ganga
- 145.** Which is the largest populated country in the world—
 (a) China
 (b) India
 (c) United State of America
 (d) Canada
- 146.** The first day session of Indian Constituent Assembly was Chaired by—
 (a) Dr. Rajendra Prasad
 (b) Jawahar Lal Nehru
 (c) B. R. Ambedkar
 (d) Dr. Sachchidanand Sinha
- 147.** Indian Parliament consists of—
 (a) Lok Sabha and Rajya Sabha
 (b) Lok Sabha, Rajya Sabha, Prime Minister
 (c) Speaker, Lok Sabha
 (d) Lok Sabha, Rajya Sabha, President
- 148.** The maximum number of Anglo Indian who can be nominated to the Lok Sabha are—
 (a) 2 (b) 3
 (c) 4 (d) 5
- 149.** The constitution of India was adopted by the constituent Assembly on—
 (a) 15th August, 1947
 (b) 30th June, 1948
 (c) 26th November, 1949
 (d) 26th January, 1950
- 150.** The Chairman of the planning commission is—
 (a) Finance Minister
 (b) Prime Minister
 (c) President
 (d) Governor of Reserve Bank
- 151.** The Maximum strength of Lok Sabha has been fixed—
 (a) 540 (b) 545
 (c) 550 (d) 555
- 152.** The Vacancy of the office of the President must be filled up within—
 (a) Ninty day (b) Six months
 (c) Nine months (d) One year
- 153.** India is a secular state is encunciated in—
 (a) Preamble of the Constitution
 (b) Fundamental Rights
 (c) Directive Principal of state policy
 (d) Citizenship provisions
- 154.** The Headquarter of UNO located at—
 (a) London (b) Rome
 (c) New Delhi (d) New York

155. The first summit of SAARC was held at–

- (a) New Delhi (b) Colombo
(c) Dhaka (d) Islamabad

156. Economic planning is a subject of–

- (a) Union list
(b) State list
(c) Concurrent list
(d) Not specified in any list

157. 'Twenty Point Economic Programme' was fixed launched in the year–

- (a) 1969 (b) 1975
(c) 1977 (d) 1980

158. 'ADHAR' is a programme–

- (a) to provide Identity to Indian residents
(b) Infrastructure Development
(c) Education
(d) Social Security

159. The time period of the 12th five year plan is–

- (a) 2001–07 (b) 2012–17
(c) 2010–15 (d) 2007–12

160. The standard of living in a country is represented by–

- (a) National Income
(b) Poverty Ratio
(c) Unemployment rate
(d) Per Capita Income

MATHS

161. If α and β are the zeros of the polynomial $f(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, the the value of K is–

- (a) 12 (b) 6
(c) 4 (d) 1

162. If $(x+2)$ is a factor of the polynomial $f(x) = x^2 + ax + 2b$ and $a + b = 4$. then the value of a and b are–

- (a) $a = 1, b = 3$ (b) $a = 3, b = 1$
(c) $a = -1, b = 5$ (d) $a = 5, b = -1$

163. If $1^3 + 2^3 + \dots + 9^3 = 2025$ then

$(0.11)^3 + (0.22)^3 + \dots (0.99)^3$ will be–

- (a) 0.2695 (b) 2.695
(c) 3.695 (d) 0.3695

164. If $\left(\tan \theta + \frac{1}{\tan \theta}\right) = 2$ then the value of $\tan^2 \theta + \frac{1}{\tan^2 \theta}$ will be–

- (a) 4 (b) 2
(c) 1 (d) 8

165. If $\sec 2A = \operatorname{cosec}(A - 42^\circ)$ where $2A$ is acute angle then value of A is–

- (a) 44° (b) 22°
(c) 21° (d) 66°

166. If $\frac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$ then θ is–

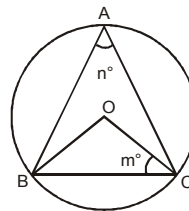
- (a) 30°
(b) 45°
(c) 60°
(d) 90°

167. If $\cos \theta + \operatorname{cosec} \theta = 2$, then the value of

$\frac{1 + \cos \theta}{1 - \cos \theta}$ is–

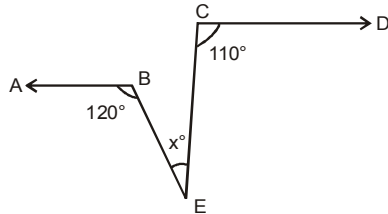
- (a) 2 (b) 4
(c) $\frac{1}{2}$ (d) $\frac{1}{4}$

168. In the following figure O is the centre of circle and $\angle BAC = n^\circ$, $\angle OCB = m^\circ$ then

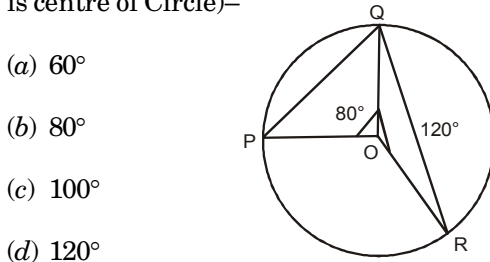


- (a) $m^\circ + n^\circ = 90^\circ$
(b) $m^\circ + n^\circ = 180^\circ$
(c) $m^\circ + n^\circ = 120^\circ$
(d) $m^\circ + n^\circ = 150^\circ$

169. In given figure $AB \parallel CD$, $\angle ABE = 120^\circ$, $\angle DCE = 110^\circ$ and $\angle BEC = x^\circ$ then x° will be—



- (a) 60° (b) 50°
(c) 40° (d) 70°
170. In the following figure $\angle PQR$ is— (there O is centre of Circle)—



- (a) 60°
(b) 80°
(c) 100°
(d) 120°
171. If $\bar{x}$ is the mean of the terms $x_1, x_2, x_3, \dots, x_n$ and $\sum_{i=1}^n x_i = x_1 + x_2 + x_3 + \dots + x_n$

then the value of $\sum_{i=1}^n x_i - n\bar{x}$ is —

- (a) 0 (b) 1
(c) n (d) x
172. Point P divides the line segment joining the points A (2, 1) and B (5, -8) such that $\frac{AP}{AB} = \frac{1}{3}$. If P lies on the line $2x + y + k = 0$ then the value of K is—
- (a) -4 (b) 4
(c) -3 (d) 3
173. A copper wire 3 mm in diameter is rounded about a cylinder whose length is 1.2 m. and diameter is 10 cm., So as to cover the curved surface of the cylinder. The length of the wire is—
- (a) 125.6 m (b) 1256 m
(c) 12.56 m (d) 1.256 m

174. Relation among mean, median and mode is—

- (a) Mode = 3 median + 2 Mean
(b) Mode = 3 median - 2 Mean
(c) Mode = 3 median + 3 Mean
(d) Mode = 2 median - 3 Mean

175. The area of the figure formed by the intersection of lines $x = 0, y = 0, x = 3, y = 4$ will be

- (a) 3 sq. unit (b) 4 sq. unit
(c) 6 sq. unit (d) 12 sq. unit

176. If $2^{x-1} + 2^{x+1} = 320$ then the value of x is —

- (a) 6 (b) 8
(c) 5 (d) 7

177. If $x + \frac{1}{x} = 2$ then $\sqrt{x} + \frac{1}{\sqrt{x}}$ will be—

- (a) $\sqrt{2}$ (b) 2
(c) $\sqrt{2} + 1$ (d) 1

178. What is the value of P for which $(a - 2)$ is factor of $a^2 - 5a + P$

- (a) 2 (b) 3
(c) 5 (d) 6

179. A person wishes to fit three rods together in the shape of a right angled triangle so that the hypotenuse is to be longer 4 cm than the base and 8 cm longer than the altitude. The lengths of the rods are—

- (a) 3 cm, 4 cm, 5 cm
(b) 1.5 cm, 2 cm, 2.5 cm
(c) 6 cm, 8 cm, 10 cm
(d) 12 cm, 16 cm, 20 cm

180. If $x + y = 8, xy = 15$, then the value of $x^2 + y^2$ will be—

- (a) 32 (b) 34
(c) 36 (d) 38

ANSWERS**MENTAL ABILITY TEST**

1. (d) 2. (c) 3. (b) 4. (b) 5. (c) 6. (c) 7. (b) 8. (c) 9. (a) 10. (d)
11. (a) 12. (b) 13. (d) 14. (a) 15. (c) 16. (b) 17. (c) 18. (a) 19. (d) 20. (b)
21. (a) 22. (c) 23. (a) 24. (d) 25. (b) 26. (c) 27. (b) 28. (a) 29. (b) 30. (d)
31. (c) 32. (a) 33. (c) 34. (a) 35. (d) 36. (b) 37. (c) 38. (a) 39. (d) 40. (c)
41. (b) 42. (d) 43. (d) 44. (b) 45. (b) 46. (b) 47. (b) 48. (a) 49. (b) 50. (c)

ENGLISH LANGUAGE

51. (b) 52. (c) 53. (a) 54. (b) 55. (d) 56. (a) 57. (a) 58. (c) 59. (d) 60. (d)
61. (c) 62. (a) 63. (d) 64. (c) 65. (b) 66. (b) 67. (a) 68. (b) 69. (d) 70. (c)
71. (b) 72. (c) 73. (c) 74. (d) 75. (a) 76. (c) 77. (a) 78. (b) 79. (d) 80. (a)
81. (a) 82. (b) 83. (c) 84. (b) 85. (d) 86. (a) 87. (b) 88. (b) 89. (a) 90. (d)

SCHOLASTIC APTITUDE TEST

91. (a) 92. (a) 93. (c) 94. (d) 95. (a) 96. (b) 97. (a) 98. (c) 99. (d) 100. (a)
101. (d) 102. (b) 103. (a) 104. (d) 105. (a) 106. (a) 107. (c) 108. (c) 109. (b) 110. (a)
111. (*) 112. (b) 113. (b) 114. (a) 115. (c) 116. (d) 117. (b) 118. (c) 119. (d) 120. (b)
121. (a) 122. (a) 123. (b) 124. (d) 125. (a) 126. (b) 127. (c) 128. (c) 129. (a) 130. (b)
131. (d) 132. (a) 133. (a) 134. (b) 135. (c) 136. (b) 137. (a) 138. (c) 139. (b) 140. (c)
141. (c) 142. (b) 143. (d) 144. (c) 145. (a) 146. (d) 147. (d) 148. (a) 149. (c) 150. (b)
151. (c) 152. (b) 153. (a) 154. (d) 155. (c) 156. (c) 157. (b) 158. (a) 159. (b) 160. (d)
161. (b) 162. (b) 163. (b) 164. (b) 165. (a) 166. (c) 167. (b) 168. (a) 169. (b) 170. (b)
171. (a) 172. (a) 173. (a) 174. (b) 175. (d) 176. (d) 177. (b) 178. (d) 179. (d) 180. (b)

EXPLANATIONS

MENTAL ABILITY TEST

1. Odd one out is $k - 1333$ as $B - 2^3$, $J - 10^3$, $G - 7^3$
2. Mercury is odd one out as it is in liquid form
3. KOSW is odd one out, as in other three options a pattern is followed i.e. two letters are added in the letter to get next letter, but in KSOW this pattern is not followed.

D $\xrightarrow{E,F}$ G $\xrightarrow{H,I}$ J $\xrightarrow{K,L}$ M

4. In figure (b), two adjacent triangles are not filled, but in remaining figures 2 adjacent triangles are filled, so Fig (b) is odd one out
5. In figure (c) total no. of lines are 4 but in other three figures there are 3 lines to form the figure so fig (c) is odd one out.
6. Figure 3 is odd one out
7. In figure (b) the figure is not divided into two equal parts but in other figures, the figures are divided into two equal parts.
8. Parliament is the head in Britain and Congress is in United States of America.

9. $6^3 + 6 = 222$

$8^3 + 8 = 520$

10. $+2 \downarrow +1 \downarrow +2 \downarrow +1 \downarrow +1 \downarrow$ $+2 \downarrow +1 \downarrow +2 \downarrow +1 \downarrow$

↓
Similarly

15. $1^3 + 1 = 2$, $2^3 + 2 = 10$, $3^3 + 3 = 30$

$4^3 + 4 = 68$, $5^3 + 5 = 130$, $6^3 + 6 = \boxed{216}$

16. It is compound series of two different series

6, 12, 20, 30, ? & 2, 6, 12, 20, ?

so answers will be 42 & 30

17. It is a compound series of two different series

5, 10, 17, 26, 37, 51, 68, 85
5, 7, 9, 11, 13, 15, 17, 19

∴ series will be

5, 34, 10, 51, 17, 68, 26, 85, 37

18. Figure (a) will follow the given sequence as

• is showing anti clock wise movement

Δ is showing anti clock wise movement

Arrow is showing clockwise movement

Based on above information figure (a) follows the sequence .

(Q. 22 – 28) :

From the above information codes of the letter are

P - 5

O - 6

R - 4

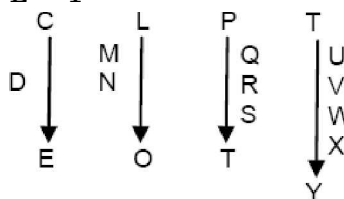
E - 3

J - 2

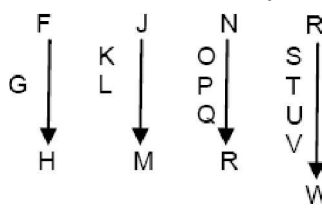
S - 7

L - 1

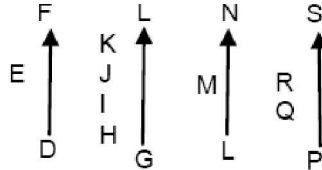
26.



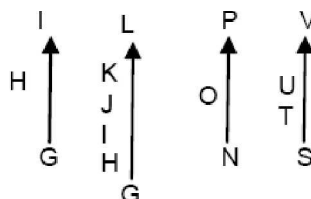
Similarly

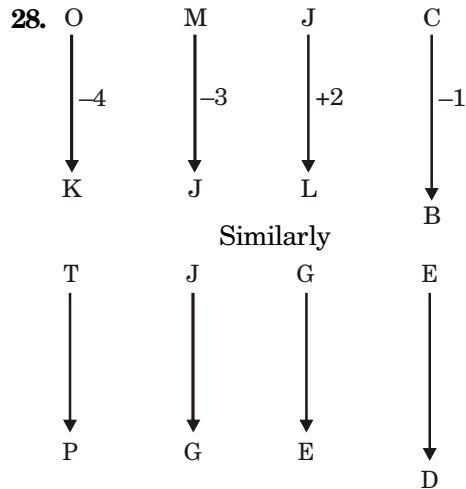


27.



Similarly





29. From the option
M O B A T | M O B A I | M O B A T
30. From the option
N T P C | N T P C | N T P C
31. From the options
T L M C | T L M C | T L M C
32. K B C | K B C | K B C
33. B M C K | B M C K | B M C K
34. Form option (a),
 $24 \div 6 + 2 = 6$ (BODMAS RULE)
 $4 + 2 = 6$
35. Form option (a)
 $3 - 5 \times 7 = 8$ (BODMAS RULE)
 $-32 \neq 8$
- Form option (b)
 $3 = 5 - 7 \times 8$
 $3 \neq -51$
- Form option (c)
 $3 = 5 \times 7 - 8$
 $3 \neq 27$
- Form option (d)
 $3 \times 5 - 7 = 8$
 $8 = 8$
36. Form option (a)
 $24 = 6 + 2 \div 6$
 $24 \neq \frac{19}{3}$ (BODMAS RULE)
- Form option (b)
 $24 \div 6 + 2 = 6$
 $6 = 6$

37. Form option (a)
 $6 + 4 \times 5 = 29$ (BODMAS RULE)
 $26 \neq 29$

Form option (b)
 $6 = 4 + 5 + 23$
 $6 \neq 149$

Form option (c)
 $6 \times 4 + 5 = 29$
 $29 = 29$

38. Form option (d) (BODMAS RULE)
 $17 - 7 + 3 = 13$
 $13 = 13$

39. $\begin{array}{ccc} \triangle & \triangle & \triangle \\ \text{3} & \text{3} & \text{5} \\ \text{5} \quad \text{12} \quad \text{4} & \text{5} \quad \text{18} \quad \text{6} & \text{8} \quad ? \quad \text{3} \end{array}$
- $(3 \times 4 \times 5) \div 5 = 12$
 $(3 \times 5 \times 6) \div 5 = 18$
 $(3 \times 6 \times 8) \div 5 = 24$

40. $\begin{array}{ccc} \triangle & \triangle & \triangle \\ \text{4} & \text{6} & \text{9} \\ \text{3} \quad \text{11} \quad \text{9} & \text{5} \quad \text{13} \quad \text{7} & \text{5} \quad ? \quad \text{6} \end{array}$
- Adding all digits on corners & subtracting 5 from all we get middle value.
 $9 + 4 + 3 = 16 - 5 = 11$
 $7 + 5 + 6 = 18 - 5 = 13$
 $9 + 6 + 5 = 20 - 5 = 15$

41. Adding all digits on corners & subtracting 9 from all we get middle value.
 $7 + 7 + 3 = 17 - 9 = 8$
 $4 + 3 + 6 = 13 - 9 = 4$
 $6 + 8 + 5 = 19 - 9 = 10$

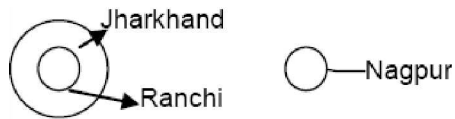
42. All three subjects are different from each other

 — History

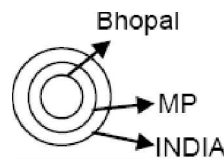
 — Psychology

 — Physics

43. Ranchi is in Jharkhand, But Nagpur is in Maharashtra.



44.



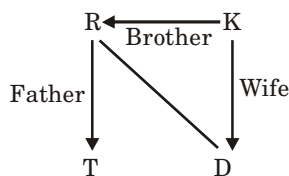
(Q. 45 – 47) : Table

	RADHA	SUMAN	SEETA	GEE TA	REETA
MONDAY	√	√	×	√	×
TUESDAY	×	√	×	×	×
WEDNESDAY	√	√	√	√	√
THURSDAY	×	√	√	√	√
FRIDAY	×	√	×	×	√
SATURDAY	×	×	×	√	×
SUNDAY	-	-	-	-	-

48. 7 rank from top & 26th from bottom means.

$$7 + 26 - 1 = 32$$

49.



T = Tarun

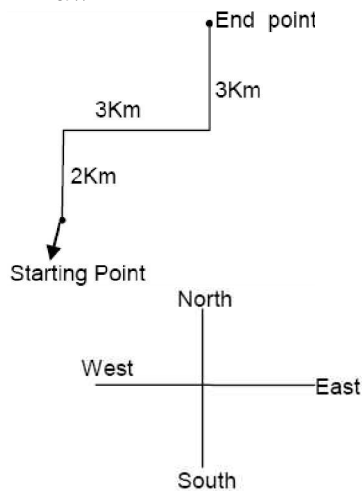
R = Rohit

K = Kala

D = Dilip

Hence from diagram Relation is Brother in Law

50.



Hence person is facing North.

SCHOLASTIC APTITUDE TEST

91.

$$\Delta P.E = mgh$$

$$= 20 \times 9.8 \times \frac{50}{100}$$

$$= 98J$$

92. In general material used is copper

93.

$$\Delta Q = mc\Delta t$$

$$1cal = 1g \times 0.093 \times \Delta t$$

$$\Delta t = \frac{1}{0.093} \approx 10$$

94. f = no of oscilation in one sec.

$$f = \frac{20}{2.5} = 8 \text{ Hz}$$

95.

$$1 \text{ hp} = 746 \text{ watt.}$$

$$\Rightarrow 1 \text{ hp} = \frac{746 \times 1000}{1000} \text{ watt.}$$

$$\Rightarrow 1 \text{ k watt} = \frac{1000}{746} \text{ hp} = 3.46 \text{ hp}$$

96. fact – based
97. The solution since becomes colourless since Zn has replaced Cu from CuSO_4 and thus is a substitution Reaction.
98. Conceptual
99. Conceptual
100. Launch by Russia on 4th oct., 1957
101. It is the 15th saturn's non satellite.

$$\begin{aligned}
 102. \quad \frac{-v}{u} &= -5 \\
 \Rightarrow v &= 5u \\
 \frac{1}{5u} + \frac{1}{u} &= \frac{1}{-10} \\
 u &= \frac{-60}{5} \\
 &= -12\text{cm}
 \end{aligned}$$

103. International unit of atomic weight is carbon –12 isotope.
104. All the isotopes of U-234, U-235 and U-238 are radioactive.
 U – 234 has a half life of 2.45×10^5 yrs
 U – 235 has a half life of 7.04×10^8 yrs
 U – 238 has a half life of 4.46×10^9 yrs
105. Atomic No –19 No. of electrons =19
 No. of protons =19
 Mass No – 39
 No. of neutrons = Mass No – Atomic No
 = 39 – 19 = 20

106. Mass % of Nitrogen in N_2O_3 is

$$\begin{aligned}
 &= \frac{28}{76} \times 100 \\
 &= 36.84\%
 \end{aligned}$$

107. The chloride of the metal M is MCl_3
 valency of the metal is 3.
 Atomic weight
 = valency $\times$ Equivalent weight
 = 3×9
 = 27

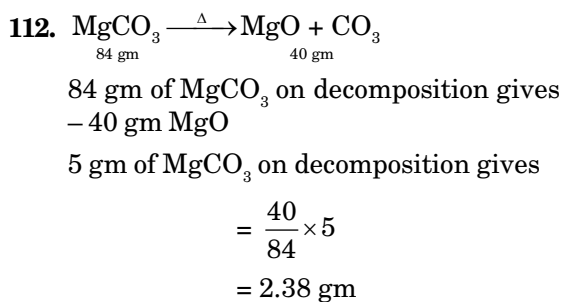
108. Atomic weight
 = valency $\times$ Equivalent weight

$$\begin{aligned}
 \text{Valency} &= \frac{\text{At.wt}}{\text{Eq.wt}} \\
 &= \frac{30}{10} \\
 &= 3.
 \end{aligned}$$

109. According to Dulong and Petit & Law

$$\begin{aligned}
 \text{At. weight} \times \text{specific heat} &= 6.4 \\
 \text{At. wt} &= 6.4 / \text{specific heat} \\
 &= \frac{6.4}{0.1} \\
 &= 64
 \end{aligned}$$

110. The No. of molecules in 1 mole in any gas is 6.023×10^{23} i.e. Avogadro's no.
111. Question in complete



113. Valency of Cr in Cr PO_4 is 3.



114. Quinine (Spelling in wrong)

Quinine, drug obtained from cinchona bark is used chiefly in the treatment of malaria.

115. Nocturnal (active at night)

There are many birds that are active nocturnally. Some birds, like owls and nighthawks are predominantly nocturnal.

116. The normal core body temperature of healthy, resting adult human being is 37.0 degrees celsius. (37°C)

117. Budding is a form of asexual reproduction in which a new individual is produced as an outgrowth (bud) of the parent, held for sometime, later released as an independent identical copy of the parent. Budding is seen in unicellular fungi like 'yeasts' and cnidarians like Hydra.
118. Species is a genetically closed system because its members do not interbreed with members of other species. It is lowest or basic taxonomic category.
119. Micronutrients are those essential elements which are required in quantity of less than 1 milligram/ gram of dry matter. They are eight in number - Fe, Mn, Zn, Cu, Ho, B, Cl and Ni.
120. Penciline (wrong spelling)
Penicillin is a group of antibiotics derived from penicillium fungi.
121. Cotton is a soft, fluffy staple fiber that grows in a ball or protective capsule, around the seeds of cotton.
122. Vessels occur regularly only in angiosperms. Pinus is a coniferous gymnosperm.
123. Heparin is used to treat and prevent blood clots in veins, arteries or lungs.
124. Phytochrome is a photo receptor, pigment that flowering plants (Angiosperm) use to detect and absorbs light for regulation of seed germination and flowering.
125. Vent (wrong spelling)
Went 1928 collected the growth stimulating substance in agar jelly. He discovered that the hormone travelled basipetally (from tip towards the base.) The growth promoting substance was named by him as 'auxin'.
126. The first governor of the Portuguese in India was Francis-de-Almeida (1503 – 1509)
127. The battle of Plassi was fought between east India company (Britain) under clive & Sirajjudaullah, the Nawab of Bengal on 23rd June. 1757.
128. Rani Laxmi bai is associated with city Jhansi
129. Rajaram Mohan Roi founded the Brahmo Samaj on 1828.
130. Lord Buddha is also known as 'light of Asia'.
131. Gandhi ji wrote the book 'My experiment' with Truth.
132. Kabir with other 11 were disciples of Ramananda
133. In Lahore session of Dec. 1929, President J.L Nehru declared the attainment of complete Independence as the ultimate goal by Indian National congress.
134. The Cabinet Mission arrived on 24th March, 1946 in Indian & published its plan on May 16, 1946.
135. Bhagat Singh coined the slogan 'Inquilab Zindabad' & used first time in Assembly Hall.
136. Indira Point is the Southern most point in India.
137. Gujarat has the longest coast line in India.
138. Hirakund Dam is constructed on Mahanadi River
139. The Vally of flowers' lies in Uttarakhand.
140. The minimum rainfall place in India is 'Jaisalmer'.
141. Laterite soil is found in Kerala.
142. Damador is tributary of river Hngli.
143. 'Titan' is the largest moon/ satellite of 'Salun .
144. The longest river of the world is 'Nile'
145. China has the largest population in the world.

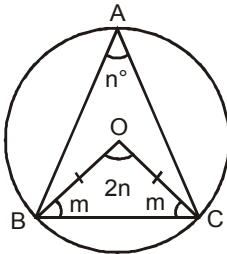
146. On first day session on 9th Dec. 1946. Dr. Sachihidanand Sinha was elected President but on 11th Dec, 1946 Dr. Rajendra Prasad was elected President. Dr. Ambedkar was President of Drafting committee.
147. Indian Parliament consists of Lok Sabha, Rajya Sabha and President.
148. Maximum 2 Anglo-Indians can be nominated to Lok-Sabha
149. Constitution of India was adopted by constituent Assembly on 26th Nov, 1949.
150. The chairman of Planning commission is Prime Minister.
151. The maximum strength of Lok Sabha has been fixed 550.
152. The vacancy of the office of President must be filled up with in 6 months (Art. 62)
153. India is a secular state is encunciated in 'Preamble of the constitution'. It was added by 42nd Amendment in 1976.
154. New York has the headquarter of UNO.
155. The first summit of SAARC was held at Dhaka in 7 - 8 Dec., 1985
156. Economic Planning is a subject of concurrent list.
157. 'Twenty Point Economic Programme' was first launched in year 1975.
158. 'ADHAR' is a programme to provide unique identity to the Indian residents.
159. 12th, 5 year Plan is from 2012 – 2017
160. The standard of living in a country is represented by Per Capita Income'.
161. $\alpha + \beta = 5$
 $\alpha\beta = k$
 $\alpha - \beta = 1$
 $(\alpha - \beta)^2 = 1$
 $(\alpha + \beta)^2 - 4\alpha\beta = 1$
 $25 - 4k = 1$
 $24 = 4k$
 $k = 6$

162. $(-2)^2 + a(-2) + 2b = 0$
 $-2a + 2b = -4$
 $a - b = 2$
 $a + b = 4$
 $a = 3, b = 1$
163. $1^3 + 2^3 + \dots + 9^3 = 2025$
 $\Rightarrow (0.11)^3 + (0.22)^3 + \dots + (0.99)^3$
 $\Rightarrow (0.11)^3 [1^3 + 2^3 + \dots + 9^3]$
 $\Rightarrow 0.001331 \times 2025 = 2.695275$
164. $\tan \theta + \frac{1}{\tan \theta} = 2$
 Squaring both sides
 $\tan^2 \theta + \frac{1}{\tan^2 \theta} + 2 = 4$
 $\tan^2 \theta + \frac{1}{\tan^2 \theta} = 2$
165. $\sec 2A = \operatorname{cosec} (A - 42^\circ)$
 $\operatorname{cosec} (90^\circ - 2A) = \operatorname{cosec} (A - 42^\circ)$
 $90^\circ - 2A = A - 42^\circ$
 $3A = 132^\circ$
 $A = 44^\circ$
166. $\frac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$
 $\frac{1 - \tan \theta}{1 + \tan \theta} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$
 By comparison,
 $\theta = 60^\circ$
167. $\cot \theta + \operatorname{cosec} \theta = 2$... (a)
 $\operatorname{cosec}^2 \theta - \cot^2 \theta = 1$
 $\operatorname{cosec} \theta - \cot \theta = \frac{1}{2}$... (b)
 Adding (a) and (b)
 $2 \operatorname{cosec} \theta = \frac{5}{2}$
 $\operatorname{cosec} \theta = \frac{5}{4}$

$$\cos \theta = \frac{3}{5}$$

$$\frac{1 + \cos \theta}{1 - \cos \theta} = \frac{1 + \frac{3}{5}}{1 - \frac{3}{5}} = \frac{\frac{8}{5}}{\frac{2}{5}} = 4$$

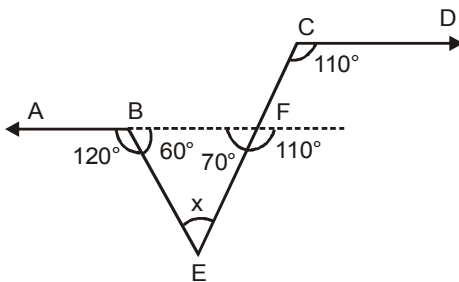
168.

In $\triangle OBC$

$$m + m + 2n = 180^\circ$$

$$m + n = 90^\circ$$

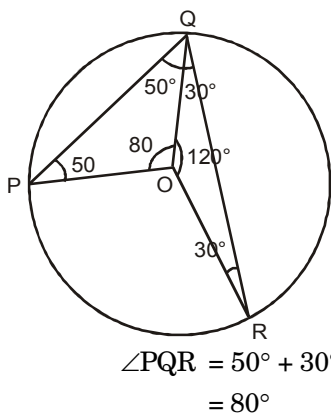
169.

In $\triangle BEF$

$$60^\circ + x + 70^\circ = 180^\circ$$

$$x = 50^\circ$$

170.



$$\angle PQR = 50^\circ + 30^\circ = 80^\circ$$

$$171. \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

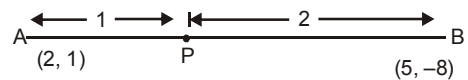
$$\sum_{i=1}^n (x_i - n\bar{x})$$

$$= (x_1 + x_2 + x_3 + \dots + x_n) - n\bar{x}$$

$$= n\bar{x} - n\bar{x}$$

$$= 0$$

172.



$$P\left(\frac{1 \times 5 + 2 \times 2}{1 + 2}, \frac{1 \times (-8) + 2 \times 1}{1 + 2}\right)$$

$$P(3, -2)$$

P lies on the line $2x + y + k = 0$

$$\therefore 2(3) - 2 + k = 0$$

$$k = -4$$

173. Circumference of base of cylinder

$$= 2\pi \times 5$$

$$= 10\pi \text{ cm}$$

Total round of wire around the cylinder

$$= \frac{1.2 \times 100}{3/10}$$

$$= 400$$

$$\therefore \text{Length of wire} = 400 \times 10\pi$$

$$= 4000\pi \text{ cm}$$

$$4000 \times 3.14 = 12560 \text{ cm}$$

$$\text{or } 125.6 \text{ m}$$

174. Mode = 3 Median = 2 Mean

175.

$x = 0$		
		$y = 4$
		$x = 3$
		$y = 0$

$$176. \quad 2^{x-1} + 2^{x+1} = 320$$

$$\frac{2^x}{2} + 2^x \times 2 = 320$$

$$2^x \times \left(\frac{1}{2} + 2 \right) = 320$$

$$2^x \times \frac{5}{2} = 320$$

$$2^x = 128 = 2^7$$

$$x = 7$$

$$177. \quad x + \frac{1}{x} = 2$$

$$\left(\sqrt{x} \right)^2 + \left(\frac{1}{\sqrt{x}} \right)^2 + 2\sqrt{x} \cdot \frac{1}{\sqrt{x}} = 2 + 2$$

$$\left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2 = 4$$

$$\sqrt{x} + \frac{1}{\sqrt{x}} = 2$$

$$178. \quad (2)^2 - 5(2) + P = 0$$

$$P = 6$$

$$179. \quad \text{Altitude} = x \text{ cm}$$

$$\text{Base} = (x + 4) \text{ cm}$$

$$\text{Hypotenuse} = (x + 8) \text{ cm}$$

$$(x + 8)^2 = (x + 4)^2 + x^2$$

$$x^2 - 8x - 48 = 0$$

$$x^2 - 12x + 4x - 48 = 0$$

$$(x - 12)(x + 4) = 0$$

$$x = 12$$

$$180. \quad x^2 + y^2 = (x + y)^2 - 2xy$$

$$= 8^2 - 2 \times 15$$

$$= 34$$

■ ■

NTSE - 2014

CHANDIGARH

PART I : MENTAL ABILITY TEST

Directions (Q. 1–5) : Arrange the given words in the sequence in which they occur in the dictionary and then choose the correct sequence from the options.

1. (A) Cloth (B) Cinema
(C) Chronic (D) Christmas
(E) Create

(a) (D), (C), (B), (A), (E)
(b) (A), (B), (C), (D), (E)
(c) (D), (B), (C), (E), (A)
(d) (D), (B), (C), (A), (E)

2. (A) Dialogue (B) Diagram
(C) Diameter (D) Diagnose
(E) Dial

(a) (D), (B), (E), (A), (C)
(b) (B), (D), (E), (A), (C)
(c) (A), (B), (D), (E), (C)
(d) (A), (B), (C), (D), (E)

3. (A) Navigate
(B) National
(C) Naughty
(D) Nation
(E) Narrow

(a) (E), (D), (C), (B), (A)
(b) (E), (D), (B), (C), (A)
(c) (A), (B), (C), (D), (E)
(d) (E), (B), (C), (D), (A)

4. (A) Peerless
(B) Penal
(C) Petroleum
(D) Pedestrian
(E) Pharmacy

(a) (D), (A), (B), (E), (C)
(b) (A), (B), (E), (D), (C)
(c) (D), (A), (B), (C), (E)
(d) (D), (A), (E), (C), (B)

5. (A) Unstable
(B) Unship
(C) Unsafe
(D) Unseat
(E) Unshared

(a) (A), (C), (B), (D), (E)
(b) (C), (D), (E), (B), (A)
(c) (A), (D), (E), (B), (C)
(d) (E), (D), (C), (B), (A)

Directions (Q. 6–10) : Select the combination of numbers so that letters arranged accordingly will form a meaningful word.

6. B L I P U S H

1 2 3 4 5 6 7

(a) 4, 5, 1, 2, 6, 3, 7
(b) 4, 5, 3, 2, 1, 6, 7
(c) 1, 2, 3, 4, 5, 6, 7
(d) 4, 5, 1, 2, 3, 6, 7

7. H L R A O C S

1 2 3 4 5 6 7

(a) 1, 2, 3, 4, 5, 6, 7
(b) 7, 6, 5, 1, 4, 2, 3
(c) 7, 6, 1, 5, 2, 4, 3
(d) 7, 6, 5, 1, 2, 4, 3

8. I K E S R T

1 2 3 4 5 6

(a) 6, 4, 5, 1, 2, 3
(b) 4, 6, 5, 1, 2, 3
(c) 6, 5, 4, 3, 2, 1
(d) 1, 2, 3, 4, 5, 6

9. M B L A L R U E

1 2 3 4 5 6 7 8

(a) 7, 1, 2, 6, 8, 3, 5, 4

(b) 1, 2, 3, 4, 5, 6, 7, 8

(c) 8, 7, 2, 1, 4, 5, 3, 6

(d) 1, 2, 3, 6, 7, 8, 4, 5

10. R G O S I E A N

1 2 3 4 5 6 7 8

(a) 3, 8, 7, 4, 5, 6, 1, 2

(b) 3, 2, 1, 5, 8, 7, 4, 6

(c) 3, 1, 2, 8, 7, 4, 5, 6

(d) 3, 1, 2, 7, 8, 5, 4, 6

Directions (Q. 11–15) : Some words are given in Column-I. These words are written in a code language in Column-II. The code equivalents of the words given in Columns-I and II are not necessarily in the corresponding order.

Choose the correct code for the words from the given alternatives.

S.No.	Column-I	Column-II
(i)	Pod na joc	very bright boy
(ii)	tan nu pod	the boy comes
(iii)	nu per ton	keep the doll
(iv)	joc ton su	very good doll
(v)	sa pod ton	doll is boy

11. Which word will be code for word doll?

(a) ton (b) na

(c) joc (d) per

12. Which word will be code for boy?

(a) nu (b) sa

(c) pod (d) tan

13. Which word will be code for word bright?

(a) pod (b) tan

(c) nu (d) na

14. Which word will be code for word keep?

(a) joc (b) per

(c) pod (d) tan

15. Which word will be code for word the?

(a) nu (b) tan

(c) per (d) sa

Directions (Q. 16–20) : There are three words. The first two words to the left of (::) are related in some way. The same relationship holds between the third word to the right of sign (::) and one of the responses. Identify the correct related word.

16. Newspaper : Editor :: Film : ?

(a) Actor (b) Producer

(c) Director (d) Story Writer

17. Calendar : Dates :: Dictionary : ?

(a) Language (b) Sentences

(c) Grammar (d) Vocabulary

18. Rupee : India :: Yen : ?

(a) Pakistan (b) Japan

(c) Bangladesh (d) Nepal

19. Dog : Bark :: Goat : ?

(a) Bleat (b) Howl

(c) Grunt (d) Bray

20. Animals : Zoology :: Birds : ?

(a) Botany (b) Philology

(c) Ornithology (d) Siesmology

Directions (Q. 21–25) : Choose the correct options.

21. As COUNSEL is to BITIRAK, so also GUIDANCE is to:

(a) HOHYBJBA (b) FPHZZKAB

(c) FOHYZJBB (d) OHYZKBB

22. As BLOCKED is to YOLOXPVW, so also OZFMXS is to:

(a) LABOUR (b) LAUNCH

(c) NAUGHT (d) RESULT

23. As THEREFORE is to TEEOERFRH, so also HELICOPTER is to:

(a) RETPOCILNE

(b) RETPOCILEH

(c) HLCPERTOIE

(d) HELICORETP

24. As RATIONAL is to RATNIOLA, so also TRIBAL is to:

- (a) TRILBA (b) TIRLBA
(c) TRIALB (d) TIRLAB

25. As CIRCLE is to RICELC, so also SQUARE is to:

- (a) UQSERA (b) UQSAER
(c) QUSERA (d) QSUERA

Directions (Q. 26–30) : They are based on the following information $\alpha, \beta, \gamma, \delta, \epsilon, \phi, \psi, \eta$ are sitting on a merry-go-round facing at the center. δ is second to the left of η who is third to the left of α , β is fourth to the right of γ who is immediate neighbour of β or γ is not a neighbor of β or γ , ϕ is not a neighbor of β .

26. Who is third to the left of β ?

- (a) α (b) γ
(c) ϕ (d) ψ

27. In which of the following pairs is the first person sitting to the immediate right of the second person?

- (a) δ, ψ (b) β, ϵ
(c) η, β (d) ψ, η

28. What is ϕ 's position with respect to ψ ?

- (a) Third towards right
(b) Third towards left
(c) Second towards right
(d) Second towards left

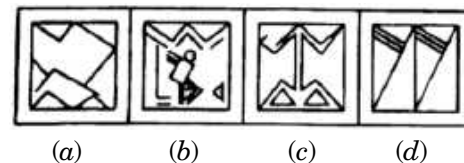
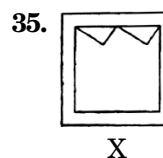
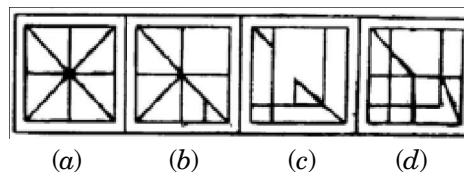
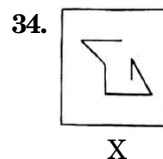
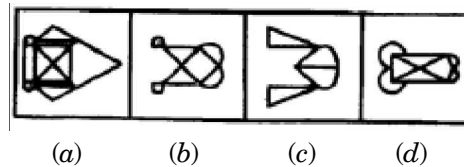
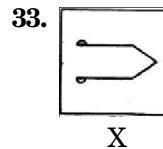
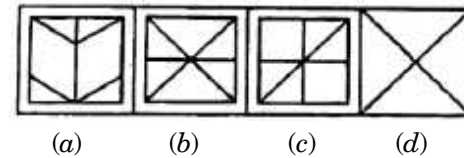
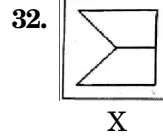
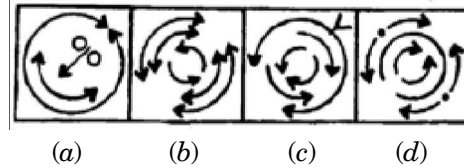
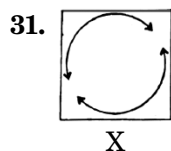
29. Who is sitting between α and β ?

- (a) Both ϵ and η (b) Both ϕ and γ
(c) Only ϵ (d) Only γ

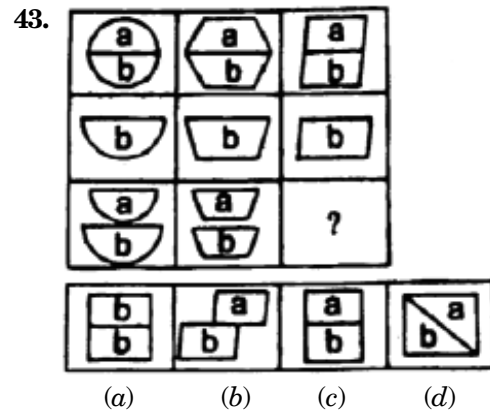
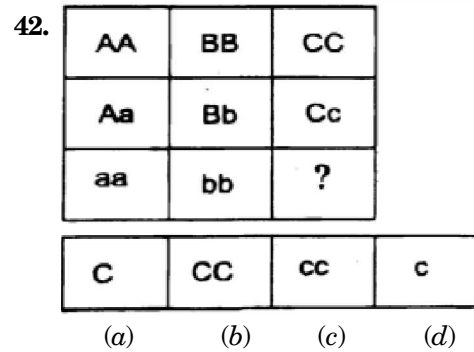
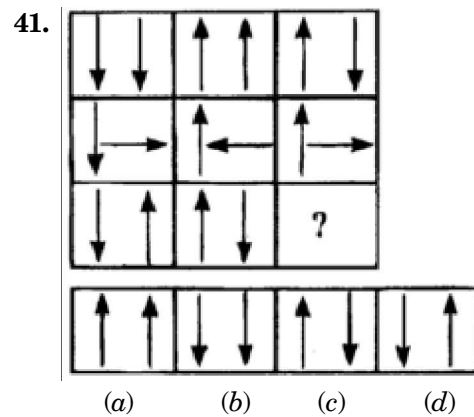
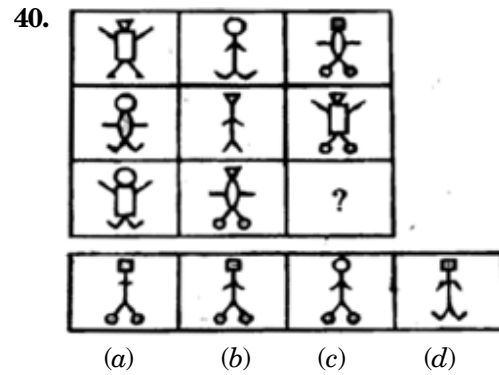
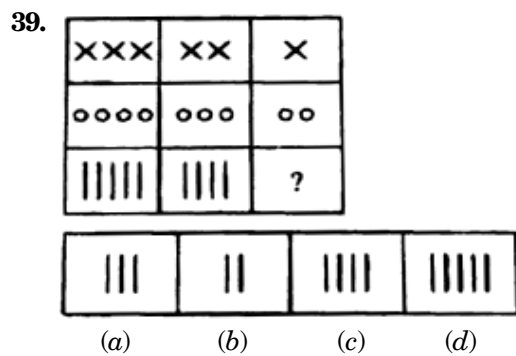
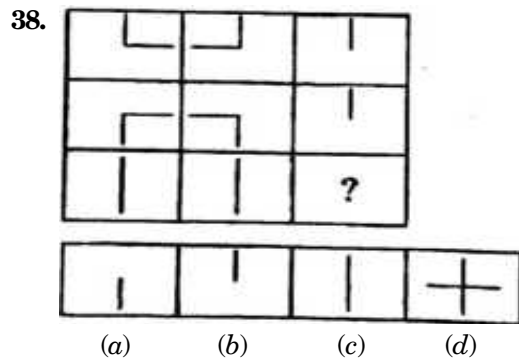
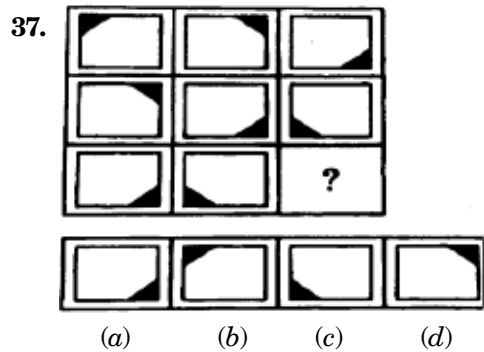
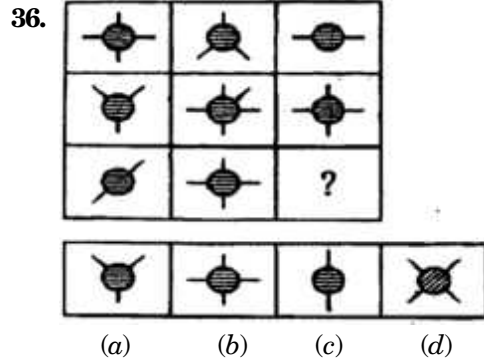
30. How many of them are sitting between γ and β ?

- (a) 0 or 6 (b) 1 or 5
(c) 2 or 4 (d) 3

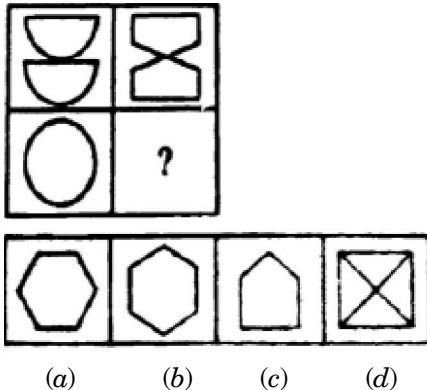
Directions (Q. 31–35) : You are given a figure (X) followed by four figures 1, 2, 3 and 4 such that (X) is embedded in one of them. Trace out the correct alternative.



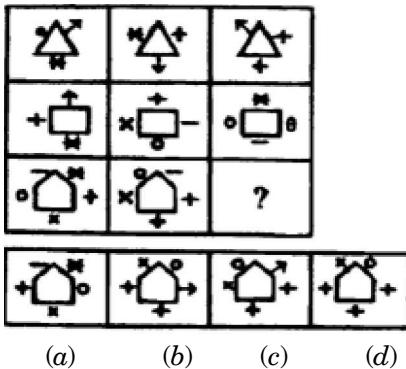
Directions (Q. 36–45) : Find out which of the answer figures 1, 2, 3, and 4 completes the figure matrix.



44.



45.



Directions (Q. 46–50) : You are given a combination of letters and numbers followed by four alternatives 1, 2, 3, and 4. Choose the alternative that most closely resembles the mirror image (can be horizontal or vertical or both) of the given combination.

46. REASONING

- (a) REAVSONING (b) GNINOSAEER
(c) GNINOSAEER (d) REAVSONING

47. WESTERN

- (a) NRETSZEW (b) NRETSZEW
(c) NRETSZEW (d) NRETSZEW

48. DBV8478

- (a) 8478DBV (b) 8748VBD
(c) 8478DBV (d) 8748VBD

49. 15UP5062

- (a) 5062UP15 (b) 2605PQ51
(c) 5062UP15 (d) None of these

50. panipat

- (a) tapinap (b) qsnipst
(c) tsqinap (d) patpani

PART II : ENGLISH LANGUAGE

Directions (Q. 1–5) : Read the passage below and answer the questions given after it.

At this stage of civilization, when many nations are brought into close and vital contact for good and evil, it is essential, as never before, that their gross ignorance of one another should be diminished, that they should begin to understand a little of one another's historical experience and resulting mentality. It is the fault of the English to expect the people of other countries to react as they do, to political and international situations. Our genuine goodwill and good intentions are often brought to nothing, because we expect other people to be like us. This would be corrected if we knew the history, not necessarily in detail but in broad outlines, of the social and political conditions which have given to each nation its present character.

1. According to the author 'Mentality' of a nation is mainly product of it's:

- (a) present character
(b) international position
(c) politics
(d) history

2. The character of a nation is the result of its:

- (a) gross ignorance
(b) cultural heritage
(c) socio-political conditions
(d) mentality

3. The need for a greater understanding between nations:

- (a) is more today than ever before
(b) was always there
(c) is no longer there
(d) will always be there

4. Englishmen like others to react to political situations like:

- (a) others (b) us
(c) themselves (d) each others

5. According to the author his countrymen should:
- read the story of other nations
 - not react to others' actions
 - have a better understanding of other nations
 - have vital contacts other nations

Directions (Q. 6–8) : Read the following passage and answer the questions given after it.

Mahatma Gandhi believed that industrialization was no answer to the problems that plague the mass of India's poor and that villagers should be taught to be self-sufficient in food, weave their own cloth from cotton and eschew the glittering prizes that the twentieth century so temptingly offers. Such an idyllic and rural paradise did not appeal to the those who inherited the reins of political power.

6. Mahatma Gandhi's views opposed industrialization of villages because:
- It would take away the skill of the villagers
 - It would undermine self-sufficiency and destroy the beauty of life of the villagers
 - It would help the poor and not the rich
 - It would affect the culture of the Indians
7. The meaning of the glittering prizes that the twentieth century so temptingly offers is
- replacement of rural by urban interests
 - absence of violence and corruption
 - pursuit of a commercialized material culture
 - complete removal of poverty
8. The basis of 'an idyllic and rural paradise' is:
- self-sufficiency in food and clothes and simplicity of life style
 - supporting those holding powerful political positions
 - rapid industrialization of villages
 - bringing to the villages the glittering prizes of the twentieth century

Directions (Q. 9–10) : In each of the following questions out of the given alternatives, choose the one which best expresses the meaning of the given word.

9. Harsh

- Disfigure
- Slit
- Severe
- Slash

10. Tedious

- Tiresome
- Painful
- Troublesome
- Lengthy

Directions (Q. 11–15) : Choose the word which is the exact *OPPOSITE* of the given words.

11. Abet

- Prevent
- Aid
- Pacify
- Rush

12. Amused

- Jolted
- Frightened
- Saddened
- Astonished

13. Disparage

- Please
- Denigrate
- Praise
- Belittle

14. Culpable

- Irresponsible
- Careless
- Defendable
- Blameless

15. Intricacy

- Distance
- Simplicity
- Cordiality
- Ornate

Directions (Q. 16–25) : Find the answer that best matches the underlined word / phrase.

16. he disposed of the old materials.

- fell away
- threw away
- went away
- cut away

17. Please submit your application before two o'clock.

- hand in
- hand down
- hand off
- hand out

18. Rahul and Jassi are friendly with each other.
 (a) get by with (b) get along with
 (c) get over with (d) get through with
19. Were you able to recover your stolen laptop?
 (a) get back (b) reach back
 (c) go back (d) come back
20. Someone illegally entered the warehouse last night.
 (a) broke away (b) saw through
 (c) saw into (d) broke into
21. After stopping at Bombay, the ship travelled towards Cochin.
 (a) made to (b) passed up
 (c) went over (d) headed for
22. Mr. Sethi was hit by a car yesterday on his way to work.
 (a) run up (b) run through
 (c) run over (d) run out
23. Please read the instructions carefully before starting the work.
 (a) watch out (b) loop up
 (c) let down (d) go through
24. Yamini resembles her mother more than her father.
 (a) takes after (b) goes after
 (c) looks after (d) calls after
25. Babu's secretary interrupted to tell him he had a telephone call.
 (a) cut out (b) cut in
 (c) took in (d) took out

Directions (Q. 26–30) : *Of the four alternatives given under each sentence, find the one that best fits into the blank space.*

26. It _____ to me that she was incurable.
 (a) suggested (b) flashed
 (c) happened (d) occurred
27. I am feeling _____ better today.
 (a) too (b) rather
 (c) very (d) fairly

28. _____ the accident, the train will arrive in time.
 (a) Besides (b) Accepting
 (c) Despite (d) Barring
29. The Sun _____ at six this morning.
 (a) arose (b) rose
 (c) aroused (d) raised
30. Health is too important to be _____.
 (a) neglected (b) detested
 (c) despised (d) discarded

Directions (Q. 31–35) : *In the following passage, there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the given options:*

Do women exercise leadership differently from which men do? And if so, will feminine leadership ... (31)... where masculine leadership does not? A recent study suggests somewhat paradoxically that female managers ... (32)... their male counterparts even when the personal characteristics are very similar. Of the two schools of thought, the structuralist theory argues that men and women do not receive the same treatment in the workspace and that stamping out ... (33)... Bias would stamp out the observed ... (34)... In contrast the socialization theory contends that men and women experience work as more ... (35)... to their lives.

31. (a) Affect (b) Succeed
 (c) Compete (d) Progress
32. (a) Out live (b) Out come
 (c) Out stand (d) Out work
33. (a) Employment (b) Culture
 (c) Gender (d) Class
34. (a) Variations (b) Discriminations
 (c) Resemblances (d) Distortions
35. (a) Central (b) Preliminary
 (c) Trivial (d) Needy

Directions (Q. 36–40) : *Select the meaning of the given phrases / idioms.*

36. At one's wit's end
 (a) Perplexed (b) Clear up
 (c) Explain (d) Enlighten

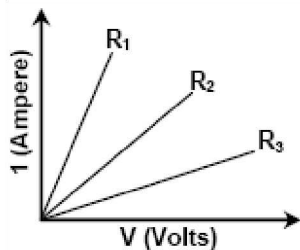
37. At one's fingertips
 (a) To take revenge
 (b) Matter of shame
 (c) Complete knowledge
 (d) None of the above
38. At the spur of the moment
 (a) Difficult Moment
 (b) Without Delay
 (c) Great Moment
 (d) Very Slow
39. All in all
 (a) Every person
 (b) Particular thing same in all
 (c) Call all at once
 (d) Most important
40. At close quarters
 (a) Close examinations
 (b) Live near to each other
 (c) Live far to each other
 (d) In love

PART III

SCHOLASTIC APTITUDE TEST

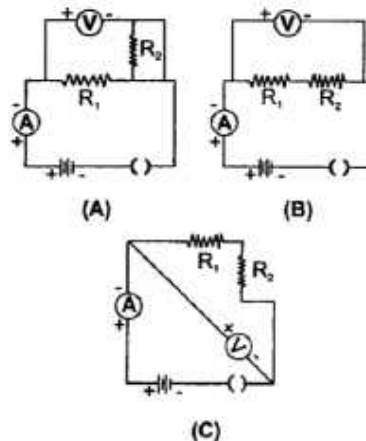
PHYSICS

1. A student carries out an experiment and plots the V-I graph of three samples of Nicrome wire with resistance R_1 , R_2 and R_3 respectively. Which of the following is true?



- (a) $R_1 = R_2 = R_3$
 (b) $R_1 > R_2 > R_3$
 (c) $R_3 > R_2 > R_1$
 (d) $R_2 > R_3 > R_1$

2. While doing their experiment on finding the equivalent resistance of two resistors connected in series, the students A, B and C set up their circuits as shown. The correct set up is that of:



- (a) Students A and B
 (b) Students B and C
 (c) Students C and A
 (d) All the three students
3. Commercial electric motors do not use:
 (a) An electromagnet to rotate the armature
 (b) Effectively large no. of turns of conducting wire in the current carrying coil
 (c) A permanent magnet to create the armature
 (d) A soft iron core on which the coil is wound
4. What is the angle of incidence when the incident ray is normal to the interface or boundary separating two media?
 (a) 0° (b) 90°
 (c) 180° (d) 45°
5. In an experiment with a rectangular glass slab, for an angle of incidence of 60° in air, angle of refraction is measured to be r_1 . When the glass slab is replaced by a hollow slab filled with water, angle of refraction is measured to be r_2 . Then:
 (a) $r_2 = r_1$ (b) $r_2 > r_1$
 (c) $r_2 < r_1$ (d) Cannot say

6. If angle of minimum deviation through an equilateral prism is 40° , angle of incidence (being equal to angle of emergence) would be:
 (a) 50° (b) 60°
 (c) 40° (d) None of these
7. A convex lens of focal length f_1 is held in contact with a concave lens of focal length f_2 . We can find rough focal length of the combination only when:
 (a) $f_1 = f_2$
 (b) $f_1 < f_2$
 (c) $f_1 > f_2$
 (d) None of these
8. An apple falls from a tree because of gravitation between the earth and apple. If F_1 is the magnitude of force exerted by the earth on the apple and F_2 is the magnitude of force exerted by apple on earth, then:
 (a) F_1 is very much greater than F_2
 (b) F_2 is very much greater than F_1
 (c) F_1 is only a little greater than F_2
 (d) F_1 and F_2 are equal
9. A body floats with $\frac{1}{3}$ of its volume outside water and $\frac{3}{4}$ of its volume outside another liquid. The density of the other liquid is:
 (a) $\frac{9}{4} \times 10^3 \text{ kg/m}^3$ (b) $\frac{4}{9} \times 10^3 \text{ kg/m}^3$
 (c) $\frac{8}{3} \times 10^3 \text{ kg/m}^3$ (d) $\frac{3}{4} \times 10^3 \text{ kg/m}^3$
10. A hydrometer floats with half of its stem outside water surface. It is now placed in alcohol (R.D = 0.8). The hydrometer floats:
 (a) with stem at the same position
 (b) with more stem inside the alcohol
 (c) with more stem outside alcohol
 (d) in tilted position
11. A key of a mechanical piano is struck gently and then struck again but much harder this time. In the second case:
 (a) Sound will be louder but pitch will not be different
 (b) Sound will be louder and pitch will also be higher
 (c) Sound will be louder but pitch will be lower
 (d) Both loudness and pitch will remain unaffected
12. The intensity of sound wave gets reduced by 20% on passing through a slab. The reduction in intensity on passing through two consecutive slabs is:
 (a) 40% (b) 36%
 (c) 30% (d) 50%

CHEMISTRY

13. A dilute Ferrous sulphate solution was gradually added to the beaker containing acidified Permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?
 (a) KMnO_4 is an oxidizing agent, it oxidizes FeSO_4
 (b) FeSO_4 acts as an oxidizing agent and oxidizes KMnO_4
 (c) The colour disappears due to dilution: no reaction is involved
 (d) KMnO_4 is an unstable compound and decomposes in presence of FeSO_4 to a colourless compound
14. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?
 (a) Lead sulphate (insoluble)
 (b) Lead acetate
 (c) Ammonium nitrate
 (d) Potassium sulphate

- 15.** Which of the following are exothermic processes?
- Reaction of water with quick lime
 - Dilution of an acid
 - Evaporation of water
 - Sublimation of Camphor (Crystals)
- (a) and (b)
 - (b) and (c)
 - (a) and (d)
 - (c) and (d)
- 16.** If a few drops of a concentrated acid accidentally spill over the hand of a student, what should be done?
- Wash the hand with saline water
 - Wash the hand immediately with plenty of water and apply a paste of sodium hydrogen carbonate
 - After washing with plenty of water, apply solution of sodium hydroxide on the hand
 - Neutralise the acid with a strong alkali
- 17.** Which of the following is acidic in nature?
- Lime juice
 - Human blood
 - Lime water
 - Antacid
- 18.** Which of the following represent saponification reaction?
- $\text{CH}_3\text{COONa} + \text{NaOH} \xrightarrow{\text{CaO}} \text{Na}_2\text{CO}_3$
 - $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$
 - $2\text{CH}_3\text{COOH} + 2\text{Na} \rightarrow \text{CH}_3\text{COONa} + \text{H}_2$
 - $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{C}_2\text{H}_5\text{OH}$
- 19.** Hard water does not easily produce lather with soap because it contains:
- Only Mg^{2+} ions
 - Only Ca^{2+} ions
 - Both Mg^{2+} and Ca^{2+} ions
 - Both Na^+ and K^+ ions
- 20.** Which of the given element A, B, C, D and E with atomic number 2, 3, 5, 7, 10 and 30 respectively belong to the same period?
- A, B, C
 - B, C, D
 - A, D, E
 - B, D, E
- 21.** A mixture of sulphur and carbon disulphide is:
- Heterogeneous and shows Tyndall effect
 - Heterogeneous and does not show Tyndall effect
 - Homogeneous and shows Tyndall effect
 - Homogeneous and does not show Tyndall effect
- 22.** Which of the following contains maximum number of molecules?
- 1 gm of CO_2
 - 1 gm of N_2
 - 1 gm of H_2
 - 1 gm of CH_4
- 23.** Which of the following correctly represent 360 gms of water?
- 2 moles of H_2O
 - 20 moles of water
 - 6.022×10^{23} molecules of water
 - 1.2044×10^{25} molecules of water
- (i)
 - (i) and (iv)
 - (ii) and (iii)
 - (ii) and (iv)

BIOLOGY

- 24.** Which one of the following is not an Annelid?
- Nereis
 - Earthworm
 - Leech
 - Urchin
- 25.** If salivary amylase is lacking in the saliva, which of the following functions in mouth cavity will be affected?
- Proteins breaking down into amino acids
 - Starch breaking down into sugars
 - Fats breaking down into fatty and glycerol
 - None of these
- 26.** Reproduction is essential for living organisms in order to:
- Keep the individual organism alive
 - Fulfil their energy requirements
 - Maintain growth
 - Continue the species generation after generation

- 27.** A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because:
- Tallness is recessive trait
 - Tallness is dominant trait
 - Dwarfness is dominant trait
 - All of these
- 28.** According to evolutionary theory, formation of new species is due to:
- New needs and changes in environmental conditions
 - Sudden change in climatic conditions
 - Accumulation of variations over several generations
 - Inheritance of acquired characteristics
- 29.** Which is correct sequence of air passage during inhalation?
- Nostrils → Larynx → Pharynx → Trachea → Lungs
 - Nasal Passage → Trachea → Pharynx → Larynx → Alveoli
 - Larynx → Nostrils → Pharynx → Lungs
 - Nostrils → Pharynx → Larynx → Trachea → Alveoli
- 30.** If testa is removed from water soaked gram seed, the remaining structure is:
- Full mature embryo
 - Cotyledons with endosperm
 - Cotyledons filled with starch
 - Half mature embryo
- 31.** Which of the following statement is incorrect?
- For every hormone there is a gene
 - For every protein there is a gene
 - For production of every enzyme there is a gene
 - For every molecule of fat there is a gene
- 32.** Some dinosaurs had feathers although they could not fly but birds have feathers that help them to fly. In the context of evolution this means that:
- reptiles have evolved from birds
 - there is no evolutionary connection between reptiles and birds
 - feathers are homologous structures in both the organisms
 - birds have evolved from reptiles
- 33.** Excessive exposure of human to UV rays results in:
- Damage to immune system
 - Damage to lungs
 - Skin cancer
 - Peptic Ulcers
- (i) and (ii)
 - (ii) and (iv)
 - (i) and (iii)
 - (iii) and (iv)
- 34.** Making antiviral drugs is more difficult than making anti bacterial medicines because:
- Viruses make use of host machinery
 - Viruses are on the border line of living and nonliving
 - Viruses have very few biochemical mechanisms of their own
 - Viruses have a protein coat
- 35.** In desert plants, rate of water loss gets reduced due to the presence of:
- Cuticle
 - Stomata
 - Lignin
 - Suberin

SOCIAL SCIENCE

- 36.** The term 'Tavern' stands for a:
- Place where people gathered to dance and dine
 - Place where people carried political discussions
 - Place where people gathered to drink alcohol
 - Place where people gathered to discuss their problems

37. "When France sneezes, the rest of Europe catches cold", who remarked these words?
 (a) Duke Metternich
 (b) Giuseppe Mazzini
 (c) Otto Von Bismarck
 (d) Frederic Sorrieu
38. The Tripartite Pact (1940) was signed by:
 (a) Britain, France and Germany
 (b) Germany, Italy and Japan
 (c) Japan, Britain and Russia
 (d) Russia, Britain and USA
39. Philanthropis mainly work for:
 (a) industrial workers
 (b) peasants
 (c) social and religious reforms
 (d) social upliftment and charity
40. The Vernacular Press Act (1878) was prepared to:
 (a) provide the government with right to censor reports and editorials
 (b) provide the government with rights to promote vernacular press
 (c) provide the government with right to favour Indian vernacular press for growth of nationalism
 (d) provide the government with rights to finance vernacular press
41. "Civil Code of 1804" is usually known as:
 (a) Habsburg Code (b) Napoleonic Code
 (c) Germanic Code (d) Dutch Code
42. Which leader is known as the Frontier Gandhi?
 (a) M.K. Gandhi
 (b) Indira Gandhi
 (c) Abdul Ghaffar Khan
 (d) J.L. Nehru
43. Raikas tribe is found in:
 (a) Madhya Pradesh
 (b) Arunachal Pradesh
 (c) Jharkhand
 (d) Rajasthan
44. Which of the following is not included in the teachings of Jainism?
 (a) Fasts and mortification for the body
 (b) Belief in Karma and rebirth
 (c) Non-violence
 (d) Belief in God
45. The Upanishads are:
 (a) A source of Hindu philosophy
 (b) Books of ancient Hindu law
 (c) Books on social behavior man
 (d) Prayers to god
46. Indian Constitution Federation from:
 (a) USA (b) Canada
 (c) Australia (d) England
47. Water privatisation protest in Bolivia was led by:
 (a) Student union (b) Fedecor
 (c) Political Parties (d) Labour Union
48. Universal Adult Franchise was firstly granted in:
 (a) Germany (b) USA
 (c) Newzealand (d) Britain
49. In a parliamentary form of democracy:
 (a) Executive controls the Legislature
 (b) Executive Controls the Judiciary
 (c) Judiciary controls the Executive
 (d) Legislature controls the Executive
50. Which of the following locations is not correct?
- | Name of the organization | Location of Headquarter |
|------------------------------------|-------------------------|
| (a) UNESCO | Paris |
| (b) ILO | Geneva |
| (c) FAO | Brussels |
| (d) International Court of Justice | the Hague |
51. Which of the following statements about the International Court of Justice is not correct?
 (a) It is the principal judicial organ of the United Nations
 (b) Its judges are elected
 (c) Its decisions are not enforceable
 (d) Nations aggrieved by the non-implementation of the decision have no further redress

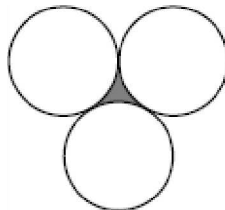
- 52.** The Civil Court does not deal with:
- (a) Land disputes
 - (b) Landlord tenant disputes
 - (c) Offence like thefts
 - (d) None of these
- 53.** In the context of Panchayati Raj, which one of the following is true about Gram Sabha?
- (a) This is the topmost tier of the Panchayati Raj
 - (b) It consists of all the voters residing in the jurisdiction of a village panchayat
 - (c) It is executive body consisting of selected representatives from the village panchayat
 - (d) It consists of all about males of the village panchayat
- 54.** Eligibility for a regional party to be recognized as a national party is:
- (a) To be recognized in at least 3 states
 - (b) Recognized in at least 4 states
 - (c) To get 1/10th of the seats of Lok Sabha
 - (d) Get 1/10th seats of Parliament
- 55.** What is Zero Hour?
- (a) When matters of utmost importance are raised
 - (b) When a money bill is introduced in the Lok Sabha
 - (c) when session became zero
 - (d) At 12'o clock
- 56.** Irrigation facilities should be improved urgently in India because:
- (a) irrigation yields better output
 - (b) monsoon is irregular
 - (c) rivers are dry most of the periods in the year
 - (d) land under irrigation is small
- 57.** Maharashtra state is ideal for cotton cultivation because:
- (a) it has a good network of communication
 - (b) it has sticky black soil
 - (c) it provides cheap and abundant labour
 - (d) it has a moderate climate
- 58.** Why is there scanty rainfall in the Deccan Plateau?
- (a) It is far away from the sea
 - (b) It is near the sea
 - (c) It is in the rain shadow region
 - (d) None of these
- 59.** Flood occur frequently in the northern plains of India because of:
- (a) Long spells of rainy weather
 - (b) the presence of many large river courses
 - (c) Fluctuation of the level of the underground water table
 - (d) Uncertain and uneven occurrence of rains in the plains
- 60.** Which of the following statements is correct?
- (a) Equatorial regions are regions of permanent low pressure
 - (b) Equatorial regions have low pressure during summer but high pressure during winter
 - (c) Atmospheric pressure is always high along the equator
 - (d) None of the above
- 61.** What is Overa?
- (a) National park
 - (b) Wild life Sanctuary
 - (c) Biosphere resource
 - (d) Bird Sanctuary
- 62.** Nagarjuna Sagar dam is on which river?
- (a) Ganga
 - (b) Ravi
 - (c) Krishna
 - (d) Cauvery
- 63.** Milpa farming is practiced in:
- (a) Venezuela
 - (b) Brazil
 - (c) Indonesia
 - (d) Mexico
- 64.** Which country is largest producer of Rice in the world?
- (a) India
 - (b) USA
 - (c) Indonesia
 - (d) China
- 65.** Which of the following is Bio-diesel crop?
- (a) Sugarcane
 - (b) Jatropha
 - (c) Wheat
 - (d) Rice

66. Which of the following is NOT a Directive Principle?
- To raise of nutrition
 - To develop scientific temper
 - To promote economic interests of weaker sections
 - To separate judiciary from executive
67. Which is not the cause of low agriculture productivity?
- Lack of irrigation facilities
 - Poor techniques
 - Non-availability of good seeds
 - Lack of demand
68. The unemployment problem can be solved by:
- development of education
 - development of industries
 - use of modern means of production in agriculture
 - efficient administration
69. Economic development of a country is measured on the basis of:
- National income only
 - Per National income only
 - Net domestic product
 - National income and per capital income
70. Second green revolution is related to the production of which crop?
- Wheat
 - Rice
 - Oilseeds
 - Sugarcane
72. The distance between the centre of the two circles of radii r_1 and r_2 is d . they will touch each other internally if:
- $d = r_1$ or r_2
 - $d = r_1 + r_2$
 - $d = r_1 - r_2$
 - $d = \sqrt{r_1 r_2}$
73. In an equilateral triangle ABC if $AD \perp BC$, then:
- $2AB^2 = 2AD^2$
 - $4AB^2 = 3AD^2$
 - $3AB^2 = 4AD^2$
 - $2AB^2 + 2AD^2$
74. The ratio of the length of a side of an equilateral triangle and its height is:
- 2 : 1
 - 1 : 2
 - $2 : \sqrt{3}$
 - $\sqrt{3} : 2$
75. There are four lines in a plane no two of which are parallel. The maximum number of points in which they can intersect is:
- 4
 - 5
 - 6
 - 7
76. A balloon of radius r makes an angle α at the eye of an observer and the angle of elevation of its centre is β . The height of its centre from the ground level is given by:
- $r \cos \frac{\beta}{2} \sec \alpha$
 - $r \cos \beta \sec \frac{\alpha}{2}$
 - $r \sin \frac{\alpha}{2} \operatorname{cosec} \beta$
 - $r \sin \beta \operatorname{cosec} \frac{\alpha}{2}$
77. From the top of a light house the angles of depression of two ships on the opposite sides of it are observed to be α and β . If the height of the light house be h meters and the line joining the ships passes through the foot of the light house, the distance between the ships is:
- $\frac{h(\cot \alpha + \cot \beta)}{\cot \alpha \cdot \cot \beta}$
 - $\frac{h(\tan \alpha + \tan \beta)}{\tan \alpha \cdot \tan \beta}$
 - $h(\tan \alpha + \tan \beta)$
 - $\frac{h \tan \alpha \cdot \tan \beta}{\tan \alpha \cdot \tan \beta}$
78. A boat is being rowed away from a cliff 150 m high. At the top of the cliff the angle of depression of the boat changes from 60° to 45° in 2 minutes. The speed of the boat is:
- 2 km/hr
 - 1.9 km/hr
 - 2.4 km/hr
 - 3 km/hr

MATHEMATICS

71. If three equal circles of radius 3 cm each touch each other externally as shown, then the area of the shaded portion is:

- $\frac{\sqrt{3}}{2}(2 - \pi)\text{cm}^2$
- $\frac{9}{2}(2\sqrt{3} - \pi)\text{cm}^2$
- $\frac{9}{2}(2\sqrt{3} + \pi)\text{cm}^2$
- $\frac{3}{2}(\sqrt{3} - \pi)\text{cm}^2$



79. $\frac{\cot A + \operatorname{cosec} A - 1}{\cot A - \operatorname{cosec} A + 1}$ is equal to
 (a) $\operatorname{cosec} A + \cot A$ (b) $\sec A + \cot A$
 (c) $\operatorname{cosec} A + \tan A$ (d) $\operatorname{cosec} A - \cot A$
80. A bag contains 5 blue and 4 black balls. Three balls are drawn at random. What is the probability that 2 are blue and 1 is black?
 (a) $\frac{1}{3}$ (b) $\frac{2}{5}$
 (c) $\frac{1}{6}$ (d) None
81. How many terms of the A.P. 3, 6, 9, 12, 15 must be taken to make the sum 108?
 (a) 6 (b) 7
 (c) 8 (d) 36
82. If V be the volume and S the surface area of a cuboid of dimensions a , b and c , then $\frac{1}{V}$ is equal to:
 (a) $\frac{S}{2}(a+b+c)$ (b) $\frac{2}{S}\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$
 (c) $\frac{2S}{a+b+c}$ (d) $2S(a+b+c)$
83. The area of a circular ring between two concentric circles of radii r and $(r+h)$ units respectively is given by:
 (a) $\pi(2r+h)h$ sq. units
 (b) $\pi(r+h)h$ sq. units
 (c) $\pi(r+2h)r$ sq. units
 (d) $\pi(r-h)r$ sq. units
84. A man can row three quarters of a km against the stream in $11\frac{1}{4}$ minutes and return in $7\frac{1}{2}$ minutes. The speed of the man in still water is:
 (a) 2 km/h (b) 3 km/h
 (c) 4 km/h (d) 5 km/h
85. A tank can be filled by one tap in 20 minutes and by another in 25 minutes. Both the taps are kept open for 5 minutes and then the second is turned off. In how many minutes more is the tank completely filled?
 (a) 6 (b) 11
 (c) 12 (d) $17\frac{1}{2}$
86. The solution set of the equation $x^{2/3} + x^{1/3} - 2 = 0$ is
 (a) $\{8, 1\}$ (b) $\{8, -1\}$
 (c) $\{-8, -1\}$ (d) $\{-8, 1\}$
87. The roots of the equation $x^2 + px + q = 0$ are 1 and 2. The roots of the equation $qx^2 - px + 1 = 0$ must be:
 (a) 1, $1/2$ (b) $-1/2, -1$
 (c) $-1/2, 1$ (d) $-1, 1/2$
88. The solution of the equations:
 $\frac{m}{x} + \frac{n}{y} = a, \frac{n}{x} + \frac{m}{y} = b$ is given by
 (a) $x = \frac{n^2 + m^2}{am - bn}, y = \frac{m^2 - n^2}{bm - an}$
 (b) $x = \frac{m^2 - n^2}{am - bn}, y = \frac{n^2 - m^2}{bm - an}$
 (c) $x = \frac{m^2 - n^2}{am - bn}, y = \frac{m^2 - n^2}{bm - an}$
 (d) $x = \frac{n^2 - m^2}{am - bn}, y = \frac{n^2 - m^2}{bm - an}$
89. The HCF of two expressions p and q is 1. Their LCM is:
 (a) $p + q$ (b) $p - q$
 (c) pq (d) $\frac{1}{pq}$
90. If $(x - a)$ is a factor of $x^3 - 3x^2a + 2a^2x + b$ then the value of b is:
 (a) 0 (b) 2
 (c) 1 (d) 3

ANSWERS**MENTAL ABILITY TEST**

1. (a)	2. (a)	3. (b)	4. (c)	5. (b)	6. (d)	7. (c)	8. (b)	9. (a)	10. (d)
11. (a)	12. (c)	13. (d)	14. (b)	15. (a)	16. (c)	17. (d)	18. (b)	19. (a)	20. (c)
21. (c)	22. (b)	23. (c)	24. (a)	25. (a)	26. (c)	27. (b)	28. (a)	29. (c)	30. (d)
31. (b)	32. (b)	33. (b)	34. (d)	35. (d)	36. (a)	37. (b)	38. (b)	39. (c)	40. (b)
41. (a)	42. (c)	43. (b)	44. (b,c)	45. (b)	46. (b)	47. (a)	48. (a)	49. (d)	50. (c)

ENGLISH LANGUAGE

1. (a)	2. (b)	3. (a)	4. (c)	5. (a)	6. (b)	7. (c)	8. (a)	9. (c)	10. (a)
11. (a)	12. (c)	13. (c)	14. (a)	15. (b)	16. (b)	17. (a)	18. (b)	19. (a)	20. (d)
21. (d)	22. (c)	23. (d)	24. (b)	25. (b)	26. (d)	27. (d)	28. (c)	29. (b)	30. (a)
31. (b)	32. (d)	33. (c)	34. (b)	35. (a)	36. (a)	37. (c)	38. (a)	39. (a)	40. (a)

SCHOLASTIC APTITUDE TEST

1. (c)	2. (b)	3. (c)	4. (a)	5. (b)	6. (a)	7. (a)	8. (d)	9. (c)	10. (b)
11. (a)	12. (b)	13. (a)	14. (b)	15. (a)	16. (b)	17. (a)	18. (d)	19. (c)	20. (b)
21. (a)	22. (c)	23. (d)	24. (d)	25. (b)	26. (d)	27. (b)	28. (c)	29. (d)	30. (b)
31. (d)	32. (d)	33. (c)	34. (c)	35. (a)	36. (c)	37. (a)	38. (b)	39. (d)	40. (a)
41. (b)	42. (c)	43. (d)	44. (d)	45. (a)	46. (b)	47. (d)	48. (c)	49. (d)	50. (c)
51. (c)	52. (c)	53. (b)	54. (b)	55. (d)	56. (d)	57. (b)	58. (a)	59. (b)	60. (a)
61. (b)	62. (c)	63. (d)	64. (d)	65. (b)	66. (d)	67. (d)	68. (d)	69. (d)	70. (b)
71. (b)	72. (c)	73. (c)	74. (c)	75. (c)	76. (d)	77. (b)	78. (b)	79. (a)	80. (d)
81. (c)	82. (b)	83. (a)	84. (d)	85. (b)	86. (d)	87. (b)	88. (c)	89. (c)	90. (a)

EXPLANATIONS**MENTAL ABILITY TEST**

1. The given words can be arranged in the alphabetical order as:
Christmas → Chronic → Cinema → Cloth → Create
2. The given words can be arranged in the alphabetical order as:
Diagnose → Diagram → Dial → Dialogue → Diameter
3. The given words can be arranged in the alphabetical order as:
Narrow → Nation → National → Naughty → Navigate
4. The given words can be arranged in the alphabetical order as:
Pedestrian → Peerless → Penal → Petroleum → Pharmacy
5. The given words can be arranged in the alphabetical order as:
Unsafe → Unseat → Unshared → Unship → Unstable
6. The given words on rearranging the letters
PUBLISH
7. The given words on rearranging the letters
SCHOLAR
8. The given words on rearranging the letters
STRIKE
9. The given words on rearranging the letters
UMBRELLA
10. The given words on rearranging the letters
ORGANISE
11. According to the given question the code for the word
Doll = ton
12. According to the given question the code for the word
Boy = pod
13. According to the given question the code for the word
Bright = na
14. According to the given question the code for the word
Keep = per
15. According to the given question the code for the word
The = nu
16. Head of the newspaper is editor similarly head of the film is director.
17. We see dates in calendar similarly we see vocabulary in dictionary
18. 'Rupee' is the currency of 'India'.
Similarly, 'yen' is the currency of 'Japan'.
19. Second is noise produced by the first.
20. Study of animal is Zoology
Similarly study of birds is Ornithology
21. The pattern is as follows:
- 1, - 6, - 1, - 5, - 1, - 4, - 1, - 3
22. The pattern is as follows:
B L O C K E D
25 15 12 24 16 22 23 Reverse value
Y O L X P V W
Similarly the code for
O Z F M X S
12 1 21 14 3 8 Reverse value
L A U N C H
23. The pattern is as follows:
1 2 3 4 5 6 7 8 9 = 1 3 5 7 9 8 6 4 2
T H E R E F O R E = T E E O E R F R H
Similarly the code for HELICOPTER
= H L C P E R T O I E
24. The pattern is as follows:
1 2 3 4 5 6 7 8 = 12 3 6 4 5 8 7
R A T I O N A L = R A T N I O L A
Similarly the code for
1 2 3 4 5 6 = 1 2 3 6 4 5
T R I B A L = T R I L B A

25. The pattern is as follows:

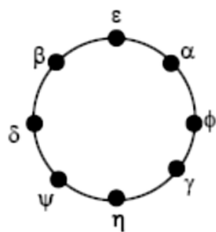
C I R C L E = R I C E L C

1 2 3 4 5 6 = 3 2 1 6 5 4

Similarly the code for

S Q U A R E = U Q S E R A

26 to 30



26. According to the above diagram ϕ is third to the left of β .
27. According to the above diagram β is sitting to the immediate right of ε .
28. According to the above diagram ϕ is third toward right of ψ .
29. According to the above diagram ε is sitting between α and β .
30. According to the above diagram three of them are sitting between γ and β .
31. 2 is answer by observation
32. 2 is answer by observation
33. 2 is answer by observation
34. 4 is answer by observation
35. 4 is answer by observation
36. 1 is answer by observation
37. 2 is answer by observation
38. 2 is answer by observation
39. 3 is answer by observation
40. 2 is answer by observation
41. 1 is answer by observation
42. 3 is answer by observation
43. 2 is answer by observation
44. 2, 3 is answer by observation
45. 2 is answer by observation
46. 2 is answer by observation
47. 1 is answer by observation
48. 1 is answer by observation
49. 4 is answer by observation
50. 3 is answer by observation that most closely resembles the mirror image.

SCHOLASTIC APTITUDE TEST

- Slope of I-V graph = $\frac{1}{R} = \tan\theta$. Slope is less for R_3 , so option three is correct.
- For figure a R_2 is parallel with ideal wire so the circuit will not work.
- Permanent magnets are weak.
- Incidence ray is along the normal so $i = 0^\circ$
- Refractive index of water is less than that of glass. So angle of refraction will be more for water.
- For minimum deviation $i = e$

$$\alpha + \delta_m = i + e$$

$$\alpha + \delta_m = 2i$$

$$60^\circ + 40^\circ = 2i$$

$$i = 50^\circ$$
- For rough focal length, we assume parallel incidence beam and it emerges out parallel. The combination will behave as a slab.
- Action and reaction have equal magnitude.
- $mg = \rho_w \frac{2v}{3} g = \rho_t \frac{v}{4} g$ $\rho_t = \frac{100 \times 2}{3} \times 4$
- The density of alcohol (800 kg/m^3) is less than that of water. So hydrometer will dip more than earlier.
- For a particular key there is fixed frequency.
- Let initial intensity is I. On first passes the intensity loss will be 20% of I. So $I_1 = 0.8 I$.
On second passage the loss will be 20% of 0.8 I.

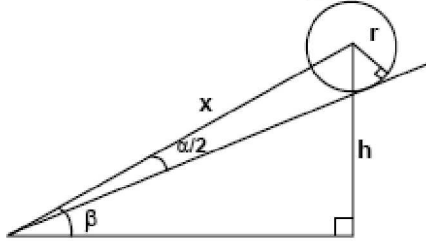
$$\frac{20}{100} \times \frac{8}{10} I = 0.16 I$$

So the final intensity will be

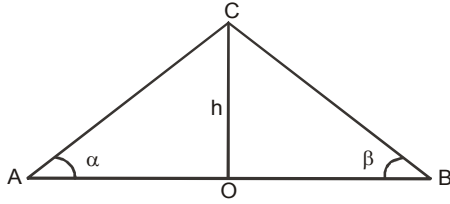
$$0.8 I - 0.16 I = 0.64 I.$$

$$\text{So loss will be } \frac{0.64 I - I}{I} \times 100$$

36%

13. In KMnO_4 oxidation state of Mn is +7. So it is a powerful oxidizing agent.
14. $(\text{CH}_3\text{COO})_2\text{Pb} + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{CH}_3\text{COOK}$
15. Addition of quick lime to water and dilution of acid are examples of exothermic reactions.
16. NaHCO_3 is added to neutralize acid.
17. Lime juice has $\text{pH} < 7$.
18. Alkaline hydrolysis of ester is called saponification.
19. Hard water contains Mg^{2+} and Ca^{2+} ions.
20. Li, N and Ne belong to same period.
21. It is a fact
22. Mole of $\text{H}_2 = \frac{1}{2}$, which is maximum.
23. Number of moles of $\text{H}_2\text{O} = \frac{360}{18} = 20$
24. Sea Urchin belongs to phylum echinodermata.
25. Salivary amylase is required for breakdown of starch into maltose.
26. Reproduction is required for multiplication of organisms thereby maintaining continuity of species.
27. Tallness is a dominant trait in pea plant, so a cross between TT and tt plant will always result in all tall plants.
28. Continuous accumulation of variation among organisms leads to formation of new species and helps in evolution.
29. During inhalation, air moves from the outermost structure of respiratory tract nostril to pharynx then larynx, trachea and then alveoli.
30. Testa is the outermost covering of seed coat, behind which is present cotyledons filled with endosperm.
31. Proteins, enzymes and proteinaceous hormones are produced through gene.
32. Presence of feathers that help birds fly shows that birds have evolved later on after reptiles.
33. Harmful U.V rays are sufficient enough to cause skin cancer and damage the immune system of human body.
34. Viruses completely depend upon host organisms for their multiplication and they don't have any biochemical mechanisms that can be acted upon by antiviral drugs.
35. Cuticle is the outermost covering in the stem of desert plants which helps in preventing water loss.
71. $\text{Area} = \frac{\sqrt{3}}{4}(6)^2 - 3 \times \frac{60}{360} \pi (3)^2$
72. $d = r_1 - r_2$
73. $\text{AB}^2 + \text{AC}^2 = 2[\text{AD}^2 + \text{BD}^2]$
- $$\text{AB}^2 + \text{AB}^2 = 2 \left[\frac{\text{AB}^2}{4} + \text{AD}^2 \right]$$
- $$2\text{AB}^2 = \frac{1}{2} [\text{AB}^2 + 4\text{AD}^2]$$
74. Let side = a
- $$\therefore \text{Height} = \frac{\sqrt{3}}{2}a$$
- $$\text{ratio} = a : \frac{\sqrt{3}}{2}a$$
75. Number of points of intersection
- $${}^4\text{C}_2 = \frac{4 \times 3}{2} = 6$$
- 76.
- 
- $$\frac{r}{x} = \sin \frac{\alpha}{2}$$
- $$\frac{h}{x} = \sin \beta$$

77.



$$AO = \frac{h}{\tan \alpha} \quad OB = \frac{h}{\tan \beta}$$

$$AB = \frac{h}{\tan \alpha} + \frac{h}{\tan \beta}$$

$$78. \frac{1}{1000} \left(150 - \frac{150}{\sqrt{3}} \right) = v \times \frac{2}{60}$$

$$79. = \frac{(\cot A + \operatorname{cosec} A) - (\operatorname{cosec}^2 A - \cot^2 A)}{\cot A - \operatorname{cosec} A + 1}$$

$$= \frac{\cot A + \operatorname{cosec} A (1 - \operatorname{cosec} A + \cot A)}{(\cot A - \operatorname{cosec} A + 1)}$$

$$= \cot A + \operatorname{cosec} A$$

$$80. P = \frac{{}^5C_2 \times {}^4C_1}{{}^9C_3}$$

$$81. \frac{n}{2} [2.3 + (n-1)3] = 108$$

$$6n + 3n^2 - 3n = 216$$

$$3n^2 + 3n - 216 = 0$$

$$n^2 + n - 72 = 0$$

$$(n+9)(n-8) = 0$$

$$\therefore n = 8$$

$$82. V = abc; S = 2(ab + bc + ac)$$

$$\therefore \frac{S}{V} = 2 \left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c} \right)$$

$$83. A = \pi(r+h)^2 - \pi r^2$$

$$84. \text{ Let } V_m = \text{velocity of man}$$

$$V_s = \text{velocity of stream}$$

$$\frac{3}{4} = (V_m - V_s) \frac{45}{4} \times \frac{1}{60}$$

$$\frac{3}{4} = (V_m + V_s) \frac{15}{2} \times \frac{1}{60}$$

$$85. \text{ Let flow rate of first tank} = x \text{ m}^3/\text{min.}$$

$$\text{Flow rate of 2nd tap} = y \text{ m}^3/\text{min.}$$

$$\text{Let volume of tank} = m^3$$

$$20x = v$$

$$x = \frac{v}{20}$$

$$25y = v$$

$$y = \frac{v}{25}$$

$$5t = \frac{v - 5x - 5y}{x} = 11 \text{ min}$$

$$86. \text{ Put } x^{1/3} = t$$

$$t^2 + t - 2 = 0$$

$$(t+2)(t-1) = 0$$

$$t = 1, \quad t = -2$$

$$x^{1/3} = 1 \quad x^{1/3} = -2$$

$$\therefore x = 1$$

$$\therefore x = 8$$

$$87. p = -3$$

$$q = 2$$

Now equation is

$$2x^2 + 3x + 1 = 0$$

$$2x^2 + 2x + x + 1 = 0$$

$$(2x+1)(x+1) = 0$$

$$2x+1 = 0$$

$$\therefore x = -\frac{1}{2}$$

$$x+1 = 0$$

$$\therefore x = -1$$

$$89. \text{ HCF of } p \text{ and } q = 1$$

$$\text{So LCM} = pq$$

$$90. x = a \text{ is root}$$

$$\text{So } a^3 - 3a^3 + 2a^3 + b = 0$$

$$\therefore b = 0$$

■ ■

NTSE - 2014

CHHATTISGARH

PART I : MENTAL ABILITY TEST

1. Find the next number in the sequence

0, 2, 24, 252, _____.

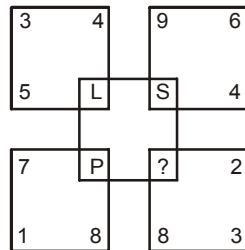
- (a) 620 (b) 1040
(c) 3120 (d) 5430

2. Find the next number in the sequence

0, 6, 24, 60, 120, _____.

- (a) 180 (b) 210
(c) 240 (d) 360

3. Find the letter to be placed in place of '?' in the given figure—

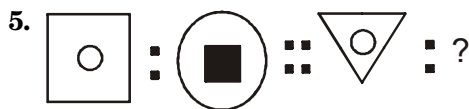


- (a) M (b) N
(c) Q (d) R

4. Find the appropriate number for the blank space 2, 10, 26, _____, 242

- (a) 80 (b) 81
(c) 82 (d) 84

Direction (Q. 5 – 7) : Find the missing term in each of the following questions.



- (a) (b) (c) (d)

6. $\frac{E}{I} : \frac{8}{4} :: \frac{J}{N} : ?$

- (a) $\frac{13}{9}$ (b) $\frac{14}{9}$
(c) $\frac{13}{7}$ (d) $\frac{17}{9}$

7. A, D, I, P, ?

- (a) W (b) X
(c) V (d) Y

Directions (Q. 8 – 9) : If $A = 1, B = 2, C = 3, \dots, Z = 26$ then

8. Find the group of letters which makes the least total among the alternative.

- (a) DKA (b) FHY
(c) ODX (d) VTM

9. Find the group of letters which make the highest total among alternatives.

- (a) PLOT (b) PLAN
(c) PLAY (d) PLUS

10. If $A = 26, SUN = 27$ then $CAT = ?$

- (a) 24 (b) 27
(c) 57 (d) 58

Directions (Q. 11 – 15) : The following questions are based on arrangement of numbers in the form of pyramid. In each question there is some relationship between the two numbers on the left of the ($:$). The same relationship exists between the two terms in the right of which one is missing. Find the missing term from the given alternatives.

1
2 3 4
9 8 7 6 5
10 11 12 13 14 15 16
25 24 23 22 21 20 19 18 17
26 27 28 29 30 31 32 33 34 35 36
49 48 47 46 45 44 43 42 41 40 39 38 37

11. 132220 : 211412 :: 222931 : (?)
 (a) 30 43 45 (b) 30 21 23
 (c) 44 29 31 (d) 31 20 22
12. 2 8 7 3 : 13 21 20 14 :: 10 24 23 11 : (?)
 (a) 29 28 24 23 (b) 28 27 47 46
 (c) 25 27 28 24 (d) 29 45 44 30
13. 24 12 14 : 75 21 19 :: 14 16 32 34 : (?)
 (a) 19 17 41 39 (b) 20 18 42 40
 (c) 21 19 43 41 (d) 20 22 42 44
14. 25 22 44 47 : 23 20 42 45 :: 11 14 32 29 : (?)
 (a) 13 16 34 31 (b) 24 21 43 41
 (c) 24 21 43 46 (d) 13 10 24 21
15. 82 22 4 : 13 31 33 :: 62022 : (?)
 (a) 91 221 (b) 81 31 2
 (c) 15 33 35 (d) 51 921
16. Which of the given alternative is the mirror image of REASON if the mirror is placed below the word-
 (a) RƎAƆƆOИ (b) RƎVƆƆOИ
 (c) RƎAƆƆOИ (d) RƎVƆƆOИ
17. What is the mirror image of b3k4S ?
 (a) Ɔ4KƎd (b) Ɔ4KƎd
 (c) Ɔ4KƎd (d) Ɔ4KƎb
18. If $27 * 3 = 243$
 $5 * 4 = 80$
 Then what is the value of $3 * 7$
 (a) 84 (b) 147
 (c) 63 (d) 23

Directions (Q. 19 – 20) : Arrange the following words in the alphabetic order of english dictionary and identify one that comes in the middle.

19. (1) Dialogue
 (2) Diabetic
 (3) Diagonal
 (4) Diaphragm
 (5) Dialect
 (a) 2 (b) 3
 (c) 4 (d) 6

20. (1) General (2) Gesture
 (3) Gentel (4) Genuine
 (5) Generous
 (a) 2 (b) 3
 (c) 4 (d) 5

Directions (Q. 21 – 23) : The following questions are based on the given matrix. The value of each letter is the product of its row and column number. e.g., the value of M is $2 \times 3 = 6$

	0	1	2	3	4
O	B	O	J	C	P
1	E	N	H	I	D
2	G	R	A	M	V
3	F	S	T	L	Z
4	W	X	Y	U	K

21. Find the group of letters which make the least total among the alternatives-
 (a) DKA (b) FHY
 (c) ODX (d) VTM
22. What is the total of GREAT
 (a) 8 (b) 10
 (c) 12 (d) 14
23. Find the group of letters which make the highest total among the alternatives given
 (a) PLOT (b) PIAN
 (c) PLAY (d) ILUS
24. In a certain code language BOARD is written as EQBNC. How will the word CLIMB be written in that language.
 (a) CLJKD (b) DKJLF
 (c) DNHMB (d) FNJRO
25. A person earns three rupees on the first day. If he earns double every next day, what will be his earning at 10th day.
 (a) ₹ 768
 (b) ₹ 1536
 (c) ₹ 3072
 (d) ₹ 30

Directions (Q. 26 – 30) : In the following questions the letters in column - I are coded in the form of numbers which are written in column - II, but the order of numerals is different. Study the code of letters and find out the correct answer for each question from given alternatives

Column - I	Column - II
LEG	432
MNG	358
ENL	248
LGS	734

26. What is the code of LSG ?
 (a) 743 (b) 438
 (c) 473 (d) 347
27. What is the code of the word NLEM ?
 (a) 4832 (b) 8425
 (c) 8437 (d) 2534
28. What is the code of word MSN ?
 (a) 578 (b) 634
 (c) 583 (d) 235
29. What is the code of the word LEM ?
 (a) 328 (b) 625
 (c) 524 (d) 425
30. Code for word GEN will be ?
 (a) 435 (b) 642
 (c) 328 (d) 825
31. There are deers and Peacocks in a zoo. By counting heads they are 80. The number of their legs is 200. How many peacocks are there ?
 (a) 20 (b) 30
 (c) 60 (d) 50

Directions (Q. 32 – 35) : The questions are based on the following information.

Five students P, Q, R, S and T study in a class. Of these

- (i) P and Q study physics and chemistry
- (ii) R and Q study physics and mathematics
- (iii) S and P study biology and chemistry
- (iv) T and Q study anthropology and civics
- (v) T and S study chemistry and mathematics

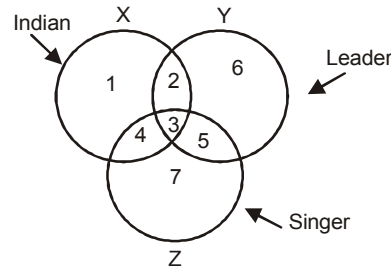
32. Who among the students studies maximum number of subjects.
 (a) T (b) S
 (c) Q (d) P

33. Who among the students studies minimum number of subjects
 (a) T (b) S
 (c) P (d) R

34. Who among the students studies only four subjects-
 (a) R (b) T
 (c) S (d) P

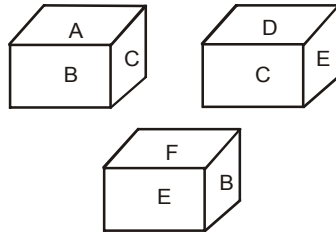
35. Which of the following pairs studies chemistry and civics-
 (a) P and S (b) Q and R
 (c) Q and T (d) R and S

Directions (Q. 36 – 40) : Study the following figure carefully and answer the given questions



36. Which region represents Indian leaders who are not singers
 (a) 2 (b) 3
 (c) 4 (d) 5
37. Which region represents leaders who are neither singers nor indian
 (a) 2 (b) 3
 (c) 6 (d) 7
38. Which region represents Indian singers who are not leaders
 (a) 1 (b) 2
 (c) 3 (d) 4
39. Which region represents Indian leaders who are singer-
 (a) 2 (b) 3
 (c) 4 (d) 5
40. Which region represents Singers who are neither Indian nor leaders
 (a) 2 (b) 4
 (c) 6 (d) 7

41. The six faces of a dice have been marked with A, B, C, D, E and F respectively. The three positions of it are shown below-

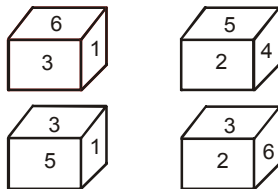


Find the alphabet opposite A ?

- (a) C (b) D
(c) E (d) B

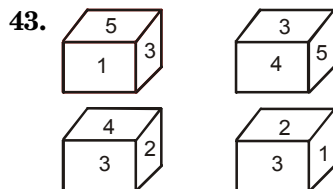
Directions (Q. 42 – 43) :

42. Four positions of a dice are given



What number is opposite to 3 ?

- (a) 2 (b) 3
(c) 4 (d) 6



What number is opposite to 4- ?

- (a) 6 (b) 5
(c) 2 (d) 1

Directions (Q. 44 – 45) : Five books are placed on the table Hindi book is placed above the English book and the mathematics book is placed below the science book. English book is above the science book and drawing book is below the mathematics book.

44. The book between Hindi and science book is ?

- (a) Drawing (b) Mathematics
(c) English (d) None of these

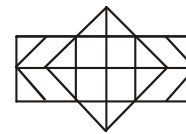
45. Which book is at the bottom ?

- (a) Hindi (b) Drawing
(c) Mathematics (d) Science

46. At 12 o'clock minute hand points east. At 4 : 30, in which direction the hour hand will point ?

- (a) North-East (b) South-East
(c) South (d) South-West

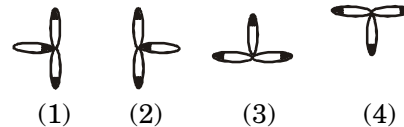
47. What will be the number of hexagons in the given figure



- (a) 2 (b) 4
(c) 5 (d) 6

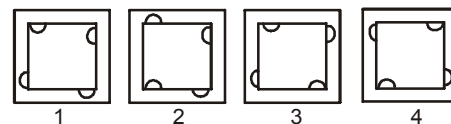
Directions (Q. 48 – 50) : In each of the following questions four figures are given. One of these figures does not fit with the rest of the figures. Find out the serial number of that figure.

48. Find the odd one out in the pictures given below-



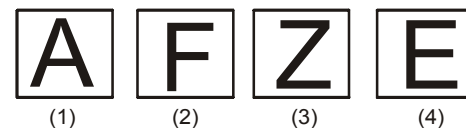
- (a) 1 (b) 2
(c) 3 (d) 4

49. Find the odd one out in the pictures given below



- (a) 1 (b) 2
(c) 3 (d) 4

50. Find odd one out in the pictures given below-



- (a) 1 (b) 2
(c) 3 (d) 4

PART II : ENGLISH LANGUAGE

Directions (Q. 1 – 2) : *The following five sentences come from a paragraph. The first and last sentence are given. Choose the order in which the three sentences (PQR) should appear to complete the paragraph.*

1. S1. Jawaharlal Nehru was born in Allahabad on 14 Nov. 1889

S2.

S3.

S4.

S5. He died on 27 May 1964.

P. Nehru met Mahatma Gandhi in February 1920.

Q. In 1905 he was sent to London to study at a school called Harrow.

R. He became the first Prime Minister of Independent India on 15 August 1947.

Choose from the options below

(a) PQR (b) QPR

(c) PRQ (d) RQP

2. S1. My tooth began to hurt yesterday.

S2.

S3.

S4.

S5. My tooth felt a lot better.

P. The dentist examined my hurting tooth.

Q. The dentist fixed my tooth.

R. My father took me to the dentist.

Choose from the options below

(a) PQR (b) QPR

(c) RPQ (d) PRQ

Directions (Q. 3 – 5) : *The following questions have the second sentence missing. Choose the appropriate sentence from the given options to complete it :*

3. 1. Mannu and his father climbed a boat and went to the other side of the lake.

2.

3. "I've caught a fish", shouted Mannu

(a) They went to the market and searched for good fish for their lunch.

(b) His dad went for fishing and Mannu went to his aunt's house.

(c) Mannu prepared the fishing pole and dropped the line in the water.

(d) Mannu and his father returned home in the evening.

4. 1. The race for which Singh is best remembered is his fourth-place finish in the 400 metres final at the 1960 Olympic Games.

2.

3. Singh's fourth-place time of 45.73 became the Indian national record and held for almost 40 years.

(a) He was the only Indian male athlete to win an individual athletics gold medal at a Commonwealth Games until Vikas Gowda won the discus gold medal in the 2014.

(b) He was awarded the Padmashree, India's fourth-highest civilian honour, in recognition of his sporting achievements.

(c) He led the race till the 200 meters mark before easing off, allowing others to surpass him.

(d) He represented India in the 1956 Summer Olympics in Melbourne, the 1960 Summer Olympics in Rome and the 1964 Summer Olympics in Tokyo.

5. 1. Sage Yajnavalkya decided to divide his property amongst his two wives Maitreyi and Katyaayani as he wished to leave for the forest.

2.

3. The sage replied that through wealth one can become one amongst the many wealthy but it was knowledge which made one immortal so she declined the property.

(a) Maitreyi took the property and went to the neighbouring country and lived their happily.

(b) Maitreyi and katyaayani declined the property and accompanied the sage to the forest.

(c) Maitreyi asked the sage if she could become immortal through this wealth.

(d) Katyaayani refused to take half of the property and demanded the complete property from the sage.

Directions (Q. 6 – 10) : Choose the word which best fills the blank from the four options given below :

6. They always him for his south Indian accent.
(a) pull (b) tease
(c) chase (d) angry
7. The bus is quite high.
(a) fair (b) charge
(c) fare (d) cost
8. Our school gardener went to the to buy a few pots of flowering plants.
(a) orchard (b) nursery
(c) estate (d) plantation
9. Make sure you read all the carefully before setting up the device.
(a) questions (b) instructions
(c) bills (d) orders
10. The students get a monthly which usually consists of writing a report.
(a) assignment (b) report
(c) grade (d) points

Directions (Q. 11 – 15) : Choose the correct meanings for the given idioms / phrases :

11. **Lose heart :**
(a) be angry (b) be discouraged
(c) be sad (d) be desperate
12. **Backstair influence :**
(a) political influence
(b) secret and unfair influence
(c) fair and proper influence
(d) religious influence
13. **Blow one's own trumpet :**
(a) praise others (b) praise oneself
(c) flatter (d) admonish others
14. **Held over :**
(a) stopped (b) postponed
(c) dropped (d) cancelled
15. **A snake in the grass :**
(a) an unexpected misfortune
(b) an unforeseen danger
(c) a treacherous persons
(d) a secret enemy

Directions (Q. 16 – 18) : Find out the alternatives which are most opposite in meanings to the words given.

16. Tentative :

- (a) definite (b) universal
(c) preliminary (d) outdated

17. Lend :

- (a) pawn (b) hire
(c) borrow (d) cheat

18. Shallow :

- (a) deep (b) definite
(c) hollow (d) hidden

Directions (Q. 19 – 20) : Select the most appropriate options to fill in the blank from the following alternatives given below :

19. If I had had enough money, I a laptop.
(a) would buy (b) had bought
(c) would buy (d) would have bought
20. an Indian ?
(a) Is You (b) You are
(c) Are you (d) Do you be

Directions (Q. 21 – 22) : Choose the alternative which can be substituted for :

21. Sound of apes :
(a) moan (b) bray
(c) gibber (d) clan
22. Words inscribed on a tomb :
(a) epilogue (b) epitaph
(c) epitome (d) episode

Directions (Q. 23 – 30) : In the following passage there are some numbered blanks. Fill in the blanks by selecting most appropriate word from the options :

Today, fountain pens are often treated as luxury goods**23**..... sometimes as status tools. Fountain pens may serve as**24**..... everyday writing instrument, much like the on ballpoint pen.**25**..... quality steel and gold pens are even available inexpensively**26**..... France, in particular, the use of fountain pens is**27**..... spread.

Users often state that once they start using**28**..... pens, it becomes uncomfortable ball

points pen due to the**29**..... motor effort needed. In some countries, fountain are**30**..... in lower school grades and are believed to teach children better control writing.

- 23.** (a) and (b) by
(c) on (d) to
- 24.** (a) an (b) in
(c) a (d) and
- 25.** (a) big (b) small
(c) good (d) large
- 26.** (a) of (b) at
(c) when (d) in
- 27.** (a) well (b) slow
(c) good (d) fast
- 28.** (a) ball point (b) imported
(c) local (d) fountain
- 29.** (a) extra (b) little
(c) most (d) few
- 30.** (a) easily (b) compulsory
(c) provide (d) compulsorily

Directions (Q. 31 – 35) : Read the passage carefully and choose the most appropriate options from the alternatives given :

William Bill Henry Gates III (Bill) was born on October 28, 1955, Seattle, Washington. Bill was the second of the three children in an upper-middle class family. He enjoyed playing games and reading books. Bill became bored in public school so his family sent to Lakeside School, where he excelled called in math and science and did well in drama and English.

Bill became interested in computer programming when he was 13. At Lakeside, Bill met Paul Allen, who shared his interest in computers. At age 17, Gates and Allen were paid \$ 20,000 for the programme called Traf-O-Data that was used to count traffic.

He scored 1590 out 1600 on the SAT and was accepted by Harvard University. Meanwhile, Allen dropped out of Washington College to work on computers at Honeywell Corporation. He convinced Gates to drop out of Harvard and join him in starting a new software company in Albuquerque, New Mexico. They called it Micro-soft initially and soon changed it to Microsoft, lived it to Bellevue, Washington.

Microsoft grew quickly from 25 employees in 1978 to over 90,000 today. Over the years, Microsoft developed many new technologies and some of the world's most popular software and products such as Word and Power Point.

Bill Gates was one of the richest men in the world. In 2012, his \$ 61 billion dollars in assets made him the world's second richest man according to Forbes magazine.

- 31.** Which of the sentences is not about Bill Gates ?
(a) He was born in Seattle, Washington.
(b) He was the second of three children.
(c) He enjoyed public school.
(d) He excelled in Math and Science
- 32.** In what ways were Bill Gates and Paul Allen not alike ?
(a) They both went to the same college
(b) They both liked computers
(c) They both went to the same school
(d) They both dropped out of the college
- 33.** What is Traf-O-Data ?
(a) Programme to count people
(b) Programme for counting traffic
(c) Programme for MS word
(d) Programme for counting money
- 34.** What was the percentage obtained by Gates to get admission in Harvard University ?
(a) 98.39 (b) 99.83
(c) 99.38 (d) 93.89
- 35.** The answer to the question, "How rich is Bill Gates ?" is given in :
(a) second paragraph
(b) third paragraph
(c) fourth paragraph
(d) fifth paragraph

Directions (Q. 36 – 40) : Read the passage carefully and choose the most appropriate options from the alternatives given :

Potatoes are the fourth on the list of the world's food staples after wheat, corn and rice. Americans consume about 140 pounds of potatoes per person every year while Europeans eat twice as many.

On August 24, 1853, at Moon Lake Lodge in Saratoga, New York, a native American Chef George Crum created the first potato chips. Once when a diner complained that the French fries were too thick, he got angry and sliced the potatoes as thinly as possible making them too thin and crispy to eat with a fork. The diner loved them and thus potato chips were born. In the United Kingdom and Ireland crisps are what are called potato chips in United States. Chips refer to French fries in United Kingdom and Ireland.

7 pounds of potato chips are produced from 100 pounds of potatoes. Americans consume on pounds of potato chips every year and spend more than \$7 billion a year on them.

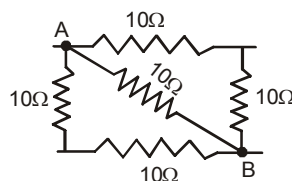
36. What are potato chips called in UK ?
 (a) french fries (b) chips
 (c) crisps (d) potatoes
37. When and where were potato chips born ?
 (a) August 14, 1853 in New York
 (b) August 24, 1853 in France
 (c) August 24, 1853 in New York
 (d) August 24, 1883 in France
38. What does the word consume mean in the first paragraph ?
 (a) play (b) grow
 (c) eat (d) store
39. According to the passage how many potatoes do the Europeans consume per person every year ?
 (a) about 180 pounds
 (b) about 242 pounds
 (c) about 240 pounds
 (d) about 280 pounds
40. One of the phrases is not true about potato chips :
 (a) eaten with fork
 (b) made of potatoes
 (c) thin and crispy
 (d) called crisps in United Kingdom

PART III

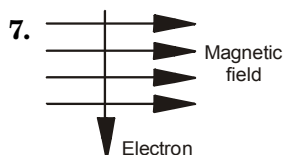
SCHOLASTIC APTITUDE TEST

PHYSICS

- Unit of pressure in S.I. system is—
 (a) Kelvin (b) Pascal
 (c) Newton (d) Calorie
- Temperature of an iron block is 140°F . Its temperature in celsius scale will be
 (a) 100°C (b) 60°C
 (c) 32°C (d) 140°C
- A drop of water is always spherical due to—
 (a) Viscosity
 (b) Surface tension
 (c) Atmospheric Pressure
 (d) Gravity
- Speed of super-sonic Aircraft is—
 (a) Below speed of sound
 (b) Equal to speed of sound
 (c) More than speed of sound
 (d) Equal to speed of light
- The escape velocity from earth is 11 km/sec. The escape velocity from a planet having equal density and double radius of earth is—
 (a) 15.56 km/sec
 (b) 22 km/sec
 (c) 5.5 km/sec
 (d) 11 km/sec
- The resultant resistance between A and B in the following circuit is—



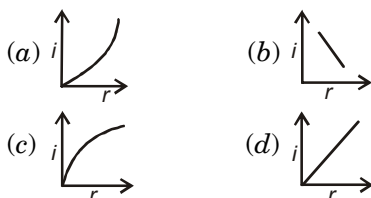
- (a) $10\ \Omega$ (b) $5\ \Omega$
 (c) $20\ \Omega$ (d) $40\ \Omega$



An electron enters a magnetic field at right angle to it as shown in figure.

The direction of the force acting on the electron will be—

- (a) To the right
(b) To the left
(c) Coming out of paper at right angle
(d) Going into the paper at right angle
8. Which of the following correctly represents graphical relation between the angle of incidence i and the angle of reflection r ?



9. Which of the following lenses would you prefer to use while reading small letters found in a dictionary—
- (a) Convex lens of focal length 50 cm
(b) Concave lens of focal length 50 cm
(c) Convex lens of focal length 5 cm
(d) Concave lens of focal length 5 cm
10. Length of a conducting wire is increased by 100%. The change in the resistance of the wire will be—
- (a) 50% (b) 100%
(c) 200% (d) 300%
11. Three light bulbs of 40W, 60W and 100W are connected in series with 220 volt source. Which of the bulbs will grow brightest ?
- (a) 60W
(b) 40W
(c) 100W
(d) All with same brightness
12. The value of gravitational acceleration g at the centre of the earth is—
- (a) Infinite (b) 9.8 m/s^2
(c) 32.2 m/s^2 (d) zero

CHEMISTRY

13. Which pair of atomic number represent S-block elements—

(a) 7, 15 (b) 6, 14
(c) 9, 17 (d) 4, 12

14. Valency of carbon in CO_3^{2-} ion is—

(a) 2 (b) 3
(c) 4 (d) 5

15. The electronic configuration of two elements X and Y are given below—

X = 2, 8, 8, 2

Y = 2, 8, 7

The formula of a compound that can be formed between these two elements is

(a) XY (b) X Y_2
(c) X_2Y (d) XY_3

16. The main component of Bio gas is—

(a) Methane (b) Benzene
(c) Ethylene (d) Ethane

17. Which of the following shows the tyndall effect—

(i) Common salt
(ii) milk
(iii) Copper sulphate solution
(iv) Starch solution

(a) (i) and (ii) (b) (ii) and (iv)
(c) (iii) and (iv) (d) (ii) and (iii)

18. Which one of the following compound will give addition reaction—

(a) CH_4 (b) C_2H_6
(c) C_2H_4 (d) C_3H_8

19. Nature of aqueous solution of salt obtained by the reaction of strong acid and strong base is—

(a) Acidic (b) Basic
(c) Neutral (d) Amphoteric

20. Which of the following alloy does not contain zinc metal —

(a) Gun metal (b) German silver
(c) Brass (d) Bronze

- 21.** The function group of carboxylic acid is—
 (a) $-\text{OH}$ (b) $-\text{CHO}$
 (c) $\begin{array}{c} >\text{C} \\ || \\ \text{O} \end{array}$ (d) $\begin{array}{c} -\text{C}-\text{OH} \\ || \\ \text{O} \end{array}$
- 22.** Number of moles is 128 gm of sulphur will be—
 (a) 0.5 (b) 2
 (c) 4 (d) 8
- 23.** In the end of manufacturing of cement _____ is mixed with the clinkers—
 (a) Gypsum powder
 (b) Magnesium powder
 (c) Alumina powder
 (d) None of the above
- 24.** A group of inter connected food chains is called—
 (a) Food cycle
 (b) Pyramid of energy
 (c) Complex food chain
 (d) Food web
- 29.** Which of the following is not an endocrine gland—
 (a) Pituitary gland (b) Thyroid gland
 (c) Liver (d) Adrenal gland
- 30.** Fibrous connective tissue is—
 (a) Tendon and ligament
 (b) Blood and lymph
 (c) Bone and cartilage
 (d) None of the above
- 31.** Which of the following is an example of algae
 (a) Yeast (b) Spirogyra
 (c) Fern (d) Amoeba
- 32.** Limiting factors for the rate of photosynthesis are—
 (a) Oxygen and water
 (b) Mineral and salt
 (c) Light intensity and temperature
 (d) Structure of leaf and stem
- 33.** Earthworm is related to which of the following phylum—
 (a) Arthropoda (b) Annelida
 (c) Echinodermata (d) Mollusca
- 34.** Rickets is caused by the deficiency of which of the following—
 (a) Carbohydrate (b) Vitamin A
 (c) Vitamin D (d) Protein
- 35.** What will be the ratio of dominant and recessive character inherited in first filial generation of monohybrid cross done by the mendal—
 (a) 3 : 1 (b) 1 : 3
 (c) 2 : 3 (d) 3 : 2

BIOLOGY

- 25.** Which of the following organ is not related with excretion—
 (a) Lungs (b) Pancreas
 (c) Liver (d) Skin
- 26.** Parallel venation is found in which of the following leaves
 (a) Lemon (b) Mango
 (c) Grass (d) Rose
- 27.** Which of the following is not found in the animal cell—
 (a) Plastid
 (b) Mitochondria
 (c) Golgi body
 (d) Endoplasmic reticulum
- 28.** Carbon dioxide transports in the blood through—
 (a) Red blood cells
 (b) Plasma
 (c) White blood cells
 (d) Platelets

SOCIAL SCIENCE

- 36.** Period of first world war—
 (a) 1916 to 1919 (b) 1920 to 1922
 (c) 1925 to 1935 (d) 1914 to 1918
- 37.** What does Satyagraha mean ?
 (a) Fight against injustice
 (b) Complete independence
 (c) Following the path of truth and non-violence
 (d) All of the above

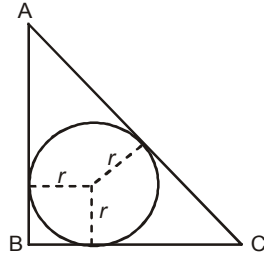
- 38.** Who was the khalifa ?
 (a) The political leader of the Islamic world
 (b) The spiritual head of the Islamic world
 (c) The spiritual leader of the whole world
 (d) The spiritual leader of the Saudi Arabia
- 39.** The Simon commission was greeted on its arrival in India with a famous slogan—
 (a) Come back Simon
 (b) Welcome back Simon
 (c) Go back Simon
 (d) Stay here Simon
- 40.** The place where Jallianwala Bagh incident took place—
 (a) Meerut (b) Jhansi
 (c) Delhi (d) Amritsar
- 41.** Which freedom fighter is known by his newspaper “kesari” ?
 (a) Rabindranath Tagore
 (b) Mukand Das
 (c) Lala lajpat Rai
 (d) Bal Gangadhar Tilak
- 42.** Azad Hind sena was established in—
 (a) II world war
 (b) I world war
 (c) Indo-China border conflict
 (d) Bangladesh conflict
- 43.** II battle of Panipat was fought between :
 (a) Between Akbar and Hemu
 (b) Between Babar and Ibrahim Lodhi
 (c) Between Humayun and Bahadurshah
 (d) Between Akbar and Rajput
- 44.** Who captured the Peacock Throne of emperor Shah Jahan ?
 (a) Timur lung
 (b) Nadir Shah
 (c) Mahmud Ghajnavi
 (d) Dara Shikoh
- 45.** Who built Khajuraho temple ?
 (a) Solanki dynasty
 (b) Parmar dynasty
 (c) Chandela dynasty
 (d) Chouhan dynasty
- 46.** Name the group of islands of India lying in the Bay of Bengal are :
 (a) Lakshadweep
 (b) Andaman-Nicobar dweep
 (c) Maldives
 (d) Minicoy dweep
- 47.** Which line of axis divides India into two parts ?
 (a) The tropic of Cancer
 (b) The tropic of Capricorn
 (c) Equator
 (d) Greenwich line
- 48.** In which of the forests are the trees with conical shaped leaves found ?
 (a) Evergreen forest
 (b) Coniferous forest
 (c) Deciduous forest
 (d) Tropical rain forest
- 49.** Which is the largest desert in the world ?
 (a) Gobi (b) Kalahari
 (c) Patagonia (d) Sahara
- 50.** Hirakund Dam is built on the river—
 (a) Chambal (b) Mahanadi
 (c) Damodar (d) Kaveri
- 51.** Shimla is capital of which state—
 (a) Himachal Pradesh
 (b) Andhra Pradesh
 (c) Tamil Nadu
 (d) Madhya Pradesh
- 52.** Which of the following term is used to describe trade between two or more countries—
 (a) Internal trade
 (b) International trade
 (c) External trade
 (d) Local trade

- 53.** Water availability per person in India is–
 (a) Decreasing (b) Increasing
 (c) Stagnant (d) None of the above
- 54.** Silicon valley is located in–
 (a) Banglore (b) California
 (c) Uganda (d) Ahmedabad
- 55.** Mansoon arrives in India approximately in–
 (a) Early May (b) Early June
 (c) Early July (d) Early August
- 56.** The model of fundamental rights had been taken from–
 (a) USA (b) Ireland
 (c) Canada (d) Great Britain
- 57.** In which year were the fundamental duties added to the constitution–
 (a) 1966 (b) 1976
 (c) 1974 (d) 1978
- 58.** Who appoints the chief election commissioner of India–
 (a) Parliament (b) President
 (c) Prime-minister (d) Chief justice
- 59.** How many members are nominated by the president in Lok Sabha ?
 (a) 2 members (b) 3 members
 (c) 12 members (d) 6 members
- 60.** The judges of the supreme court of India retire at the age of–
 (a) 60 years (b) 64 years
 (c) 65 years (d) 70 years
- 61.** Which of the following is not a quality of good citizenship–
 (a) Ignorance (b) Good health
 (c) Education (d) Patriotism
- 62.** How many articles are there in the Indian Constitution ?
 (a) 195
 (b) 295
 (c) 395
 (d) 495
- 63.** Who holds the power of judicial review in India ?
 (a) Parliament
 (b) Law minister
 (c) Supreme court and High court
 (d) Only Supreme court
- 64.** Which of the following articles of the Indian constitution deals with the directive principles of state policy ?
 (a) Article 26 to 41
 (b) Article 31 to 56
 (c) Article 41 to 66
 (d) Article 36 to 51
- 65.** “Satyameva Jayete” has been taken from–
 (a) Mundak Upnishad
 (b) Rigveda
 (c) Natya Sutra
 (d) None of these
- 66.** Which place does India hold in the world regarding the population ?
 (a) First (b) Second
 (c) Third (d) Fourth
- 67.** The duration of first five year plan–
 (a) 1955 to 60 (b) 1962 to 67
 (c) 1950 to 56 (d) 1951 to 56
- 68.** White revolution means–
 (a) Dairy product (b) Wheat product
 (c) Rubber product (d) Pulse product
- 69.** Agmark and ISI mark shows–
 (a) Quality and standard of products
 (b) Quantity of the product
 (c) Availability of the product
 (d) None of these
- 70.** Write the full form of PDS ?
 (a) Price distribution system
 (b) Plural distribution system
 (c) Public distribution system
 (d) Place distribution system

MATHEMATICS

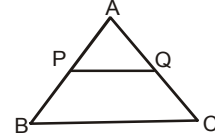
- 71.** Equivalent of $\frac{6}{20}$ is
 (a) 6% (b) 20%
 (c) 26% (d) 30%
- 72.** How many surfaces in solid cylinder—
 (a) 1 (b) 2
 (c) 3 (d) 4
- 73.** The order of any matrix is 3 X 2 then number of its element are—
 (a) 3 (b) 2
 (c) 5 (d) 6
- 74.** If $(x - 2)$ is a factor of polynomial $x^3 + 2x^2 - kx + 10$. Then the value of k will be
 (a) 10 (b) 13
 (c) 16 (d) 9
- 75.** From a pack of playing cards all cards whose numbers are multiple of 3 are removed. A card is now drawn at random. Then the probability that the card drawn is an even number is red card—
 (a) $\frac{10}{52}$ (b) $\frac{1}{4}$
 (c) $\frac{1}{5}$ (d) $\frac{3}{13}$
- 76.** Median of 4, 5, 10, 6, 7, 14, 9 and 15 will be—
 (a) 6 (b) 7
 (c) 8 (d) 9
- 77.** Mean proportion of 64 and 225 will be—
 (a) 120
 (b) 90
 (c) 60
 (d) 30
- 78.** If the points $(-2, -5)$, $(2, -2)$ and $(8, a)$ are collinear then value of a will be—
 (a) $\frac{1}{2}$ (b) $\frac{3}{2}$
 (c) $-\frac{5}{2}$ (d) $\frac{5}{2}$
- 79.** If the number 13, 15, 17, 18 and n are arranged in ascending order and their arithmetic mean and median are equal then value of n will be—
 (a) 27 (b) 22
 (c) 28 (d) none of these
- 80.** $\log_{10} 1 = ?$
 (a) 0 (b) 10
 (c) 100 (d) 1000
- 81.** If an arithmetic progression sum of first n terms is $2n^2 + 3n$. Its common difference is —
 (a) 6 (b) 3
 (c) 2 (d) 4
- 82.** The area of three adjoining faces of cuboid are A, B and C respectively, then its volume will be
 (a) ABC (b) $\sqrt{ABC}$
 (c) $A^2B^2C^2$ (d) None of these
- 83.** If the radius of circle is π , then its area will be—
 (a) π (b) π^2
 (c) π^3 (d) 3π
- 84.** If the co-ordinate of any circle are (3, 4) and the co-ordinate of one ends of its diameter are (5, 3) then co-ordinate of other ends of diameter are
 (a) (4, 1) (b) (1, 4)
 (c) (1, 5) (d) (5, 1)
- 85.** The value of $\cos^2 26 + \cos 64 \sin 26 + \frac{\tan 36}{\cot 54}$
 (a) 2 (b) 1
 (c) 0 (d) None of these
- 86.** $\sqrt[3]{64} = ?$
 (a) 2 (b) 4
 (c) 6 (d) 8
- 87.** The additive inverse of $\frac{2x-3}{3x+5}$ is—
 (a) $\frac{3-2x}{3x+5}$ (b) $\frac{3x+5}{2x-3}$
 (c) $\frac{3-2x}{-3x-5}$ (d) $\frac{2x-3}{-3x-5}$

88. In below figure $\triangle ABC$ is a right angle triangle in which $\angle B = 90^\circ$ and $BC = 6$ cm and $AB = 8$ cm. Then radius of incircle will be—



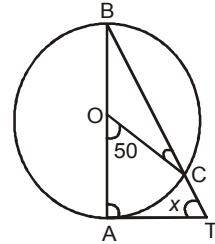
- (a) 5 cm
(b) 4 cm
(c) 3 cm
(d) 2 cm

89. In below figure $PQ \parallel BC$ and $AP : PB = 1 : 2$. Then the ratio of area of $\triangle APQ$ and $\triangle ABC$ will be



- (a) 1 : 2
(b) 1 : 4
(c) 1 : 9
(d) 4 : 1

90. In the below figure AB is a diameter of circle and AT is tangent line then value of x will be



- (a) 65°
(b) 50°
(c) 45°
(d) 90°

ANSWERS

MENTAL ABILITY TEST

1. (c)	2. (b)	3. (a)	4. (c)	5. (a)	6. (a)	7. (d)	8. (a)	9. (d)	10. (c)
11. (b)	12. (d)	13. (a)	14. (a)	15. (c)	16. (d)	17. (a)	18. (b)	19. (*)	20. (b)
21. (c)	22. (c)	23. (d)	24. (d)	25. (b)	26. (c)	27. (b)	28. (a)	29. (d)	30. (c)
31. (c)	32. (c)	33. (d)	34. (b)	35. (c)	36. (a)	37. (c)	38. (d)	39. (b)	40. (d)
41. (c)	42. (c)	43. (d)	44. (c)	45. (b)	46. (d)	47. (c)	48. (c)	49. (a)	50. (c)

ENGLISH LANGUAGE

1. (b)	2. (c)	3. (c)	4. (c)	5. (c)	6. (b)	7. (c)	8. (b)	9. (b)	10. (a)
11. (b)	12. (b)	13. (b)	14. (a)	15. (b)	16. (a)	17. (c)	18. (a)	19. (d)	20. (c)
21. (c)	22. (b)	23. (a)	24. (a)	25. (c)	26. (d)	27. (a)	28. (d)	29. (a)	30. (b)
31. (c)	32. (a)	33. (b)	34. (c)	35. (d)	36. (c)	37. (c)	38. (c)	39. (d)	40. (a)

SCHOLASTIC APTITUDE TEST

1. (b)	2. (b)	3. (b)	4. (c)	5. (b)	6. (b)	7. (d)	8. (d)	9. (c)	10. (d)
11. (b)	12. (d)	13. (d)	14. (c)	15. (b)	16. (a)	17. (b)	18. (c)	19. (c)	20. (d)
21. (d)	22. (c)	23. (a)	24. (d)	25. (b)	26. (c)	27. (a)	28. (b)	29. (c)	30. (a)
31. (b)	32. (c)	33. (b)	34. (c)	35. (a)	36. (d)	37. (c)	38. (b)	39. (c)	40. (d)
41. (c)	42. (a)	43. (a)	44. (b)	45. (c)	46. (b)	47. (a)	48. (b)	49. (d)	50. (b)
51. (a)	52. (b)	53. (a)	54. (b)	55. (b)	56. (a)	57. (*)	58. (b)	59. (c)	60. (c)
61. (a)	62. (*)	63. (d)	64. (a)	65. (a)	66. (b)	67. (d)	68. (a)	69. (a)	70. (c)
71. (d)	72. (c)	73. (d)	74. (b)	75. (c)	76. (c)	77. (a)	78. (d)	79. (b)	80. (a)
81. (d)	82. (b)	83. (c)	84. (c)	85. (a)	86. (b)	87. (d)	88. (d)	89. (c)	90. (a)

EXPLANATIONS**MENTAL ABILITY TEST**

1. $(1)^1 - 1 = 0$

$(2)^2 - 2 = 2$

$(3)^3 - 3 = 24$

$(4)^4 - 4 = 252$

$(5)^5 - 5 = 3120$

2. $(1)^3 - 1 = 0$

$(2)^3 - 2 = 6$

$(3)^3 - 3 = 24$

$(4)^3 - 4 = 60$

$(5)^3 - 5 = 120$

$(6)^3 - 6 = 210$

3. $3 + 4 + 5 = 12$

$L \rightarrow 12$

(position of alphabet starts from left end).

$9 + 6 + 4 = 19$

$S \rightarrow 19$

$7 + 1 + 8 = 16$

$P \rightarrow 16$

$8 + 3 + 2 = 13$

$M \rightarrow 13$

4. $2 \times 3 + 4 = 10$

$10 \times 3 - 4 = 26$

$26 \times 3 + 4 = \boxed{82}$

$82 \times 3 - 4 = 242$

5. Answer figure (a) is the next missing term.

6. $4E : 8I$

$E \rightarrow 5$

$I \rightarrow 9$

(Position of a alphabet starts from letter 'A')

$(5 - 1)E : (9 - 1)I$

Similarly

$J : N$

$(10 - 1)J : (14 - 1)N$

$\frac{J}{N} : \frac{13}{9}$

7. A, D, I, P, $\boxed{Y}$
 $\begin{array}{cccc} \square & \square & \square & \square \\ +3 & +5 & +7 & +9 \end{array}$

9. From option (a)

$PLOT = 16 + 12 + 15 + 20 = 63$

(Position of alphabet starts from initial letter 'A')

$PLAN = 16 + 12 + 1 + 14 = 43$

$PLAY = 16 + 12 + 1 + 25 = 54$

$PLUS = 16 + 12 + 21 + 19 = 68$

10. A = 26

(Position of alphabet starts from initial letter 'Z')

$SUN = 8 + 6 + 13 = 27$

$CAT = 24 + 26 + 7 = 57$

16. Answer figure (d) is the mirror image of the given word REASON.

17. The mirror image of the given letters and numbers is answer figure (a). (In a mirror image the object on the left side appear on the right sides).

18. $27 \times 3 \times 3 = 243$

$5 \times 4 \times 4 = 80$

$3 \times 7 \times 7 = \boxed{147}$

19. Given options is not right.

20. From the given option, the word 'Gental' will come in middle, when arrange the given words in the alphabetic order of english dictionary.

21. $DKA = 14 + 44 + 22 = 80$

$FHY = 30 + 12 + 42 = 84$

$UDX = 01 + 14 + 41 = 56$

$VTM = 24 + 32 + 23 = 79$

23. $PLOT = 04 + 33 + 01 + 32 = 70$

$PLAN = 04 + 33 + 22 + 11 = 70$

$PLAY = 04 + 33 + 22 + 42 = 101$

$PLUS = 04 + 33 + 43 + 31 = 111$

25. $t_{10} = 3, 6, 12, \dots$ upto 10 terms.

$$\begin{aligned} t_n &= ar^{n-1} \\ &= 3 \times (2)^{10-1} \\ &= ₹ 1536 \end{aligned}$$

(26 – 30) :

Here the code for

G → 3

L → 4

S → 7

N → 8

M → 5

E → 2

26. LSG = 473

27. NLEM = 8425

28. MSN = 578

29. LEM = 425

30. GEN = 328

31. Let the no. of deers and peacocks be x and $(80 - x)$.

According to question

$$4x + (80 - x)2 = 200$$

$$x = 20$$

So the no. of peacocks = $80 - 20 = 60$

(32 – 35)

Students	Subjects					
	Phy	Chem	Math	Civics	Bio	Anth
P	√	√	×	×	√	×
Q	√	√	√	√	×	√
R	√	×	√	×	×	×
S	×	√	√		√	
T	×	√	√	√	×	√

32. The student studies maximum number of subjects is 'Q'
33. The students 'R' studies minimum number subjects
34. The students studies only four subjects is 'T'.
35. Q and T pairs studies Chemistry and Civics.

36. The region that represents Indian Leaders who are not singers is '2'.

37. The region '6' represents leaders who are neither singers nor Indian.

38. The region that represents Indian singers who are not leaders is '4'.

39. The Indian leaders who are singer is '3'.

40. The region that represents singers who are neither Indian nor leaders is '7'.

41. From the given dices, it is clear that the alphabet opposite to 'A' is 'E'.

42. From the given dices (3) and (4), it is clear that 1, 2, 5 and 6 is the adjacent of 3, hence the number is opposite to 3 is 4.

43. The number opposite to 4 is '1'.

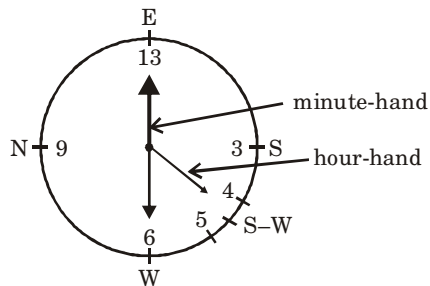
(44 – 45) :

H	↑	H → Hindi
E	↑	E → English
S	↑	S → Science
M	↑	M → Mathematics
D	↑	D → Drawing

44. From the above question, it is clear that the book between Hindi and Science book is English.

45. Drawing book is at the bottom.

46.



From the figure, it is clear that hour hand will point south-west direction.

47. There are 5 hexagones in the given figure.

48. From the given pictures, it is clear that answer figure (3) is odd because there is a shaded part at each corner.

49. In the given figures (a), (c) and (d), there is a semicircle onside and outside the side of a square, except answer figure (b).
50. In the given letters A, F and Z, there are three straight lines except letter E, there are four straight lines.

SCHOLASTIC APTITUDE TEST

$$71. = \left(\frac{6}{20} \times 100 \right) \% = 30\%$$

72. There are 3 surfaces in solid cylinder.

73. If the order of any matrix is 3×2 , then
no. of element = $3 \times 2 = 6$

74. Given

$x^3 + 2x^2 + kx + 10$ is a polynomial of factor $(x - 2)$.

So $x = 2$, we get

$$(2)^3 + 2(2)^2 - k(2) + 10 = 0$$

$$\therefore k = 13$$

76. Arrange the given number in ascending order

4, 5, 6, 7, 9, 10, 14, 15

Here total numbers = 8 = even

So the median

$$= \frac{\text{Sum of 4}^{\text{th}} \text{ number \& } 5^{\text{th}} \text{ numbers}}{2}$$

$$= \frac{7 + 9}{2} = 8$$

$$77. \text{ Mean proportion} = \sqrt{64 \times 225}$$

$$= 8 \times 15 = 120$$

78. Given points $(-2, -5)$, $(2, -2)$ and $(8, a)$ are collinear, then

$$\begin{vmatrix} -2 & -5 & 1 \\ 2 & -2 & 1 \\ 8 & a & 1 \end{vmatrix} = 0$$

$$-2(-2 - a) + 5(-6) + 1(2a + 16) = 0$$

$$4a = 10$$

$$\therefore a = \frac{5}{2}$$

79. According to question

$$\frac{13 + 15 + 17 + 18 + n}{5} = 17$$

$$63 + n = 85$$

$$\therefore n = 22$$

$$80. \log_{10} 1 = 0$$

81. Given

$$S_n = 2n^2 + 3n$$

$$\text{Put } n = 1, 2, 3, \dots$$

$$S_1 = 5$$

$$S_2 = 14$$

$$S_3 = 27$$

Now first term = 5

So Second term = $14 - 5 = 9$

third term = $27 - 14 = 13$

So $t_n = 5, 9, 13, \dots$ upto n terms.

Now common difference

$(d) = 9 - 5 = 4$ (common difference = $b - a$)

82. Let length, breadth and height of a cuboid be l , b and h .

According to question

$$A = l \times b$$

$$B = b \times h$$

$$C = h \times l$$

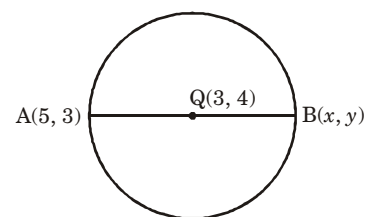
$$ABC = (lbh)^2$$

$$V = lbh$$

$$\therefore \text{Volume (V)} = \sqrt{ABC}$$

$$\begin{aligned} 83. \text{ Area of a circle} &= \pi r^2 \\ &= \pi(\pi)^2 \\ &= \pi^3 \end{aligned}$$

84.



According to question

$$\left(\frac{5+x}{2}, \frac{3+y}{2}\right) = (3, 4)$$

$$\therefore x = 1$$

$$\text{and } y = 5$$

B(1, 5)

So the co-ordinate of other ends of diameter is B(1, 5).

$$\begin{aligned} 85. &= \cos^2 26^\circ + \cos(90^\circ - 26^\circ) \cdot \sin 26^\circ \\ &\quad + \frac{\tan 36^\circ}{\cot(90^\circ - 30^\circ)} \\ &= \cos^2 26^\circ + \sin 26^\circ \cdot \sin 26^\circ + \frac{\tan 36^\circ}{\tan 36^\circ} \\ &= 1 + 1 \\ &= 2 \end{aligned}$$

$$\begin{aligned} 86. \quad \sqrt[3]{64} &= \sqrt[3]{4 \times 4 \times 4} \\ &= 4 \end{aligned}$$

87. The additive inverse of

$$\frac{2x-3}{3x+5} = \frac{3-2x}{3x+5}$$

88. Here in right angle triangle ABC

$$AC = \sqrt{(8)^2 + (6)^2} = 10$$

The radius of incircle

$$\begin{aligned} &= \frac{AB + BC - AC}{2} \\ &= \frac{8 + 6 - 10}{2} = 2 \text{ cm} \end{aligned}$$

89. Given AP : PB : 1 : 2

Now the ratio of area of $\triangle APQ$ and $\triangle ABC$

$$\begin{aligned} &= \frac{AP^2}{AB^2} \\ \Rightarrow \frac{1}{(AP+PB)^2} &= \frac{1}{(1+2)^2} = \frac{1}{9} = 1 : 9 \end{aligned}$$

90. In $\triangle OAC$, $OA = OC$

$$\therefore \angle OAC = \angle OCA$$

$$\angle AOC + \angle OAC + \angle OCA = 180^\circ$$

$$\therefore \angle OAC = 65^\circ = \angle OCA$$

$$\angle BCA = 90^\circ$$

$$\therefore \angle ACT = 90^\circ$$

$$\angle CAT = 90^\circ - 65^\circ = 25^\circ$$

Now in $\triangle ACT$

$$\angle CAT + \angle ACT + \angle ATC = 180^\circ$$

$$25^\circ + 90^\circ + x = 180^\circ$$

$$\therefore x = 65^\circ$$

■ ■

NTSE - 2014

BIHAR

PART I : MENTAL ABILITY TEST

Directions (Q. 1–5) : In each of the following questions, a group of letters is given, which are numbered differently. Below four alternatives are given, containing combination of these numbers. Select that combination of numbers which forms a meaningful word.

1. toepret

- (a) 1536724 (b) 7123456
(c) 5642137 (d) 3471625

2. esbtril

- (a) 6742351 (b) 3762415
(c) 4235671 (d) 5673124

3. ilaecprim

- (a) 496178532 (b) 813456279
(c) 781256934 (d) 125349678

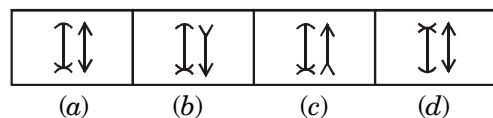
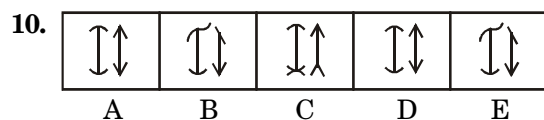
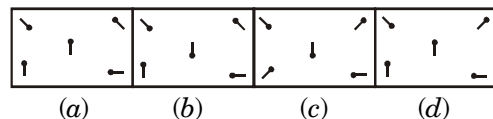
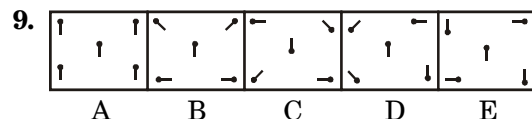
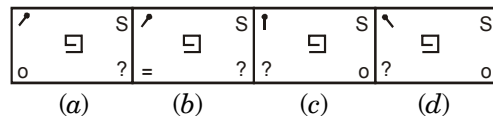
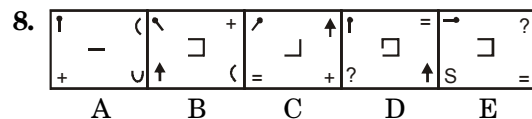
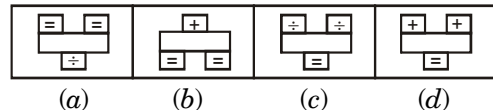
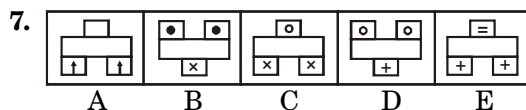
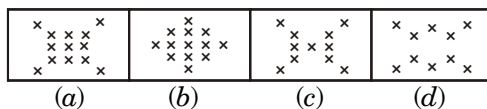
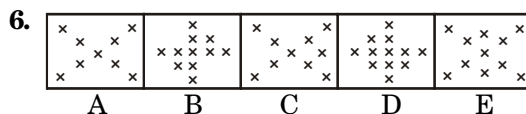
4. erqechxeu

- (a) 781635924 (b) 912673548
(c) 541678392 (d) 175643982

5. afirgel

- (a) 2415376 (b) 4361257
(c) 1234567 (d) 6217354

Directions (Q. 6–10) : In each of the following questions, find the figure from the answer-set (i.e. (a), (b), (c) and (d)) which will continue the series given in the problem-set (i.e. A, B, C, D, and E)



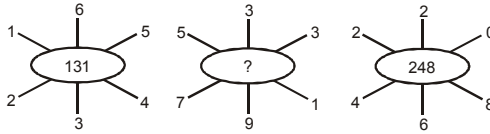
Directions (Q. 11–13) : Study the pattern of numbers in the following questions and select the missing number in the place of question mark (?). Mark the correct alternative on your answer-sheet as directed.

11.

7	4	5
8	7	6
3	3	?
29	19	31

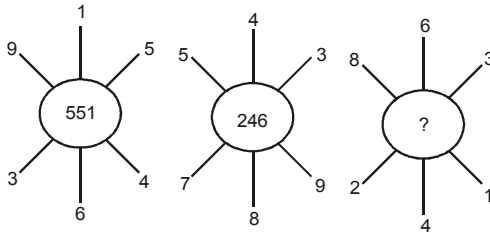
- (a) 11 (b) 13
(c) 5 (d) 9

12.



- (a) 262 (b) 249
(c) 331 (d) 312

13.



- (a) 406 (b) 319
(c) 622 (d) 762

14. If + means $\times$, $-$ means $\div$, $\times$ means $-$ and $\div$ means $+$ then $16 \div 96 - 4 \times 3 + 6 = ?$

- (a) 27 (b) 22
(c) 43 (d) 8

15. If + means $\times$, $-$ means $\div$, $\times$ means $-$ and $\div$ means $+$ then $10 + 6 - 15 \times 5 \div 5 = ?$

- (a) -6 (b) 6
(c) 12 (d) -7

16. If % means $\times$, $\times$ means $\div$, $+$ means $-$ and $\div$ means $+$ then $215 \times 5 + 10 \% 3 \div 3 = ?$

- (a) 10 (b) 12
(c) 18 (d) 20

17. If $\sqrt{\quad}$ means square, $\times$ means $+$, $-$ means $\times$ and $+$ means $\div$ then $\sqrt{20} + 25 \times 5 - 3 = ?$

- (a) 28 (b) 31
(c) 32 (d) 38

18. If + means $\times$, $-$ means $\div$, $\times$ means $-$ and $\div$ means $+$ then $9 + 8 \div 8 - 4 \times 9 = ?$

- (a) 62 (b) 64
(c) 65 (d) 67

19. If $\div$ means $+$, $-$ means $\div$, $\times$ means $-$ and $+$ means $\times$ then $12 - 2 + 6 \times 4 \div 5 = ?$

- (a) 27
(b) 47
(c) 57
(d) 37

Directions (Q. 20–25) : In each of the following questions, a series of number is given which follow certain rules. One of the number is missing. Choose the missing number from the alternatives given below and mark it on your answer-sheet as directed.

20. $1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \frac{1}{243}, ?$

- (a) $\frac{1}{729}$ (b) $\frac{1}{829}$
(c) $\frac{1}{749}$ (d) $\frac{1}{769}$

21. 3, 4, 7, 7, 13, 13, 21, 22, 31, 34, ?

- (a) 43 (b) 49
(c) 81 (d) 69

22. 2, 5, 4, 8, 6, 11, 8, 14, 10, ?

- (a) 19 (b) 17
(c) 21 (d) 23

23. 2, 7, 11, 8, 13, 17, 14, 19, 23, ?

- (a) 30 (b) 20
(c) 28 (d) 27

24. 5, 4, 15, 7, 23, 11, 29, 16, 33, ?

- (a) 24 (b) 22
(c) 28 (d) 25

25. 9, 12, 11, 14, 13, ?, 15

- (a) 17 (b) 16
(c) 19 (d) 21

Directions (Q. 26–30) : In the series given below what will come in the place of question mark (?).

26. ADF, CFH, EHJ, GJL, ?

- (a) ILN (b) IKM
(c) KHM (d) HLN

27. AZBY, ?, EVFU, GTHS

- (a) CRDK (b) CXDW
(c) CLDO (d) CIDJ

28. APGL, CQIM, ERKN, ?

- (a) QTWB (b) GSMO
(c) XDLT (d) UNZF

29. ZW3, UR6, PM10, KH15, ?

- (a) FC21 (b) FC20
(c) FB21 (d) FC41

30. Q1F, S1F, U6D, W24C, ?

- (a) Y120B (b) Z40B
(c) Y24D (d) U98T

Directions (Q. 31–34) : Choose the correct water-image of the given words / numbers from amongst the alternatives.

31. ANSWER

- (a) VN2MEB (b) YNW2EV
(c) YNWS2V (d) YNRAE

32. REFLECTION

- (a) EBFECLION (b) YEEFECLION
(c) EFEFECLION (d) YEEFECLION

33. T3P2Y5

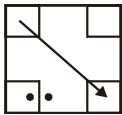
- (a) L3P2Y5 (b) L3P2Y5
(c) L3P2Y5 (d) L3P2Y5

34. RJ6MA7

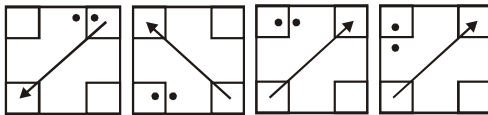
- (a) RJ6MA7 (b) RJ6MA7
(c) RJ6MA7 (d) RJ6MA7

Directions (Q. 35–36) : Find the water-image of X from (a), (b), (c) and (d) amongst the given alternatives.

35.

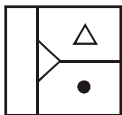


X

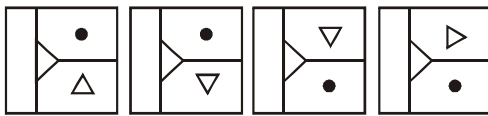


- (a) (b) (c) (d)

36.

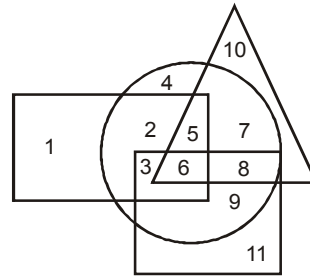


X



- (a) (b) (c) (d)

Directions (Q. 37–41) : In the diagram below circle represents wheat, triangle represents sugarcane, rectangle represents rice and square represents millet. Study the diagram carefully and match the numbers with the questions given below



37. Which area has the cultivation of all the four commodities mentioned ?

- (a) 3 (b) 5
(c) 6 (d) 3

38. Which area gives millet and rice both ?

- (a) 6 (b) 9
(c) 5 (d) 8

39. Which area grows sugarcane and millet together ?

- (a) 14 (b) 8
(c) 7 (d) 5

40. Which area grows only wheat and rice ?

- (a) 6 (b) 8
(c) 2 (d) 7

41. Which area grows wheat only ?

- (a) 2 (b) 3
(c) 4 (d) 5

Directions (Q. 42–46) : In every question a dice has been shown in three different faces on which numbers / letters have been written randomly. Carefully study the faces of the dice and answer the questions based on it.

42. Which letter is opposite to letter 'L' ?



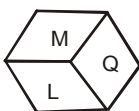
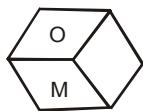
- (a) A
(c) M



- (b) X
(d) P

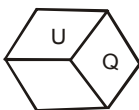
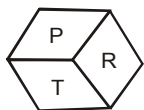


43. Which letter is opposite to letter 'O' ?



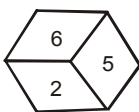
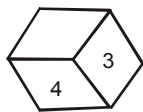
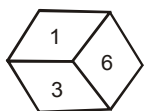
- (a) N (b) L
(c) Q (d) M

44. Which letter is opposite to letter 'Q' ?



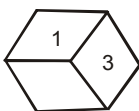
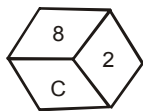
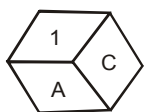
- (a) T (b) R
(c) P (d) U

45. Which letter is opposite to number '4' ?



- (a) 5 (b) 1
(c) 6 (d) 2

46. Which letter is opposite to number '3' ?



- (a) C (b) A
(c) 8 (d) 2

47. The total of present age of P, Q and R is 90 years. Ten years back their age ratio was 1 : 2 : 3. What is the present age of Q.

- (a) 36 (b) 30
(c) 18 (d) 20

48. The average age of three persons is 60 years. The age of the first person is $\frac{1}{4}$ of the total age of the other persons. What is the age of the first person ?

- (a) 46 (b) 56
(c) 36 (d) 66

49. The average age of three girls is 35 years. The ratio of their is 3 : 5 : 7. Find the age of the youngest one.

- (a) 12 (b) 17
(c) 21 (d) 23

50. 'A' is 16 years elder than 'B'. But 'B's' $\frac{1}{2}$ age is equal to $\frac{1}{3}$ age of 'A', then what is the present age of 'A' and 'B'.

- (a) A = 32, B = 16 (b) A = 48, B = 32
(c) A = 40, B = 42 (d) A = 46, B = 30

PART II : ENGLISH LANGUAGE

Directions (Q. 1-5) : Read the passage given below and answer the questions that follow.

Every eye was fixed at the Little Master, as Charl Langeveldt walked over to his bowling mark to bowl him. The Little master was at the score of 199. Will history be created today ? Will they be the witness to the history in making ? They held their breath as the little genius tapped the ball and stole a single. History was made. The first double century in the limited over cricket was scored. Ant the Little Master who did it was none other than Sachin Tendulkar. He scored exactly 200 not out against South Africa in Gwalior breaking the previous highest score of 194 held jointly by Zimbabwean Charles Coventry and Pakistan's Saeed Anwar.

1. Little Master here refers to :

- (a) Charl langeveldt (b) Sachin Tendulkar
(c) Charles Coventry (d) Saeed Anwar

2. History was made because

- (a) Tendulkar scored a century
(b) It was the highest score
(c) It was the first double century in a one day match
(d) Langeveldt was bowling

3. The description is about

- (a) a baseball match
(b) a T-20 match
(c) a Test match
(d) a One day match

4. Sachin Tendulkar completed his 200 runs by scoring

- (a) a six (b) a boundary
(c) one run (d) two runs

5. Where did Tendulkar score 200 runs ?

- (a) South Africa (b) Gwalior
(c) Pakistan (d) Zimbabwe

Directions (Q. 6–10) : Read the passage given below and answer the questions that follow.

I was born in a middle class Tamil family in the island town of Rameswaram in the erstwhile Madras state. My father, Jainulabdeen, had neither much formal education nor much wealth, in spite of these disadvantages. He possessed great innate wisdom and a firm generosity of spirit. He had an ideal help in my mother, Ashiamma. I do not recall the exact number of people she fed everyday, but I am quite certain that more outsiders are with us than all the members of our own family put together. I was one of many children - a short boy with rather undistinguished looks, born to tall and handsome parents. We lived in our ancestral house, which was built in the middle of the nineteenth century. My austere father used to avoid all inessential comforts and luxuries. However, all necessities were provided for, in terms of food, medicine or clothes. In fact, I would say mine was a very secure childhood, both materially and emotionally.

6. The narrator was born in a/an

- (a) Upper class Oriya family
(b) Middle class Tamil family
(c) Middle class Gujarati family
(d) Lower class Bengali family

7. Jainulabdeen was

- (a) very miserly
(b) extremely orthodox
(c) highly educated
(d) always ready to give things freely

8. An ancestral house is

- (a) The house made by the owner
(b) The house inherited from forefathers
(c) The house of father-in-law
(d) A fairly large pucca house

9. The narrator's childhood was secure because

- (a) He had all comforts at his disposal
(b) His father was very influential
(c) He had all support that he needed
(d) He enjoyed all support and had no anxiety.

10. Ashiamma

- (a) did not like her husband's attitude
(b) loved to be idle
(c) was not very helpful
(d) supported her husband in his generosity

Directions (Q. 11–12) : The following five sentences come from a paragraph. The first and the last sentences are given. Choose the order in which the three sentences (PQR) should appear to complete the paragraph.

11. S₁ It is easy to tell the world that film production in India is quantitatively second only to Hollywood.

S₂

S₃

S₄

S₅ Or, are we just plain ashamed of our films ?

P But can the same be said of its quality ?

Q Is it solely because India offers a potential market for her own products ?

R Why are our films not shown abroad ?

Choose from the options given below

(a) PRQ (b) QPR

(c) PQR (d) RQP

12. S₁ Unity and universality must belong to any culture that is true and vital

S₂

S₃

S₄

S₅ Not one of them is separately culture, but collectively they constitute the expression of life which we describe as culture.

P It is always a complex of many strands of varying importance and vitality

Q There is no single character or mark which can be regarded as the essence or distinctive feature of culture

R Now culture is a concept which cannot be simply or unitarily defined

Choose from the options given below

- (a) PQR (b) QRP
(c) RPQ (d) RQP

Directions (Q. 13–22) : Choose the word which best fills the blank in the sentences from the four options given.

13. will not let you rise in life.
(a) Idleness (b) Taste
(c) Readiness (d) Happiness
14. Did you the sweet dish ?
(a) test (b) taste
(c) threaten (d) liked
15. Having failed in the examination, he was in a mood.
(a) pensive (b) happy
(c) glad (d) delighted
16. I didn't get a sleep last night.
(a) light (b) heavy
(c) sound (d) peace
17. Ankita was found to the required qualifications for the job
(a) disclose (b) possess
(c) acquire (d) contain
18. The New Delhi bound Rajdhani Express with an accident.
(a) fell (b) hit
(c) crashed (d) met
19. Meena has just left and if you want to her up, you will have to drive right now.
(a) sec (b) witness
(c) catch (d) get

20. The chairman has agreed in to our suggestions.

- (a) theory (b) principle
(c) view (d) account

21. Columbus America

- (a) invented (b) reported
(c) discovered (d) divulged

22. Everyone laughed at him to see him in such a garment.

- (a) lose (b) loose
(c) close (d) lost

Directions (Q. 23–25) : Select the meaning of the given phrases / idioms

23. Better half

- (a) a big share (b) wife
(c) mother (d) sister

24. To call in question

- (a) ask question (b) to praise
(c) to doubt (d) call to question

25. To hold good

- (a) to be applicable to
(b) to feel good
(c) to hold tightly
(d) to be fixed

Directions (Q. 26–30) : In the following passage there are some blanks with numbers. Fill in the blanks by selecting the most appropriate word for each blank from given options of each number.

When Della 26 home her intoxication 27 way a little to prudence and reason. She got out her curling irons and lighted the gas and went to work repairing the 28 made by 29 added to love. Which is always a 30 task, dear friends a mammoth task.

26. (a) goes (b) comes
(c) reached (d) saw
27. (a) gives (b) takes
(c) gave (d) took
28. (a) ravages (b) tasks
(c) achievements (d) jobs

29. (a) cruelty (b) generosity
(c) heartlessness (d) skilfulness
30. (a) bad (b) tremendous
(c) treacherous (d) tricky

Directions (Q. 31–33) : Select the word which means the opposite of the given word.

31. Adversity
(a) Advertisement (b) Achievement
(c) Hardship (d) Prosperity
32. Cajole
(a) harass (b) persuade
(c) entice (d) allure

33. Foe
(a) enemy (b) rival
(c) friend (d) flatterer

Directions (Q. 34–36) : Select the word which means nearly the same as the given word.

34. Amend
(a) rectify (b) satisfy
(c) ratify (d) spoil
35. Yearn
(a) long (b) short
(c) hate (d) love
36. Bashful
(a) outspoken (b) talkative
(c) shy (d) coward

Directions (Q. 37–40) : In each of the following sentences you will find a blank. Fill in the blanks from the given alternatives.

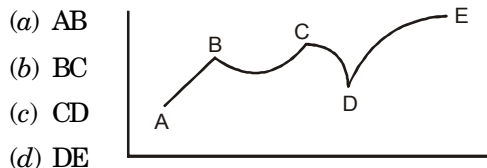
37. He had a in the accident
(a) close save (b) close shave
(c) clean save (d) clean shave
38. They had to in the last election.
(a) eat a humble pie (b) eat a sweet pie
(c) eat a sweet dish (d) eat sour soup
39. Bhavani is trying to a change in her daughter's habits
(a) bring down (b) bring about
(c) bring in (d) bring up
40. It is always wise to save money for a
(a) summer day (b) spring day
(c) rainy day (d) winter day

PART III

SCHOLASTIC APTITUDE TEST

PHYSICS

1. The figure given below shows the displacement plotted against time for a particle. In which region is the force acting on the particle zero ?

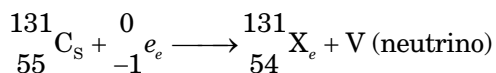


2. A person standing on the floor of a lift drops a coin. The coin reaches the floor of the lift in a time t_1 if the lift is stationary and in time t_2 if its moving uniformly. Then
(a) $t_1 = t_2$
(b) $t_1 < t_2$
(c) $t_1 > t_2$
(d) $t_1 < t_2$ or $t_1 > t_2$ depending on whether the lift is going up or down.
3. A boy is rotating in a circular motion, a stone of mass 500 gm by using a string of length 50 cm with a speed 10 cm/s. What will be the work done by the force applied by the boy.
(a) $0.01 \pi J$ (b) πJ
(c) $10 \pi J$ (d) Zero
4. A planet of volume V and mass m has gravitational acceleration g on its surface. If it expands to 8 times its original volume, what will be the acceleration due to gravity.
(a) $4g$ (b) $2g$
(c) $\frac{g}{4}$ (d) $\frac{g}{8}$
5. A convex lens forms a real image of a point object placed on its principal axis. If the upper half of the lens is cut
(a) The image will be shifted downward
(b) The image will be shifted upward
(c) The intensity of the image will decrease
(d) None of the above

6. A screen is placed at a distance 40 cm away from an illuminated object. A converging lens is placed between the source and screen and attempt is made to form an image on screen. If no position could be found. The focal length of the lens

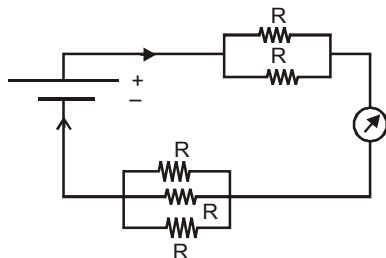
(a) must be less than 10 cm
 (b) must be greater than 20 cm
 (c) must not be greater than 20 cm
 (d) must not be less than 10 cm

7. In a nuclear reaction given below the total energy released is 355 keV and the binding energy of electron is 35 keV. The energy E of the neutrino will be



(a) $E < 355 \text{ keV}$ (b) $E = 355 \text{ keV}$
 (c) $E > 355 \text{ keV}$ (d) None of the above

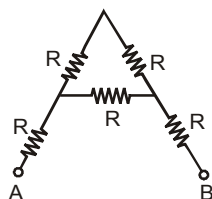
8. In the circuit given below what will be the ratio of current flowing in the upper arm 'R' and lower arm 'R'.



(a) $\frac{2}{3}$ (b) $\frac{5}{3}$
 (c) $\frac{3}{2}$ (d) $\frac{1}{5}$

9. What will be the equivalent resistance between points A and B in the given circuit.

(a) $\left(\frac{5}{3}\right)R$
 (b) $2R$
 (c) $\left(\frac{8}{3}\right)R$
 (d) $3R$



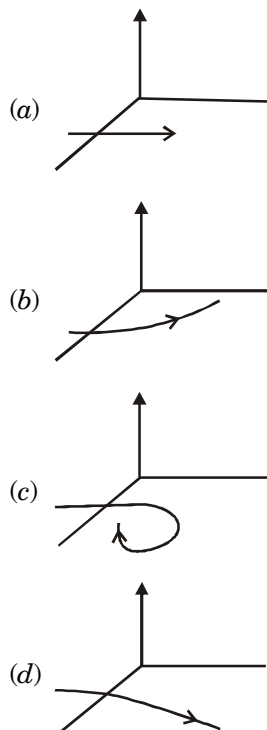
10. A rectangular coil of copper wire is rotated in a magnetic field. The direction of the induced current changes once in each.

(a) revolution
 (b) two revolutions
 (c) half revolution
 (d) one fourth of a revolution

11. Neglecting the rotation of the earth, if suddenly the attractive power of the earth drops to Zero, a man standing on the earth will ...

(a) fly up
 (b) slide along the surface
 (c) move out tangentially
 (d) stand unaffected

12. A high energy electron enters into a strong magnetic field which is perpendicular to its velocity plane. In which path is it expected to move ?



CHEMISTRY

13. If Z is a compressibility factor, van der waals equation at low pressure can be written as :

$$(a) Z = 1 + \frac{Pb}{RT} \quad (b) Z = 1 - \frac{Pb}{RT}$$

$$(c) Z = 1 + \frac{RT}{Pb} \quad (d) Z = 1 - \frac{a}{VRT}$$

14. The metal that can be obtained by electrolysis of an aqueous solution of its salts is

- (a) Zn (b) Cr
(c) Mg (d) Ca

15. Which of the following oxide of nitrogen is ionic ?

- (a) NO (b) N_2O_3
(c) N_2O_5 (d) NO_2

16. The equivalent conductance of NaCl at concentration C and at infinite dilution are λ_c and λ_∞ respectively. The correct relationship between λ_c and λ_∞ is given by

- (a) $\lambda_c = \lambda_\infty - B\sqrt{C}$ (b) $\lambda_c = \lambda_\infty + B\sqrt{C}$
(c) $\lambda_c = \lambda_\infty + BC$ (d) $\lambda_c = \lambda_\infty - BC$

17. On heating an aliphatic primary amine with chloroform and ethanolic potassium hydroxide the organic compound formed is :

- (a) an alkyl cyanide
(b) an alkyl isocyanide
(c) an alkanol
(d) an alkanediol

18. Which one of the following bases is not present in DNA ?

- (a) Cytosine (b) Thymine
(c) Quinoline (d) Adenine

19. In which of the following reactions H_2O_2 acts as a reducing agent

- A. $H_2O_2 + 2H^+ + 2e \rightarrow 2H_2O$
B. $H_2O_2 - 2e \rightarrow O_2 + 2H^+$
C. $H_2O_2 + 2e \rightarrow 2(OH^-)$
D. $H_2O_2 + 2OH^- - 2e \rightarrow O_2 + 2H_2O$
(a) A and C (b) B and D
(c) A and B (d) C and D

20. The IUPAC and of C_6H_5CN is

- (a) Phenyl Cyanide (b) Phenylacetoneitrile
(c) Benzene Cyanide (d) Benzonitrile

21. For the non-stoichiometric reaction $2A + B \rightarrow C + D$, the following kinetic data were obtained in three separate experiments, all at 298 K

Initial Concentration (A)	Initial Concentration (B)	Initial rate of function of C (mol L ⁻¹ s ⁻¹)
0.1 M	0.1 M	1.2×10^{-3}
0.1 M	0.2 M	1.2×10^{-3}
0.2 M	0.1 M	2.4×10^{-3}

The rate of the formation of C is

- (a) $\frac{dc}{dt} = K[A][B]^2$ (b) $\frac{dc}{dt} = K[A]$
(c) $\frac{dc}{dt} = K[A][B]$ (d) $\frac{dc}{dt} = K[A]^2[B]$

22. Which of the following is known as Freon ?

- (a) CCl_2F_2 (b) $CHCl_3$
(c) CH_2F_2 (d) CF_4

23. Which of the following is a β^+ emitter :

- (a) $^{49}_{20}\text{Ca}$ (b) ^8_5B
(c) $^{208}_{82}\text{Pb}$ (d) $^{94}_{36}\text{Kr}$

BIOLOGY

24. Major food crops of the world belong to the family

- (a) solanaceae
(b) Leguminosae
(c) Cruciferae (Brassicaceae)
(d) Graminaceae

25. WBC and RBCs are found in human blood in the ratio of :

- (a) 1 : 60 (b) 1 : 600
(c) 1 : 6000 (d) 1 : 60000

26. The common component of nuclear membrane of organelles like Mitochondria, Endoplasmic-reticulum and Nucleus is

- (a) Glycolipid (b) Glycoprotein
(c) Nucleoprotein (d) Lipoprotein

27. DNA (Deoxyribonucleic acid) and RNA (Ribonucleic acid) are found in cells of all living beings. Its amount in the cells are
 (a) RNA is more than DNA
 (b) DNA is more than RNA
 (c) RNA and DNA is equal in amount
 (d) None of the above
28. During rainy season, wooden doors are difficult to open or close. It is due to
 (a) Plasmolysis (b) Osmosis
 (c) Imbibition (d) Dehydration
29. Haemoglobin is a protein. It is an example of
 (a) Primary structure of protein
 (b) Secondary structure of protein
 (c) Tertiary structure of protein
 (d) Quaternary structure of protein
30. The capsule present in Bacteria is mainly made of
 (a) Glycolipids and proteins
 (b) Phospholipids and proteins
 (c) Poly saccharide and proteins
 (d) All of above
31. 'Coir of commerce' comes from which part of the 'coconut'
 (a) Epicarp (b) Pericarp
 (c) Mesocarp (d) Endocarp
32. The volume of air we breathe in and out during normal respiration is known as
 (a) Vital capacity (b) Vital volume
 (c) Ideal volume (d) Tidal volume
33. Our atmosphere is made of many layers. The layer nearest to the surface of the earth is known as
 (a) Geosphere (b) Stratosphere
 (c) Troposphere (d) None of above
34. A sexual reproduction in plants which produces seed without fertilization is known as
 (a) Parthenogenesis
 (b) Sporulation
 (c) Apomixis
 (d) Vegetative reproduction
35. Which part of the human brain is more developed than other mammals
 (a) Cerebellum (b) Cerebrum
 (c) Sensory lobes (d) None of the above

MATHEMATICS

36. In a A.P, 5 times the 5th term is equal to 8 times the 8th term, then its 13th term is
 (a) 0 (b) -1
 (c) -12 (d) -13
37. If $x + \frac{1}{x} = 5$, then

$$x^3 - 5x^2 + x + \frac{1}{x^3} - \frac{5}{x^2} + \frac{1}{x} = \dots$$

 (a) -5 (b) 0
 (c) 5 (d) 10
38. The surface area of a cylindrical pipe, open at both ends is 628 sq.m. The difference between its radius and length is 15 m, the length being larger. If the pipe was closed at one end, the amount of water that it can hold is,
 (a) 500π cu. m (b) 525π cu. m
 (c) 550π cu. m (d) None of these
39. If $a + b + c = 0$ and $a^2 + b^2 + c^2 = k(a^2 - bc)$ then $k = \dots$
 (a) 0 (b) 1
 (c) 2 (d) 3
40. Given $5A9 + 3B7 + 2C8 = 1114$, then the maximum value of C is
 (a) 5 (b) 7
 (c) 8 (d) None of these
41. Two fair die are thrown. The probability the sum of the numbers appearing is 6 is
 (a) $\frac{1}{6}$ (b) $\frac{5}{6}$
 (c) $\frac{1}{36}$ (d) $\frac{5}{36}$
42. The ratio, in which the line segment joining (3, -4) and (-5, 6) is divided by the x-axis is,
 (a) 3 : 2 (b) 2 : 3
 (c) 1 : 2 (d) 2 : 1

43. If the co-ordinate of two opposite vertices of a square are (a, b) and (b, a) then the area of the square is
 (a) $(a + b)^2$ (b) $2(a + b)^2$
 (c) $(a - b)^2$ (d) $2(a - b)^2$
44. If $\sin x + \sin^2 x = 1$ then $\cos^8 x + 2 \cos^6 x + \cos^4 x = \dots$
 (a) 0 (b) -1
 (c) 2 (d) 1
45. $1 - \frac{\sin^2 y}{1 + \cos y} + \frac{1 + \cos y}{\sin y} - \frac{\sin y}{1 - \cos y} = \dots$
 (a) 0 (b) 1
 (c) $\sin y$ (d) $\cos y$
46. A tower is $100\sqrt{3}$ m. high. The angle of elevation of its top from a point 100 m. away from its foot is ...
 (a) 60° (b) 45°
 (c) 30° (d) $22\frac{1}{2}^\circ$
47. In a ΔPRS , $\angle PRS = 120^\circ$. A point Q is taken on PR such that PQ = QS and QR = RS then $\angle QPS = \dots$
 (a) 15° (b) 30°
 (c) 45° (d) 12°
48. A chord of a circle of radius 7 cm. subtends an angle of 90° at its centre. The ratio of areas of smaller and larger segment is
 (a) 2 : 7 (b) 1 : 10
 (c) 1 : 11 (d) None of these
49. The length of a ladder is exactly equal to the height of the wall it is leaning against. If the lower end of the ladder is kept on a bench of height 3 m. and the bench is kept 9 m. away from the wall, the upper end of the ladder coincides with the top of the wall. The height of the wall is :
 (a) 11 m. (b) 12 m.
 (c) 15 m. (d) 18 m.
50. A cone of height 7 cm. and base radius 3 cm. is carved from a rectangular block of wood of dimensions 10 cm. $\times$ 5 cm. $\times$ 2 cm. The percentage of wood wasted is
 (a) 37% (b) 46%
 (c) 54% (d) 66%
51. The mean of n numbers $x_1, x_2, \dots, x_n$ is M. If x_1 is replaced by 'a', the new mean is
 (a) $\frac{nM - x_1 + a}{n}$ (b) $\frac{M - x_1 + a}{n}$
 (c) $\frac{nM - a + x_1}{n}$ (d) None of these
52. Which of the following is correct for the given data 55, 38, 69, 24, 89 ?
 (a) median = mode (b) mean = mode
 (c) mean = median (d) None of these
53. The mean of n numbers is M. If 1 is added to the first number, 2 is added to the second number. n is added to the n^{th} number then the new mean is
 (a) $M + \frac{n+1}{2}$ (b) $M + \frac{n}{2}$
 (c) $M + n$ (d) None of these
54. A bag contains 5 red and some blue balls. If the probability of drawing a blue ball is three times the probability of drawing a red ball then the number of blue balls in the bag is
 (a) 10 (b) 12
 (c) 15 (d) 8
55. $\frac{\tan x}{\sec x - 1} - \frac{\sin x}{1 + \cos x} = \dots$
 (a) $2 \tan x$ (b) $2 \sin x$
 (c) $6 \cos x$ (d) $2 \cot x$

HISTORY

56. Hargovind Khurana, the great scientist was born on
 (a) 1 January 1922 (b) 9 January 1922
 (c) 3 January 1922 (d) 7 January 1922
57. M. S. Swaminathan, the great scientist was awarded PADMA SRI by the Govt. of India in :
 (a) 1965 (b) 1966
 (c) 1967 (d) 1968
58. The Jalianwala Bagh is located at
 (a) Lahore
 (b) Multan
 (c) Amritsar
 (d) Jalandhar

- 59.** Rashtriya Swayamsevak Sangh (RSS) was founded in :
 (a) 1925 (b) 1926
 (c) 1927 (d) 1928
- 60.** Vallabhbhai Patel was born in Nadiad, Gujarat on
 (a) 31 October 1875 (b) 30 October 1876
 (c) 30 October 1877 (d) 30 October 1878
- 61.** The original name of Vinoba Bhave was
 (a) Vijay Narain Bhave
 (b) Vijay Narhari Bhave
 (c) Vinoba Narhari Bhave
 (d) Vinayak Narhari Bhave
- 62.** Socialist Party was founded in
 (a) 1933 (b) 1934
 (c) 1935 (d) 1936
- 63.** Jeevak, the first surgeon, was of
 (a) Varanasi (b) Takshila
 (c) Rajgir (d) Pataliputra
- 64.** Agra City was founded by :
 (a) Allaudin Khilji (b) Sikandar Lodi
 (c) Akbar (d) Shahjahan
- 65.** What is Tigris ?
 (a) King (b) Place
 (c) Mountain (d) River
- 67. Assertion (A) :** Jute is considered a golden fibre in India.
Reason (R) : Jute in its appearance is golden in colour
 Select the correct option from the given alternatives
 (a) Both (A) and (R) are true and (R) explains (A)
 (b) Both (A) and (R) are true but (R) does not explain (A)
 (c) (A) is true and (R) is false
 (d) (A) is false and (R) is true
- 68. Assertion (A) :** Tank irrigation is most common and prevalent means of irrigation in peninsular India.
Reason (R) : The terrain of the peninsular plateau is very uneven with many natural depressions.
 Select the correct option from the given alternatives
 (a) Both (A) and (R) are true and (R) explains (A)
 (b) Both (A) and (R) are true but (R) does not explain (A)
 (c) (A) is true and (R) is false
 (d) (A) is false and (R) is true
- 69. Assertion (A) :** Delhi has a high annual range of temperature.
Reason (R) : Delhi is located in the subtropical region.
 Select the correct option from the given alternatives
 (a) Both (A) and (R) are true and (R) explains (A)
 (b) Both (A) and (R) are true but (R) does not explain (A)
 (c) (A) is true and (R) is false
 (d) (A) is false and (R) is true

GEOGRAPHY

- 66. Assertion (A) :** Indian rivers on the western coast do not form delta though they bring along lot of sediments.
Reason (R) : Tidal waves wash away sediments from the western coast.
 Select the correct option from the given alternatives
 (a) Both (A) and (R) are true and (R) explains (A)
 (b) Both (A) and (R) are true but (R) does not explain (A)
 (c) (A) is true and (R) is false
 (d) (A) is false and (R) is true
- 70.** The river Mahanadi passes from which state
 (a) Karnataka (b) Andhra Pradesh
 (c) Odisha (d) Tamil Nadu

- 71.** India is deficient in which of the following minerals
 (a) Mica (b) Bauxite
 (c) Iron (d) Lead
- 72.** The source of best quality Pashmina wool is
 (a) Angora sheep from Himachal Pradesh
 (b) Chamba goats from Himachal Pradesh
 (c) Gurej sheep from J & K
 (d) Bikaner sheep from Rajasthan
- 73.** The main problem of Green Revolution is
 (a) Regional imbalance
 (b) inequality in the production of crop
 (c) pollution of the environment
 (d) all of the above
- 74.** Royal Bengal Tiger is found in which of the following forest region
 (a) Gir forest (b) Sundarban
 (c) Vrindavan (d) Dandkaranya
- 75.** The coastal plain south of river Tapti till Southern Goa is known as
 (a) Plain of Gujrat
 (b) Malabar coastal plain
 (c) Konkan coastal plain
 (d) Coromandal coastal plain
- 78.** Who made the Indian Constitution ?
 (a) Constituent Assembly
 (b) British Parliament
 (c) Indian Parliament
 (d) Governor General
- 79.** Which institution is the example of Direct Democracy in India ?
 (a) Gram Sabha
 (b) Gram Panchayat
 (c) Nagar Panchayat
 (d) District Panchayat
- 80.** Which constitutional amendment bill has amended the tenure of Lok Sabha from 6 years to 5 years
 (a) 42nd (b) 44th
 (c) 45th (d) None of these
- 81.** The decision regarding eligibility criteria controversy of the members of the parliament is taken by
 (a) Election Commission
 (b) Related Chamber
 (c) Lok Sabha Speaker
 (d) The President after taking advice from Electoral Commission
- 82.** The Prime Minister of India is
 (a) Elected by the Lok Sabha
 (b) Elected by the parliament
 (c) Elected by the majority party in the Lok Sabha
 (d) Elected by the people
- 83.** The President of India is a
 (a) Nominal Head
 (b) Real Head
 (c) Political Head
 (d) Nominal and Constitutional Head
- 84.** 'Sons of the Soil' doctrine related to
 (a) Regionalism
 (b) Casteism
 (c) Communalism
 (d) None of the above

CIVICS

- 76.** Who is the chairman of the Drafting Committee of the Indian Constitution ?
 (a) Dr. Rajendra Prasad
 (b) Dr. Bhim Rao Ambedkar
 (c) Jawaharlal Nehru
 (d) Raja Gopalachari
- 77.** Who has the power of Judicial review in the Indian Constitution ?
 (a) only Supreme Court
 (b) only High Court
 (c) President
 (d) Both Supreme Court and High Court

85. Democracy is a system of government in which the final power rests with

- (a) The mob
- (b) The people
- (c) The politicians
- (d) The civil servants

ECONOMICS

86. National Development Council (NDC) was set up in the year

- (a) 1952
- (b) 2001
- (c) 1956
- (d) 1991

87. The currency of England is

- (a) Dollar
- (b) Pound
- (c) Rubal
- (d) Dinar

88. Mahatma Gandhi National Rural Employment Guarantee Scheme was started by

- (a) Government of Bihar
- (b) Government of India
- (c) Government of Maharashtra
- (d) Government of Kerala

89. Globalisation policy was initiated by the Government of India in the year

- (a) 1947
- (b) 1977
- (c) 1991
- (d) 2001

90. Government of India enacted Consumer Protection Act in the year

- (a) 1951
- (b) 1981
- (c) 1986
- (d) 1991

ANSWERS

MENTAL ABILITY TEST

1. (a)	2. (b)	3. (a)	4. (d)	5. (a)	6. (b)	7. (a)	8. (a)	9. (b)	10. (c)
11. (c)	12. (a)	13. (c)	14. (b)	15. (*)	16. (*)	17. (b)	18. (c)	19. (a)	20. (a)
21. (a)	22. (b)	23. (b)	24. (b)	25. (b)	26. (a)	27. (b)	28. (b)	29. (a)	30. (a)
31. (a)	32. (a)	33. (c)	34. (c)	35. (c)	36. (c)	37. (c)	38. (a)	39. (b)	40. (c)
41. (c)	42. (a)	43. (b)	44. (b)	45. (c)	46. (a)	47. (b)	48. (c)	49. (c)	50. (b)

ENGLISH

1. (b)	2. (c)	3. (d)	4. (c)	5. (b)	6. (b)	7. (d)	8. (b)	9. (c)	10. (d)
11. (a)	12. (d)	13. (a)	14. (b)	15. (a)	16. (c)	17. (b)	18. (d)	19. (c)	20. (d)
21. (c)	22. (b)	23. (b)	24. (c)	25. (a)	26. (c)	27. (c)	28. (a)	29. (d)	30. (b)
31. (d)	32. (a)	33. (c)	34. (a)	35. (a)	36. (c)	37. (b)	38. (d)	39. (b)	40. (c)

SCHOLASTIC APTITUDE TEST

1. (a)	2. (a)	3. (d)	4. (c)	5. (c)	6. (d)	7. (a)	8. (c)	9. (c)	10. (c)
11. (d)	12. (b)	13. (d)	14. (b)	15. (c)	16. (a)	17. (b)	18. (c)	19. (b)	20. (d)
21. (b)	22. (a)	23. (b)	24. (d)	25. (b)	26. (d)	27. (a)	28. (c)	29. (d)	30. (c)
31. (c)	32. (d)	33. (c)	34. (c)	35. (b)	36. (a)	37. (b)	38. (a)	39. (a)	40. (d)
41. (d)	42. (b)	43. (d)	44. (d)	45. (d)	46. (a)	47. (a)	48. (d)	49. (c)	50. (a)
51. (a)	52. (c)	53. (a)	54. (c)	55. (d)	56. (b)	57. (c)	58. (c)	59. (a)	60. (a)
61. (d)	62. (b)	63. (c)	64. (b)	65. (d)	66. (d)	67. (a)	68. (b)	69. (b)	70. (c)
71. (d)	72. (b)	73. (d)	74. (b)	75. (c)	76. (b)	77. (d)	78. (a)	79. (b)	80. (b)
81. (d)	82. (c)	83. (d)	84. (a)	85. (b)	86. (a)	87. (b)	88. (b)	89. (c)	90. (c)

EXPLANATIONS**MENTAL ABILITY TEST**

11. $7 \times 3 + 8 = 29$

$4 \times 3 + 7 = 19$

$5 \times ? + 6 = 31$

$\therefore ? = 5$

14. $16 + 96 \div 4 - 3 \times 6 = 16 + 24 - 3 \times 6$
 $= 16 + 24 - 18 = 22$

15. $10 \times 6 \div 15 - 5 + 5 = 10 \times \frac{6}{15} - 5 + 5$
 $= 4 - 5 + 5 = 4$

16. $215 \div 5 - 10 \times 3 + 3 = 43 - 30 + 3$
 $= 13 + 3 = 16$

17. $202 \div 25 + 5 \times 3 = 400 \div 25 + 5 \times 3$
 $= 16 + 5 = 31$

18. $9 \times 8 + 8 \div 4 - 9 = 72 + 2 - 9$
 $= 74 - 9 = 65$

19. $12 \div 2 \times 6 - 4 + 5 = 6 \times 6 - 4 + 5$
 $= 36 + 5 - 4 = 37$

20. $1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \frac{1}{243}, \frac{1}{729}$

21. $3, 4, 7, 7, 13, 13, 21, 22, 31, 34, 43$

22. $5, 4, 8, 6, 11, 8, 14, 10, 17$

23. $2, 7, 11, 8, 13, 17, 14, 19, 23, 20$

24. $5, 4, 15, 7, 23, 11, 24, 16, 33, 22$

25. $9, 12, 11, 14, 13, 16, 15$

26. $A D F, C F H, E H J, G J L, I L N$

27. $A Z B Y, C X D W, E V F U, G T H S$

28. $A P G L, C Q I M, E R K N, G S M O$

29. $Z W 3, U R 6, P M 10, K H 15, F C 21$

30. $Q 1 F, S 2 E, U 6 D, W 2 4 C, Y 1 2 0 B$

47. Let the required ratio be x

Then $x + 2x + 3x = 90 - (10 + 10 + 10)$

$\Rightarrow 6x = 60$

$\Rightarrow x = 10$

Age of Q = $2x = 20$

Present age = $20 + 10 = 30$ years

48. Let three person be x, y and z respectively

Then $x + y + z = 60 \times 3$

$= 180 \quad \dots(1)$

According to question $x = \frac{1}{4}(y + z)$

$\Rightarrow 4x = y + z$

Then $x + 4x = 180$

$\Rightarrow 5x = 180$

$\Rightarrow x = 36$

49. Let the required ratio be x

Then $3x + 5x + 7x = 35 \times 3$

$\Rightarrow 15x = 105$

$\Rightarrow x = \frac{105}{15} = 7$

Then youngest girl age = $3x$

$= 3 \times 7 = 21$ years

50. Let age of B = x

Then $A = x + 16$

According to question

$\frac{x}{2} = \frac{x+16}{3}$

$\Rightarrow 3x = 2x + 32$

$\Rightarrow x = 32$

$\therefore B = 32$

$A = x + 16 = 48$

SCHOLASTIC APTITUDE TEST

1. Velocity is constant in AB

$\therefore a \text{ and } f = 0$

2. When lift is going up $t_2 < t_1$

When lift is going down $t_2 > t_1$

3. $\therefore$ tension is at 90° to the displacement.

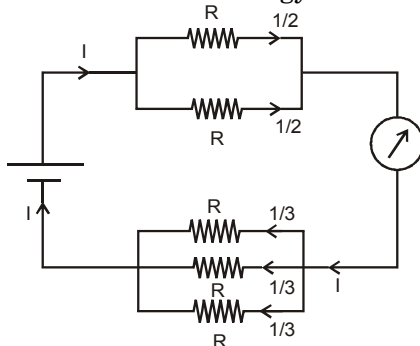
$$\begin{aligned}
 4. \quad \therefore \quad \frac{4}{3}\pi r^2 \times 8 &= \frac{4}{3}\pi R^3 \Rightarrow R = 2r \\
 g &= \frac{GM}{r^2} \\
 g' &= \frac{GM}{R^2} \\
 \Rightarrow \quad \left(\frac{g'}{g}\right) &= \frac{r^2}{R^2} \\
 \therefore \quad g' &= \frac{g}{4}
 \end{aligned}$$

5. $\therefore$ since light transmitting area is reduced.

6. This is due to virtual image.

7. Neutrino has low energy.

8.



$$\frac{\frac{1}{2}}{\frac{1}{3}} = \frac{3}{2}$$

$$9. R_{eq} = \left(R + \frac{2R \cdot R}{2R + R} + R \right) = \frac{8R}{R}$$

12. The direction can be given by $(\vec{B} \times \vec{V})$

$$13. \quad \left(P + \frac{n^2 a}{V^2} \right) (V - nb) = nRT$$

For $n = 1$

$$\left(P + \frac{a}{V^2} \right) (V - b) = RT$$

At low pressure

$V \gg b$

$$\text{Hence} \quad \left(P + \frac{a}{V^2} \right) V = RT$$

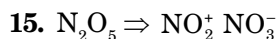
$$PV + \frac{a}{V} = RT$$

$$PV = RT - \frac{a}{V}$$

Dividing both side by RT

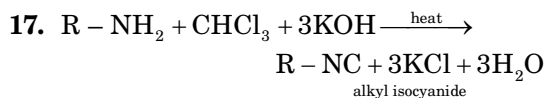
$$\frac{PV}{RT} = 1 - \frac{a}{VRT}$$

$$z = 1 - \frac{a}{VRT}$$



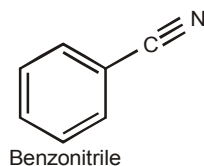
16. According to Debye Huckel's theory for a strong electrolyte

$$\lambda_c = \lambda_\infty - B\sqrt{C}$$



This reaction is known as carbylamines reaction or isocyanide test and is used as a test for primary amines.

20.



21. From table it is clear that $\frac{dc}{dt}$ (initial rate of function of c) is independent of concentration of B

$$\text{Hence} \quad \frac{dc}{dt} = K[A]$$

36.

$$5a_5 = 8a_8$$

$$5(a + 4d) = 8(a + 7d)$$

$$\Rightarrow 3(a + 12d) = 0$$

$$\Rightarrow a_{13} = 0$$

$$37. \quad \left(x^3 + \frac{1}{x^3} \right) + \left(x + \frac{1}{x} \right) - 5 \left(x^2 + \frac{1}{x^2} \right)$$

$$\left[\left(x + \frac{1}{x} \right)^3 - 3 \left(x + \frac{1}{x} \right) \left(x + \frac{1}{x} \right) \right] +$$

$$\left(x + \frac{1}{x} \right) - 5 \left[\left(x + \frac{1}{x} \right)^2 - 2 \left(x + \frac{1}{x} \right) \left(\frac{1}{x} \right) \right]$$

$$= (5^3 - 3 \cdot 5) + 5 - 5(5^2 - 2)$$

$$= 0$$

$$\begin{aligned}
 38. \quad 2\pi rh &= 628 \\
 rh &= 100 \quad \dots(1) \\
 h - r &= 15 \quad \dots(2)
 \end{aligned}$$

By (1) and (2)

$$\begin{aligned}
 h &= 20 \\
 r &= 5 \\
 \text{volume} &= \pi(20)(25) = 500\pi
 \end{aligned}$$

$$\begin{aligned}
 39. \quad a + b + c &= 0 \\
 a &= -b - c \quad \dots(1) \\
 (a + b + c)^2 &= 0 \\
 a^2 + b^2 + c^2 + 2(ab + bc + ca) &= 0 \\
 k(a^2 - bc) + 2(ab + bc + ca) &= 0 \\
 2(ab + bc + ca) &= -k(a(-b - c) - bc) \\
 \Rightarrow 2(ab + bc + ca) &= k(ab + bc + ca) \\
 \therefore K &= 2
 \end{aligned}$$

$$\begin{array}{r}
 40. \quad \begin{array}{ccc} 1 & 2 & \\ 5 & A & 9 \\ 3 & B & 7 \\ 2 & C & 8 \\ \hline 1 & 1 & 1 \end{array} \quad \begin{array}{c} 4 \\ 4 \\ 4 \\ 4 \end{array}
 \end{array}$$

$$2 + A + B + C = 11$$

$$A + B + C = 9$$

Clearly max value of C = 9

$$41. \text{favourable} = \{(1, 5)(5, 1)(2, 4)(4, 2)(3, 3)\} \equiv 5$$

$$\text{Total} = 36$$

$$\therefore P(\text{sum} = 6) = \frac{5}{36}$$

$$42. \quad \begin{array}{c} A \quad \lambda \quad B \quad 1 \quad C \\ \bullet \quad \quad \bullet \quad \quad \bullet \\ (3, -4) \quad (a, 0) \quad (-5, 6) \end{array}$$

B is on x axis so, let B(a, 0)

Let B divides AC in $\lambda : 1$

$$\Rightarrow 0 = \frac{6\lambda + 1(-4)}{\lambda + 1} = \lambda = \frac{2}{3}$$

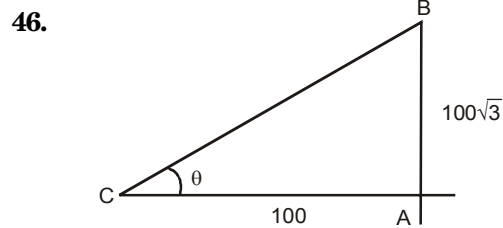
$$\text{Ratio} = 2 : 2$$

$$\begin{array}{c}
 43. \quad \begin{array}{c} \begin{array}{c} b \\ | \\ a \\ | \\ \text{---} \end{array} \quad \begin{array}{c} (a, b) \\ \text{---} \end{array} \quad \begin{array}{c} (b-a) \\ \downarrow \\ (b, a) \end{array} \\ \begin{array}{c} \text{---} \end{array} \quad \begin{array}{c} (b-a) \end{array} \end{array}$$

$$\text{Area} = (b-a)^2 = (a-b)^2$$

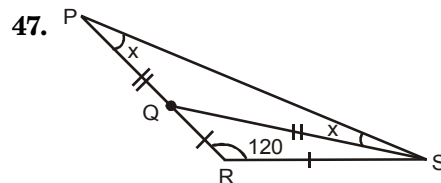
$$\begin{aligned}
 44. \quad \sin x &= 1 - \sin^2 x \\
 \sin x &= \cos^2 x \\
 (\cos^2 x)^4 + 2(\cos^2 x)^3 + (\cos^2 x)^2 &= (\sin x)^4 + 2(\sin x)^3 + (\sin x)^2 \\
 &= \sin^2 x (\sin x + 1)^2 \\
 &= (1 - \sin x)(1 + \sin x)(1 + \sin x) \\
 &= (1 - \sin^2 x)(1 + \sin x) \\
 &= (\sin x)(1 + \sin x) \\
 &= \sin x + \sin^2 x = 1
 \end{aligned}$$

$$\begin{aligned}
 45. \quad 1 - \frac{\sin^2 y}{1 + \cos y} + \frac{1 + \cos y}{\sin y} - \frac{\sin y}{1 - \cos y} \\
 = \frac{1 + \cos y - \sin^2 y}{1 + \cos y} + \frac{1 - \cos^2 y - \sin^2 y}{\sin y(1 - \cos y)} \\
 = \frac{\cos y + \cos^2 y}{1 + \cos y} + \frac{1 - (\sin^2 y + \cos^2 y)}{\sin y(1 - \cos y)} \\
 = \frac{\cos y(1 + \cos y)}{1 + \cos y} + \frac{1 - 1}{\sin y(1 - \cos y)} \\
 = \cos y
 \end{aligned}$$



$$\tan \theta = \frac{100\sqrt{3}}{100}$$

$$\theta = 60^\circ$$



$$PQ = QS$$

$$\Rightarrow \angle QPS = \angle QSP = x \text{ (say)}$$

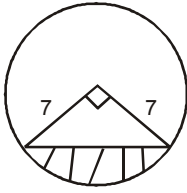
$$\Rightarrow \angle SQR = 2x \text{ (exterior angle)} \\ = \angle RSQ$$

From $\triangle QRS$

$$120 + 2x + 2x = 180$$

$$\Rightarrow x = 15^\circ = \angle QPS$$

48.



Area of minor segment

$$= \frac{\pi \times R^2}{4} - \frac{1}{2} \times R^2$$

$$= \frac{(\pi - 2)}{4} R^2 \quad \dots(1)$$

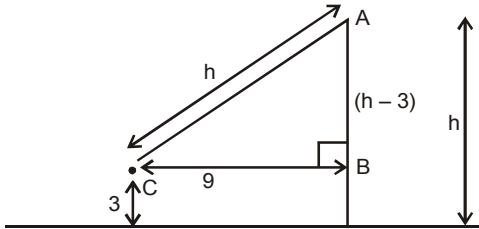
Area of major segment

$$= \pi R^2 - \frac{(\pi - 2)}{4} R^2$$

$$= \frac{[4\pi - (\pi - 2)]}{4} R^2 \quad \dots(2)$$

$$\therefore \text{required ratio} = \frac{\pi - 2}{3\pi + 2} = \frac{8}{80} = \frac{1}{10}$$

49.



$$AB^2 + BC^2 = AC^2$$

$$(h - 2)^2 + 9^2 = h^2$$

$$\Rightarrow 6h = 90$$

$$h = 15 \text{ m}$$

50. Volume of block = $(10 \times 5 \times 2) \text{ cm}^3$
 $= 100 \text{ cm}^3$

$$\text{Volume of cone} = \frac{1}{3} \left(\frac{22}{7} \times 9 \times 7 \right) \text{ cm}^3$$

$$= 66 \text{ cm}^3$$

$$\Rightarrow \text{volume of wood wasted} = 34 \text{ cm}^3$$

 $\therefore$ percentage of wood wasted

$$= \left(\frac{34}{100} \times 100 \right) \% = 34\%$$

51. $\frac{(x_1 + x_2 + \dots + x_n)}{n} = M$

$$\Rightarrow x_1 + (x_2 + \dots + x_n) = Mn$$

$$\Rightarrow (x_2 + \dots + x_n) = Mn - x_1$$

$$\Rightarrow a + (x_2 + \dots + x_n) = Mn - x_1 + a$$

$$\Rightarrow \frac{(a + x_2 + \dots + x_n)}{n} = \frac{Mn - x_1 + a}{n}$$

52. 24, 38, 55, 69, 89

$$\text{Mean} = \frac{275}{5} = 55$$

$$\text{Median} = 55$$

$$\text{Mean} = \text{median}$$

53. Let $x_1, x_2, \dots, x_n$ be the 'n' numbers

$$\frac{x_1 + x_2 + \dots + x_n}{n} = M$$

$$\frac{x_1 + 1 + x_2 + 2 + \dots + x_n + n}{n}$$

$$= \frac{(1 + 2 + \dots + n) + (x_1 + x_2 + \dots + x_n)}{n}$$

$$= M + \left[\frac{\frac{n(n+1)}{2}}{n} \right] = M + \frac{n+1}{2}$$

54. Let x be the number of blue balls

$$\text{Total balls} = 5 + x$$

$$P(\text{red}) = \frac{5}{5+x}$$

$$P(\text{blue}) = \frac{x}{5+x}$$

$$P(\text{blue}) = 3 \times P(\text{red})$$

$$\Rightarrow \frac{x}{5+x} = \frac{3 \times 5}{5+x}$$

$$\Rightarrow x = 15$$

55. $\frac{\tan x}{\sec x - 1} - \frac{\sin x}{1 + \cos x}$

$$= \frac{\frac{\sin x}{\cos x}}{\frac{1}{\cos x} - 1} - \frac{\sin x}{1 + \cos x}$$

$$= \sin \left(\frac{1}{1 - \cos x} - \frac{1}{1 + \cos x} \right)$$

$$= \sin x \left(\frac{2 \cos x}{1 - \cos^2 x} \right)$$

$$= \frac{2 \sin x \cos x}{\sin^2 x} = 2 \cot x$$

NTSE - 2014

JHARKHAND

PART I : MENTAL ABILITY TEST

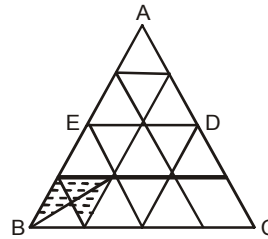
Directions (Q. 1–5) : In each of the following questions, four groups of letters are given. Three of them are alike in some manner, while one is different. Find the odd-man-out and mark it on your answer-sheet as directed.

1. (a) ARYQB (b) CTZSD
(c) EVYUF (d) GVZWE
2. (a) AJNAUO (b) BTMIAE
(c) DNLUEO (d) CEKAIO
3. (a) IRAJS (b) BKTCL
(c) UCGNX (d) UDMVE
4. (a) XECSQ (b) GNUBI
(c) PWDKR (d) YFMTA
5. (a) FLRXD (b) ECGSY
(c) JPVBH (d) NTZFL

Directions (Q. 6–10) : In each of the following questions, group of numbers are given. They are alike in some manner, while one number is wrong. Find out the odd-man-out and mark it on your answer-sheet as directed.

6. 8, 14, 26, 48, 98, 194, 386
(a) 48 (b) 386
(c) 8 (d) 194
7. 3, 10, 27, 4, 16, 64, 5, 25, 125
(a) 10 (b) 16
(c) 27 (d) 5
8. 529, 361, 289, 171, 121, 49
(a) 361 (b) 49
(c) 171 (d) 529
9. 336, 210, 120, 62, 24, 6, 0
(a) 62 (b) 6
(c) 210 (d) 24
10. 3, 28, 9, 13, 22, 18, 32, 23, 42
(a) 3 (b) 18
(c) 9 (d) 42

Directions (Q. 11–15) : All the questions given below are based on a figure. All the triangles in the figure are equilateral. The area of the shaded part, in the figure, is equal to 2 square units. Based on these information answer the questions given below.



11. The area of the figure BCDE will be
(a) 15 square units
(b) 14 square units
(c) 16 square units
(d) $16\frac{1}{2}$ square units
12. The area of total figure will be
(a) $21\frac{1}{3}$ square units
(b) 32 square units
(c) $10\frac{2}{3}$ square units
(d) 36 square units
13. The area of the half portion of the figure will be
(a) $9\frac{1}{3}$ square units
(b) $10\frac{1}{2}$ square units
(c) $10\frac{2}{3}$ square units
(d) $9\frac{2}{3}$ square units

14. The shaded part of the total area will be

- (a) $\frac{2}{32}$ (b) $\frac{2}{24}$
 (c) $\frac{3}{32}$ (d) $\frac{6}{16}$

15. The ratio of the area of the shaded and unshaded part will be

- (a) 3 : 92 (b) 3 : 25
 (c) 3 : 31 (d) 3 : 29

Directions (Q. 16–19) : In each of the following questions, a group of letters is given, which are numbered differently. Below four alternatives are given, containing combination of these numbers. Select that combination of numbers which form a meaningful word.

16. tiynpmui

17845362

- (a) 51236748 (b) 23564718
 (c) 62134857 (d) 38715246

17. talegyh

35782641

- (a) 41735628 (b) 17865423
 (c) 74612538 (d) 86732154

18. zremioh

1234567

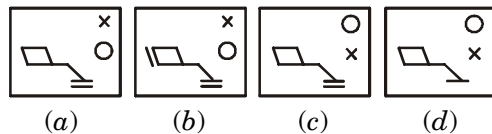
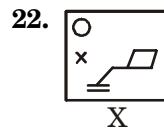
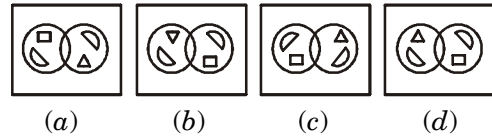
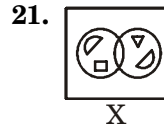
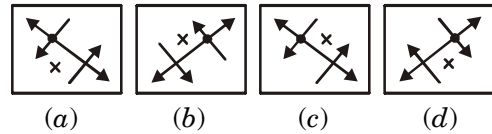
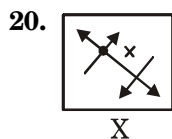
- (a) 2751643 (b) 3712456
 (c) 1246537 (d) 4653127

19. oyepcanst

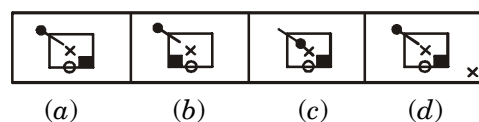
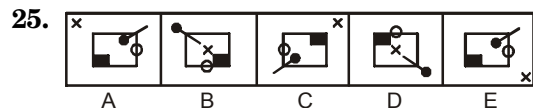
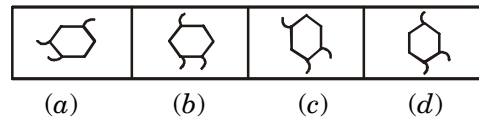
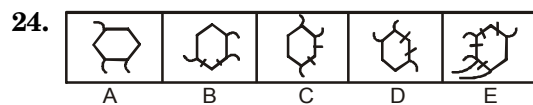
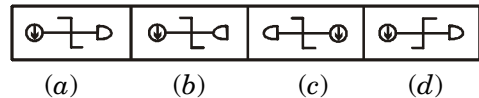
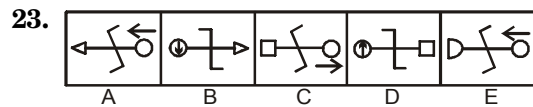
123456789

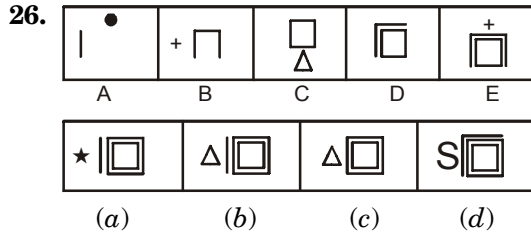
- (a) 358914269 (b) 827514693
 (c) 563478192 (d) 567123489

Directions (Q. 20–22) : In each of the following questions, choose the correct mirror-image of the figure(x) from amongst the four alternatives 1, 2, 3 & 4 given along with it.

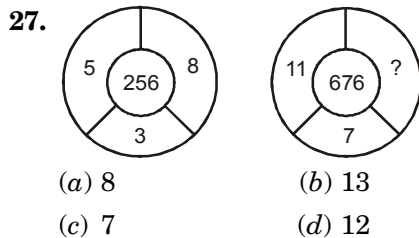


Directions (Q. 23–26) : In each of the following questions, find the figure from the answer-set (i.e. 1, 2, 3 and 4) which will continue the series given in the problem-set (i.e. A, B, C, D and E)





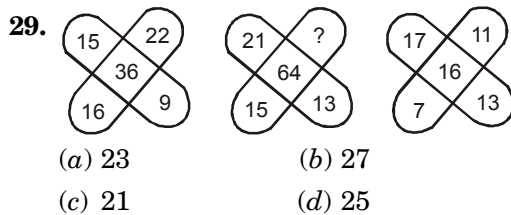
Directions (Q. 27–29) : Study the pattern of numbers in the following questions and select the missing number in place of question mark (?). Mark the correct alternative on your answer sheet as directed.



28.

9	10	12
12	16	?
14	20	32

- (a) 30 (b) 24
(c) 28 (d) 18



Directions (Q. 30–33) : In each of the following questions choose the correct water-image of the given words/numbers from amongst the four alternatives.

30. UNCHANGED
(a) UNCHANGED
(b) UNCHANGED
(c) UNCHANGED
(d) UNCHANGED

31. IDENTICAL

- (a) IDENTICAL (b) IDENTICAL
(c) IDENTICAL (d) IDENTICAL

32. DL2CA34

- (a) DL2CA34 (b) DL2CA34
(c) DL2CA34 (d) DL2CA34

33. YZVPSTA7

- (a) YZVPSTA7 (b) YZVPSTA7
(c) YZVPSTA7 (d) YZVPSTA7

34. If A, B and C together earn ₹ 150 per day while A and C earn ₹ 94 per day. B and C, daily, earn ₹ 76. Calculate the per day earning of C.

- (a) 20 (b) 35
(c) 40 (d) 25

35. A train covers 36 km. in one hour. How many metres will it cover in 3 minutes?

- (a) 2010 (b) 1800
(c) 1860 (d) 2000

Directions (Q. 36–39) : In the series of letters-numbers, what will come in the place of question mark (?)

36. A25D, B22F, D18H, G13J, ?

- (a) K7L (b) L7M
(c) K10P (d) R16Y

37. 5X8, 7C11, 10U15, 14F20, ?

- (a) 17L22 (b) 19R26
(c) 16S23 (d) 18T21

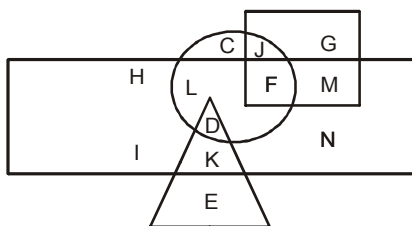
38. D15K, F12L, H9M, J6N, ?

- (a) O2L (b) P3L
(c) L3O (d) R3O

39. HL7, EO10, BR13, YU16, ?

- (a) SX25
(b) ZX23
(c) WX21
(d) VX19

Directions (Q. 40–43) : In the figure given below, circle represents rural, rectangle represents male, triangle represents educated and square represents government employee. Study the figure and match the letters with the questions that follows.

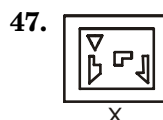


40. Which letter represents neither a government employee nor an educated but is rural and not a male ?
 (a) C (b) N
 (c) G (d) M
41. Which letter indicates rural people and who are government employee but not male?
 (a) F (b) H
 (c) E (d) J
42. Which letter represents the government employee but not a male nor rural and is uneducated ?
 (a) K (b) H
 (c) G (d) L
43. Which letter represents the uneducated people and also rural male ?
 (a) C (b) L
 (c) J (d) N
44. If the cost price of 5 eggs is equal to the selling price of 4 eggs, what is the percentage of profit ?
 (a) 35% (b) 30%
 (c) 25% (d) 40%
45. If 4 cows give 4 dabbas (containers) of milk in 4 days, then in how many days 8 cows will gave 8 dabbas (containers) of milk ?
 (a) 16 (b) 2
 (c) 8 (d) 4

46. 7 numbers have an average of 13 and the average of other 13 numbers is 7. What would be the average of these 20 numbers?

(a) 9.1 (b) 3.9
 (c) 6.8 (d) 8.9

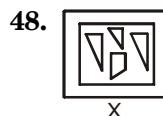
Directions (Q. 47–49) : In each of the following questions, find out the figure from amongst the alternatives (a), (b), (c) & (d) which can be formed from the pieces given in X.



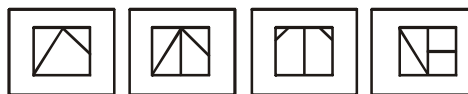
X



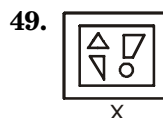
(a) (b) (c) (d)



X



(a) (b) (c) (d)

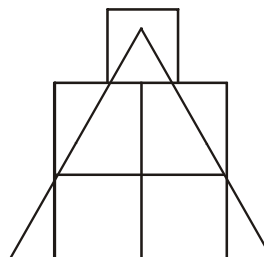


X



(a) (b) (c) (d)

50. How many squares and triangles are there in the following figure ?



(a) 7, 15 (b) 8, 17
 (c) 9, 18 (d) 7, 18

PART II : ENGLISH LANGUAGE

Direction (Q. 1–5) : *The passage given below is followed by a set of questions. Choose the most appropriate answer to each questions.*

It was a chilly winter night. Saint Socrates was preaching to his disciples. His wife warned him of ending the discourse. Socrates did not oblige her. At midnight she got angry. She took a bucket of water and poured it on him. Socrates was just laughing. But his disciples were annoyed with the preceptress. Socrates told them, "I am a saint who is expected not to lose patience and temper even in precarious situations. My wife tested me and I got success. She is my preceptor. Don't relive her." Having heard this, she fell on the feet of Socrates and begged of his pardon. Since then she became a good wife and a human women.

1. The night was
 - (a) warm (b) pleasant
 - (c) very cold (d) very warm
2. Socrates wife got angry because
 - (a) It was a chill winter night
 - (b) Socrates was preaching to his disciples
 - (c) She warned him to end the discourse
 - (d) Socrates continued preaching his disciples in the chilly winter night despite her warning
3. Socrates just laughed when his wife poured water on him because
 - (a) He took is as a test of his patience
 - (b) He himself wanted to take bath
 - (c) He enjoyed his wife's anger
 - (d) He was testing his wife
4. Socrates' wife felt sorry for her act because
 - (a) Socrates was shivering
 - (b) Socrates was laughing
 - (c) Socrates lost his patience
 - (d) Socrates kept his cool and even defended her.

5. How did this incident change Socrates' wife ?

- (a) It made her wise
- (b) It made her good
- (c) It instilled in her humility
- (d) Her nature became good and human

Directions (Q. 6–10) : *The passage given below is followed by a set of questions. Choose the most appropriate answer to each questions.*

The doors of a great newspaper office are not ever locked. All through the day and all through the night work has to be done there, so that the readers of the paper may be kept in touch with everything which is interest. News comes into the office at every hour of the day – news of political developments, news of crimes, news of town happenings, and news of events which are going to take place. All this has to be gone through. The important facts are given headlines and the unnecessary details are cut out.

Everyday important things are taking place in all parts of the earth. Wherever anything interesting is going on, a representative of the paper is sent to take notes and get all the facts. If there is a serious train collision somewhere on the line, an army of lists of the dead and get an account of what took place from the eye witness. Camera men go with them and take pictures of the twisted and broken carriage.

6. 'Not ever locked' means
 - (a) always remains open
 - (b) always remain locked
 - (c) sometimes locked
 - (d) sometimes open
7. What is meant by 'headline'
 - (a) Lines on the forehead
 - (b) Newspaper heading
 - (c) main line of railway
 - (d) Major line

8. News comes into the office
 (a) Round the clock
 (b) In the pre-fixed hours
 (c) During day time
 (d) During night
9. 'An army of newspaper men' refers to
 (a) Army man
 (b) Army man who reads newspaper
 (c) A team of newspaper persons
 (d) Security man of the newspaper
10. What is done with the news that comes into the office ?
 (a) It is published as it is
 (b) Published with headlines and all details
 (c) published with headlines and necessary details
 (d) Unnecessary details are cut out

Directions (Q. 11–12) : The following five sentences come from a paragraph. The first and the last sentences are given. Choose the order in which the three sentences (PQR) should appear to complete the paragraph.

11. S₁ I hold my temper and pick up my gum wrapper
 S₂
 S₃
 S₄
 S₅ That dog dips up my garden and messes up my yard
 P So why is yours always all over the place ?
 Q Then she says, and there's a law in this town about dogs on a leash.
 R I put the wrapper in a bag
 (a) PQR (b) RQP
 (c) QPR (d) PRQ
12. S₁ Moving closer, I saw that it was a tiny baby squirrel
 S₂
 S₃
 S₄

- S₅ It was now motionless, waiting for further assault
 P It must have accidentally fallen down from a nest
 Q It was now an easy prey for crows
 R It had already sustained two wounds due to the assault by a pair of crows
 (a) PQR (b) RQP
 (c) QPR (d) QRP

Directions (Q. 13–22) : Choose the word which best fills the blank in the sentences from the four options given.

13. One should not the orders of one's superiors.
 (a) defy (b) deify
 (c) defile (d) devoid
14. Please convey my best to your parents
 (a) Complements (b) compliments
 (c) supplements (d) nourishment
15. Please Your votes in favour of me.
 (a) caste (b) cast
 (c) cost (d) cancel
16. He was wearing a cotton shirt.
 (a) lose (b) cost
 (c) loose (d) size
17. Her approach to work is so That no one consider her reliable.
 (a) casual (b) common
 (c) low (d) high
18. The Condition of our country is not so good.
 (a) Economical (b) Economic
 (c) Expensive (d) Cheap
19. There was a good of Tabla and violin in the cultural programme.
 (a) Unison (b) Unity
 (c) Union (d) Unanimous
20. Before we apply we must ensure that we the required qualifications for the job.
 (a) contain (b) disclose
 (c) possess (d) acquire

21. On the way home from work, my car Out of gas.

- (a) went (b) ran
(c) climbed (d) slid

22. One should From making unwarranted comments.

- (a) refrain (b) abstain
(c) allow (d) prevent

Directions (Q. 23–25) : Select the meaning of the given phrases / idiomes.

23. Body and soul

- (a) Spiritually (b) Physically
(c) Entirely (d) Partially

24. Milk and water

- (a) very costly (b) weak
(c) strong (d) white

25. To play ducks and drakes

- (a) to waste money
(b) to be romantic
(c) to behave like a child
(d) very wise

Directions (Q. 26–30) : In the following passage there are some blanks with numbers. Fill in the blanks by selecting the most appropriate word for each blank from given options of each number.

It was a cloudy day. Before I 26 off to office, my mother 27 on my 28 an umbrella. So I 29 an umbrella along with my briefcase. Hardly had I started, when it started 30.

- 26.** (a) went (b) reached
(c) begin (d) set
27. (a) asked (b) requested
(c) insisted (d) admonished
28. (a) get (b) taking
(c) have (d) leaving
29. (a) took (b) taken
(c) have (d) catch
30. (a) to drizzle (b) drizzling
(c) to rain (d) rained

Directions (Q. 31–33) : Select the word which means the opposite of the given word.

31. Accustomed

- (a) Used to (b) Habituated
(c) Unusual (d) Customary

32. Elevation

- (a) Depression (b) Lift
(c) Scale up (d) Frequent

33. Humane

- (a) Kind (b) Humanity
(c) Ruthless (d) Generous

Directions (Q. 34–36) : Select the word which means nearly the same of the given word.

34. Abstain

- (a) Refuse (b) Accept
(c) Agree (d) Disagree

35. Brittle

- (a) Strong (b) Fragile
(c) Unbreakable (d) Rough

36. Cajole

- (a) Coax (b) Rebuke
(c) Chide (d) Upright

Directions (Q. 37–40) : In each of the following sentences you will find a blank. Fill in blanks from the given alternative.

37. He the opposition with a single trick.

- (a) beat down (b) beat up
(c) beat in (d) beat about

38. The teacher was very upset when the students did not for the class.

- (a) show down (b) show off
(c) showcase (d) show up

39. Sachin an impossible win for India.

- (a) brought up (b) brought off
(c) brought before (d) brought for

40. The rising cases of crime Immediate measure

- (a) call for (b) call over
(c) call forth (d) call in

PART III
SCHOLASTIC APTITUDE TEST
PHYSICS

1. What will be the work done in raising the velocity of a car weighing 2000 kg from 18 km/hr to 54 km/hr.
 (a) 2.5×10^5 J (b) 2.25×10^5 J
 (c) 2.0×10^5 J (d) 1.5×10^5 J
2. Two cars of unequal masses use similar tyres. If they are moving with same initial speed, the minimum stopping distance
 (a) is smaller for the heavier car
 (b) is smaller for the lighter car
 (c) is same for both the cars
 (d) depends on the volume of the car
3. A body is dropped from a 100 m high cliff and at the same time another body is thrown from the ground with 25 m/s velocity in upward direction. Where the two will meet ?
 (a) 50 m (b) 40 m
 (c) 20 m (d) 10 m
4. A truck and a car are moving with velocity v towards each other. They collide head in and stops after some time. If the time of collision is 1 sec. which vehicle will have maximum change in momentum?
 (a) car
 (b) truck
 (c) both will have same
 (d) None of the above
5. A balloon which is ascending at the rate of 12m/s is 30.4 metre above the ground, when a stone is dropped. After what time the stone will reach the ground ?
 (a) 3 sec. (b) 3.5 sec.
 (c) 4 sec. (d) 6 sec.
6. A pandubbi sends a sonar signal to locate a body and receives the each after 5 s. If the velocity of sound is 340 m/s. What is the distance of the body ?
 (a) 0.85 km (b) 1.7 km
 (c) 0.425 km (d) 4.25 km
7. Which of the following quantities remain constant in a planetary motion (consider elliptical orbits) as seen from the sun ?
 (a) Speed
 (b) Angular velocity
 (c) Kinetic energy
 (d) Angular momentum
8. The far point of a myopic person is 100 cm in front of him. What is the power of the lens to correct the problem of his eye ?
 (a) -1.0 D (b) $+1.0$ D
 (c) -1.25 D (d) $+1.25$ D
9. A vessel is 2 meter deep. How deep will it appear if it is filled with water and viewed from above ?
 (a) 2 m (b) 3 m
 (c) $\frac{3}{2}$ m (d) $\frac{4}{3}$ m
10. A convex lens is made of a material ($\mu = 1.2$), both the surfaces are convex. If it is dipped in water ($\mu = 1.33$) it will behave like
 (a) convergent lens
 (b) divergent lens
 (c) a rectangular slab
 (d) a prism
11. A wire of resistance R is cut in three equal parts. If they are arranged in parallel and the equivalent resistance is R' then $\frac{R}{R'}$ will be equal to
 (a) 3 (b) $\frac{1}{3}$
 (c) 9 (d) $\frac{1}{9}$
12. Several electric bulbs designed for 220V supply line are rated 10W. How many lamps can be lighted if connected in parallel with each other across the 220V line if the maximum allowable current 5A.
 (a) 220 (b) 110
 (c) 440 (d) 55

CHEMISTRY

13. Graphite is used as a lubricant in machines because it has a very high melting point and also it :
 (a) is crystalline
 (b) has layer structure
 (c) is a giant molecule
 (d) is a liquid at room temperature
14. Which of the following oxyacid of phosphorus are monobasic (monoprotic) ?
 (a) H_3PO_4 (b) H_3PO_3
 (c) H_3PO_2 (d) $\text{H}_4\text{P}_2\text{O}_7$
15. The percentage of gold present in 20 carat gold is
 (a) 100 (b) 73.86
 (c) 50 (d) 83.33
16. 8.7g of pure MnO_2 is heated with an excess of HCl and the gas evolved is passed into a solution of KI. Calculate the weight of the iodine liberated (Mn = 55, Cl = 35.5, I = 127)
 (a) 7.77g (b) 16.41g
 (c) 12.70g (d) 25.4g
17. Which of the following aldehyde undergo cannizzaro reaction?
 (a) $\text{C}_3\text{H}_7\text{CHO}$ (b) $\text{C}_6\text{H}_5\text{CHO}$
 (c) CH_3CHO (d) $\text{CH}_3\text{CH}_2\text{CHO}$
18. Which one of the following bases is not present in DNA ?
 (a) Cytosine (b) Thymine
 (c) Quinoline (d) Adenine
19. Which one of the following is classified as a condensation polymer ?
 (a) Teflon (b) Acrylonitrile
 (c) Dacron (d) Neoprene
20. Acidified KMnO_4 is decolourized by
 (a) Ferric ammonium alum
 (b) Mortar salt
 (c) Haematite
 (d) A neutral ferric chloride solution
21. Which of the following evolve O_2 on treatment with water ?
 (a) F_2 (b) Cl_2
 (c) Na (d) P_4

22. The number of iodine atoms present in 50ml of a 0.1M KI solution is

(a) 6×10^{23} (b) 12×10^{23}
 (c) 3×10^{21} (d) 6×10^{22}

23. How many Faradays are required to reduce 1 mole of BrO_2 to Br^- ?

(a) 3 (b) 5
 (c) 4 (d) 6

BIOLOGY

24. In simple organisms, exchange of gases and excretion occur through

(a) Osmosis (b) Diffusion
 (c) Imbibition (d) All of the above

25. The site of photosynthesis in plant is

(a) Mitochondria (b) Chloroplast
 (c) Leucoplast (d) Dictyosomes

26. Oxygen released during photosynthesis comes from

(a) Water (b) Carbon dioxide
 (c) Glucose (d) Dictyosomes

27. The important components of DNA molecule are A (Adenine), T (Thymine), G (Guanine) and C (Cytosine). According to Chargaff's rule, their amount in DNA molecule is

(a) The amount of A & T is equal to that of C & G
 (b) The amount of A & G is equal to that of T & C
 (c) A, T, C & G are all in equal amount
 (d) None of these

28. Organic farming is the technique of raising crops through the use of

(a) Manure
 (b) Biofertilizers
 (c) Resistant varieties
 (d) All of these

29. WBC and RBC are found in human blood in the ratio of

(a) 1 : 60 (b) 1 : 600
 (c) 1 : 6000 (d) 1 : 60,000

- 30.** Serum differs from plasma in the absence of
 (a) Fibrinogen (b) Immunoglobulin
 (c) Nutrients (d) Waste products
- 31.** Which of the following diseases is not caused by polluted water
 (a) Typhoid (b) Dysentery
 (c) Malaria (d) Jaundice
- 32.** Muscular partition present between thorax and abdomen is
 (a) Pericardium (b) Pleura
 (c) Epiglottis (d) Diaphragm
- 33.** Cement factory labourers are prone to
 (a) Leukemia
 (b) bone-marrow diseases
 (c) Asbestosis
 (d) Cytosilicosis
- 34.** The excretory organs in "Earthworm" is known as
 (a) Malphigian cells (b) Renal cells
 (c) Nephridia (d) Flame cells
- 35.** The most important function of inflorescence is to help in
 (a) Dispersal of seeds
 (b) Help in fertilization
 (c) Attracting insects for pollination
 (d) Forming large number of fruits
- 38.** The area of a rectangle is same as that of a circle of radius $\sqrt{\frac{35}{11}}$ cm. If the length of the rectangle exceeds its breadth by 3cm., then the length of the rectangle is
 (a) 2 cm (b) 3 cm
 (c) 4 cm (d) 5 cm
- 39.** If $x + y = 1$ then $x^3 + y^3 + 3xy = \dots\dots\dots$
 (a) 0 (b) 1
 (c) 2 (d) None of these
- 40.** The difference between a two digit given number and the number obtained by interchanging the digits is 27. The sum of the two digits is
 (a) 3 (b) 5
 (c) 7 (d) cannot be found
- 41.** The probability that a leap year selected will have 53 Sunday is
 (a) $\frac{1}{7}$ (b) $\frac{2}{7}$
 (c) $\frac{3}{7}$ (d) 0
- 42.** The probability 'p' of happening of an event
 (a) can be negative
 (b) $0 \leq p \leq 1$
 (c) can be greater than 1
 (d) none of these

MATHEMATICS

- 36.** If $\frac{1}{p+q}, \frac{1}{q+r}, \frac{1}{r+p}$ are in A.P. then
 (a) p, q, r are in A.P.
 (b) q^2, p^2, r^2 are in A.P.
 (c) p^2, q^2, r^2 are in A.P.
 (d) q, p, r are in A.P.
- 37.** For the equation $3x^2 + px + 3 = 0$, if one of the roots is the square of the other then $p = \dots\dots\dots$
 (a) $-\frac{1}{3}$ (b) -1
 (c) -6 (d) $\frac{2}{3}$
- 43.** If $\sin A = \frac{1}{2}$ ($0^\circ < A < 90^\circ$) then $\cos^3 A - 3 \cos A = \dots\dots\dots$
 (a) 0 (b) 1
 (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{2}$
- 44.** If $\sin^4 \theta + \sin^2 \theta + \sin^3 \theta = 3$ then $\cos^4 \theta + \cos^2 \theta + \cos^3 \theta = \dots\dots\dots$
 (a) 3 (b) 2
 (c) 1 (d) 0
- 45.** If $\sin \theta + \operatorname{cosec} \theta = 2$ then $\sin^{100} \theta + \operatorname{cosec}^{100} \theta = \dots\dots\dots$
 (a) 1 (b) 2
 (c) 4 (d) none of these

46. If the vertices of a triangle are (1, 2), (4, -6) and (3, 5) then
 (a) triangle is right angled
 (b) the area of triangle is 12.5 sq. units
 (c) the points do not form a triangle
 (d) none of these
47. In $\triangle ABC$, E divides AB in the ratio 3 : 1 and F divides BC in the ratio 3 : 2, then the ratio of areas of $\triangle BEF$ and $\triangle ABC$ is
 (a) 3 : 5 (b) 3 : 10
 (c) 1 : 5 (d) 3 : 20
48. The sum of the areas of two circles which touch each other externally is 153π sq. units. If the sum of their radii is 15 units, then the ratio of large radius to the smaller radius is equal to
 (a) 4 (b) 2
 (c) 3 (d) none of these
49. ABCD is a rectangle such that $AC + AB = 5 AD$ and $AC - AD = 8$, then the area of rectangle ABCD is
 (a) 36 sq. units (b) 50 sq. units
 (c) 60 sq. units (d) cannot be found
50. Water flows at the rate of 10 metres per minute from a cylindrical pipe 5 mm. in diameter. The time taken to fill up a conical vessel, whose diameter at the base is 40 cm and depth 24 cm., is
 (a) 55 minutes
 (b) 52 minutes 1 sec.
 (c) 51 minutes 12 secs.
 (d) 48 minutes 15 secs.
51. If the arithmetic mean of 9 observations is 100 and that of 6 observations is 80, then the combined mean of all the 15 observations will be
 (a) 100 (b) 80
 (c) 90 (d) 92
52. On 13 consecutive days the number of person booked for violating speed limit of 40 km/hr. were as follows
 59, 52, 58, 61, 68, 57, 62, 50, 55, 62, 53, 54, 51
 The median number of speed violations per day is
 (a) 61 (b) 52
 (c) 55 (d) 57
53. Which of the following is correct for the given data -1, 0, 1, 2, 3, 5, 5, 6, 8, 10, 11, ?
 (a) mean = mode = median
 (b) mean = 5
 (c) mean = mode
 (d) mode = median
54. In a given fraction if the numerator is multiplied by 3 and the denominator is subtracted by 3, the fraction becomes $\frac{18}{11}$ and if the numerator is increased by 8 and the denominator doubled the fraction becomes $\frac{2}{5}$. The sum of the numerator and the denominator of the given fraction is
 (a) 27 (b) 33
 (c) 37 (d) 42
55. Two fair dice are thrown together. The probability that the number 5 does not appear on any of them is
 (a) $\frac{1}{36}$ (b) $\frac{5}{36}$
 (c) $\frac{11}{36}$ (d) $\frac{25}{36}$

HISTORY

56. Lenin introduced New Economic Policy in the year :
 (a) 1917 (b) 1919
 (c) 1921 (d) 1924
57. Aryabhatiya was written during :
 (a) Maurya period (b) Shung period
 (c) Khushan period (d) Gupta period
58. Who wrote Brihat Samhita
 (a) Vatsyayana (b) Varah Mihir
 (c) Kalidas (d) Kalhan
59. The First summit of non-aligned countries was held at :
 (a) Cairo (b) Belgrade
 (c) New Delhi (d) Djakarta
60. Television service was started in New Delhi on
 (a) 14 September 1959
 (b) 15 September 1959
 (c) 16 September 1959
 (d) 17 September 1959

61. The Reserve Bank of India was set up in
 (a) 1932 (b) 1933
 (c) 1934 (d) 1936
62. Which were the three Presidency Towns in British India ?
 (a) Calcutta, Delhi, Bombay
 (b) Delhi, Bombay, Madras
 (c) Calcutta, Delhi, Madras
 (d) Calcutta, Bombay, Madras
63. Under whose leadership was the Hindustan Socialist Republican Association organized in 1928 ?
 (a) Bhagat Singh
 (b) Chandra Shekhar Azad
 (c) Rajguru
 (d) Batukeshwar Dutt
64. What is Tolkappiyam ?
 (a) River (b) King
 (c) Sangam Text (d) Sanskriti Test
65. Shilappadigaram was written in which language ?
 (a) Malayalam (b) Tamil
 (c) Telugu (d) Sanskrit

GEOGRAPHY

66. What is the longitudinal extent of India?
 (a) $67^{\circ}10'$ East to $96^{\circ}27'$ East
 (b) $67^{\circ}05'$ East to $96^{\circ}22'$ East
 (c) $69^{\circ}05'$ East to $98^{\circ}22'$ East
 (d) $68^{\circ}08'$ East to $97^{\circ}25'$ East
67. Read the following statements and select the correct option which follow—
 (A) Evergreen forest is found in Kerala
 (B) Tropical deciduous forest is found in Odisha
 (C) Dry deciduous forest is found in Western Madhya Pradesh
 (a) Only (a) is correct
 (b) Only (b) is correct
 (c) Only (c) is correct
 (d) (a), (b) and (c) are correct
68. **Assertion (A)** : Bikaner has high diurnal range of temperature.
Reason (R) : Bikaner is located far away from the sea.
 Select the correct option from the given alternatives -
 (a) Both (A) and (R) are true and (R) explains (A)
 (b) Both (A) and (R) are true but (R) does not explain (A)
 (c) (A) is true but (R) is false
 (d) (A) is false but (R) is true
69. **Assertion (A)** : People of J & K are covered in woolen clothes in winter season while people in Kerala are in lungi.
Reason (R) : Both the states are situated in the same longitudes of meridian.
 Select the correct option from the given alternatives—
 (a) Both (A) and (R) are true but (R) explains (A)
 (b) Both (A) and (R) are true but (R) does not explain (A)
 (c) (A) is true but (R) is false
 (d) (A) is false but (R) is true
70. Which of the following soils is more fertile ?
 (a) Bangar (b) Khadar
 (c) Laterite (d) Red Soil
71. The Ganges of the South is
 (a) Kaveri (b) Godavari
 (c) Narmada (d) Krishna
72. The origin of Himalaya was in which era?
 (a) Tertiary (b) Miocene
 (c) Paleozoic (d) Pleistocene
73. Sardar Sarovar dam is constructed on
 (a) Tapti (b) Narmada
 (c) Mahi (d) Luni

- 74.** The first rail line in India was laid between—
 (a) Mumbai – Pune
 (b) Mumbai – Thane
 (c) Mumbai – Ahmedabad
 (d) None of these
- 75.** According to 2011 census the highest density of population is in—
 (a) U P (b) Kerala
 (c) Bihar (d) West Bengal
- 76.** Who made the Indian Constitution?
 (a) Constituent assembly
 (b) British Parliament
 (c) Indian Parliament
 (d) Governor general
- 77.** When was the first election for the Lok Sabha in India held ?
 (a) 1947 (b) 1948
 (c) 1949 (d) 1952
- 78.** Which authority has the power to suspend fundamental rights in India ?
 (a) Supreme Court (b) Parliament
 (c) Prime Minister (d) President
- 79.** Who is the appointing authority for the Chairman of Union Public Service Commission ?
 (a) Parliament (b) Prime Minister
 (c) President (d) Cabinet
- 80.** Indian President submits his resignation letter to whom?
 (a) Vice President
 (b) Chief Minister
 (c) Prime Minister
 (d) Lok Sabha speaker
- 81.** Who was the chairman of the Drafting committee of the Indian Constitution ?
 (a) Dr. Rajendra Prasad
 (b) Dr. Bhim Rao Ambedkar
 (c) Jawahar Lal Nehru
 (d) Raj Gopalachari
- 82.** Democracy is a system of government in which the final power rests with
 (a) The mob (b) The People
 (c) The Politicians (d) The civil servants
- 83.** The fundamental duties of Indian Citizens are contained in
 (a) Part I of the Constitution
 (b) Part III of the Constitution
 (c) Part IV A of the constitution
 (d) None of the above
- 84.** Who give recognition to Political Party in India ?
 (a) President
 (b) Central Home Minister
 (c) Election Commission
 (d) Lok Sabha Speaker
- 85.** Who was the authority to change the name of any state ?
 (a) President (b) Parliament
 (c) Rajya Sabha (d) Regional Council

ECONOMICS

- 86.** The First Human Development Report for the World was prepared by :
 (a) India (b) USA
 (c) UNDP (d) England
- 87.** “The National Consumer Day” is celebrated on”
 (a) 13 August (b) 26 January
 (c) 2 October (d) 24 December
- 88.** The Co-operative Credit Societies ACT in India was passed in the year :
 (a) 1904 (b) 1947
 (c) 1951 (d) 1991
- 89.** World Trade Organization (WTO) was established in the year :
 (a) 1945 (b) 1991
 (c) 1995 (d) 2001
- 90.** Eleventh Five Year Plan of India's period is :
 (a) 1985 – 1990 (b) 2002 – 2007
 (c) 2007 – 2012 (d) 2012 – 2017

ANSWERS**MENTAL ABILITY TEST**

1. (d) 2. (c) 3. (c) 4. (a) 5. (b) 6. (a) 7. (c) 8. (c) 9. (a) 10. (*)
11. (c) 12. (a) 13. (c) 14. (c) 15. (d) 16. (b) 17. (c) 18. (a) 19. (b) 20. (b)
21. (b) 22. (c) 23. (b) 24. (c) 25. (a) 26. (b) 27. (a) 28. (b) 29. (a) 30. (b)
31. (c) 32. (a) 33. (c) 34. (a) 35. (d) 36. (a) 37. (b) 38. (c) 39. (d) 40. (a)
41. (d) 42. (c) 43. (b) 44. (b) 45. (d) 46. (a) 47. (d) 48. (b) 49. (d) 50. (a)

ENGLISH LANGUAGE

1. (c) 2. (d) 3. (a) 4. (d) 5. (d) 6. (a) 7. (b) 8. (a) 9. (c) 10. (d)
11. (a) 12. (a) 13. (a) 14. (b) 15. (b) 16. (c) 17. (a) 18. (b) 19. (a) 20. (c)
21. (b) 22. (a) 23. (c) 24. (b) 25. (c) 26. (d) 27. (c) 28. (b) 29. (a) 30. (a)
31. (c) 32. (a) 33. (c) 34. (a) 35. (b) 36. (a) 37. (a) 38. (d) 39. (a) 40. (a)

SCHOLASTIC APTITUDE TEST

1. (c) 2. (c) 3. (c) 4. (b) 5. (c) 6. (a) 7. (d) 8. (a) 9. (c) 10. (b)
11. (c) 12. (b) 13. (b) 14. (c) 15. (d) 16. (d) 17. (b) 18. (c) 19. (c) 20. (b)
21. (a) 22. (c) 23. (b) 24. (b) 25. (b) 26. (a) 27. (b) 28. (d) 29. (b) 30. (a)
31. (c) 32. (d) 33. (d) 34. (c) 35. (c) 36. (b) 37. (c) 38. (d) 39. (b) 40. (d)
41. (b) 42. (b) 43. (*) 44. (d) 45. (b) 46. (b) 47. (d) 48. (a) 49. (c) 50. (c)
51. (d) 52. (d) 53. (d) 54. (c) 55. (d) 56. (c) 57. (d) 58. (b) 59. (b) 60. (b)
61. (c) 62. (d) 63. (b) 64. (c) 65. (b) 66. (d) 67. (d) 68. (b) 69. (b) 70. (a)
71. (b) 72. (b) 73. (b) 74. (b) 75. (a) 76. (a) 77. (d) 78. (d) 79. (c) 80. (a)
81. (b) 82. (b) 83. (c) 84. (c) 85. (b) 86. (c) 87. (d) 88. (a) 89. (c) 90. (c)

EXPLANATIONS**MENTAL ABILITY TEST**

1. $\begin{array}{|c|c|} \hline \text{A R Y Q B} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{C T Z S D} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{E V Y U F} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{G V Z W E} \\ \hline \end{array}$

+1 +1 +1 -2

3. $\begin{array}{|c|c|} \hline \text{I R A J S} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{B K T C L} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{U C G N X} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{U D M V E} \\ \hline \end{array}$

+1 +1 +21 +1

4. $\begin{array}{|c|c|} \hline \text{X E C S Q} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{G N U B I} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{P W D K R} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{Y F M T A} \\ \hline \end{array}$

-2 -2 +7 +7 +7 +7 +7 +7

5. $\begin{array}{|c|c|} \hline \text{F L R X D} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{E C G S Y} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{J P V B H} \\ \hline \end{array}$ $\begin{array}{|c|c|} \hline \text{N T Z F L} \\ \hline \end{array}$

+6 +6 -2 +12 +6 +6 +6 +6

6. $8 \times 2 - 2 = 14$

$14 \times 2 - 2 = 26$

$26 \times 2 - 2 = \boxed{50}$

$50 \times 2 - 2 = 98$

$98 \times 2 - 2 = 194$

$194 \times 2 - 2 = 386$

So the given number 48 is wrong.

7. $3 \times 3 = \boxed{9}$ $9 \times 3 = 27$

$4 \times 4 = 16$ $16 \times 4 = 64$

$5 \times 5 = 25$ $25 \times 5 = 125$

So the given number 10 is wrong.

8. $529 = (23)^2$,

$361 = (19)^2$,

$289 = (17)^2$

$171, 121 = (11)^2$,

$49 = (7)^2$

So the given number 171 is not a square of any number.

9. $1^3 - 1 = 0$

$2^3 - 2 = 6$

$3^3 - 3 = 24$

$4^3 - 4 = 60$

$5^3 - 5 = 120$

$6^3 - 6 = 210$

$7^3 - 7 = 336$

10. Given equation is wrong

11. In the given figure, there are three parts to make the shaded part.

Let the each part be x square units

According to question

$$3x = 2$$

$$\therefore x = \frac{2}{3} \text{ square units}$$

$$2x = \text{Area of a equilateral triangle} \\ = \frac{4}{3} \text{ square units}$$

The area of the figure BCDE

$$= 12 \text{ equilateral triangle area}$$

$$= 12 \times \frac{4}{3} = 16 \text{ square units}$$

12. Area of total figure

$$= 16 \text{ equilateral triangle area}$$

$$= 16 \times \frac{4}{3}$$

$$= \frac{64}{3} \text{ square units}$$

$$= 21\frac{1}{3} \text{ square units}$$

13. Area of the half portion of the figure

$$= \text{area of 8 equilateral triangle}$$

$$= 8 \times \frac{4}{3}$$

$$= \frac{32}{3} \text{ square units}$$

$$= 10\frac{2}{3} \text{ square units}$$

14. Total area = area of 16 equilateral triangle = 32

Total area of shaded part = 3

Now shaded part of the total area = $\frac{3}{32}$

15. Here area of the shaded part = 3 part

Total area = 32 part = 16 equilateral triangle area

Area of unshaded part = $(32 - 3) = 29$ part

Now the ratio of the area of the shaded and unshaded part = $\frac{3}{29} = 3 : 29$

16. From option (1)

5	1	2	3	6	7	4	8
↓	↓	↓	↓	↓	↓	↓	↓
p	t	i	m	u	i	n	y

From option (2)

2	3	5	6	4	7	1	8
↓	↓	↓	↓	↓	↓	↓	↓
I	m	p	u	n	i	t	y

So, from the given combination of numbers a meaningful word impunity will be formed.

17. From option (1)

4	1	7	3	5	6	2	8
↓	↓	↓	↓	↓	↓	↓	↓
y	h	l	t	a	c	g	e

From option (2)

1	7	8	6	5	4	2	3
↓	↓	↓	↓	↓	↓	↓	↓
h	l	e	c	a	y	g	t

From option (3)

7	4	6	1	2	5	3	8
↓	↓	↓	↓	↓	↓	↓	↓
l	y	c	h	g	a	t	e

So from the given number a meaningful word lychgate will be formed.

18. From option (1)

2	7	5	1	6	4	3
↓	↓	↓	↓	↓	↓	↓
r	h	i	z	o	m	e

So from the given number a meaningful word rhizome will be formed.

19. From option (1)

3	5	8	9	1	4	2	6	9
↓	↓	↓	↓	↓	↓	↓	↓	↓
e	c	s	t	o	p	y	a	t

From option (2)

8	2	7	5	1	4	6	9	3
↓	↓	↓	↓	↓	↓	↓	↓	↓
s	y	n	c	o	p	a	t	e

So from the given number a meaningful word syncopate will be formed.

20. Answer figure (2) is the mirror image of the given question figure (x).

21. In the given figure, answer figure (2) is the mirror image of the given question figure. (In a mirror image the object on the left side appear on the right side).

22. In the given question figure, answer figure (3), is the correct mirror image.

27. $(5 + 8 + 3)^2 = (16)^2 = 256$

similarly

$$(11 + ? + 7)^2 = 676$$

$$(18 + ?)^2 = (26)^2$$

$$\therefore ? = 26 - 18 = 8$$

28. $9 + 1 \times 1 = 10$ $10 + 1 \times 2 = 12$

$$14 + 6 \times 1 = 20$$

$$20 + 6 \times 2 = 32$$

$$12 + 4 \times 1 = 16$$

$$16 + 4 \times 2 = \boxed{24}$$

29. $(22 - 16) \times (15 - 9) = 36$

$$(11 - 7) \times (17 - 13) = 16$$

$$(? - 15) \times (21 - 13) = 64$$

$$(? - 15) = 8$$

$$\therefore ? = 23$$

30. From the given options, option (2), is the water image of the given word. (In a water image the object on the downward appears upward)

31. Option (3), is the water image of the given word IDENTICAL.

32. From the given letters and numbers, option (1) is the water image.

33. Option (3) is the correct water image of the given words / number.

34. Total earning by A, B and C together per day = ₹ 150

$$A + B + C = 150$$

Total earning by A & C together per day

$$A + C = 94 \quad \dots(i)$$

Total earning by B & C together per day

$$B + C = 76 \quad \dots(ii)$$

Adding equation (i) & (ii), we get

$$A + B + 2C = 170$$

$$(A + B + C) + C = 170$$

$$150 + C = 170$$

$$\therefore C = 20$$

So the per day earning of C is ₹ 20.

$$\begin{aligned}
 35. \text{ Speed of a train} &= \frac{36}{1} \\
 &= 36 \text{ km/hr} \\
 &= 36 \times \frac{5}{18} \text{ m/s} \\
 &= 10 \text{ m/s}
 \end{aligned}$$

[1 km/h = $\frac{5}{18}$ m/s]

$$\begin{aligned}
 \text{Total distance covered by a train in 3 minutes} \\
 &= 3 \times 60 \times 10 \\
 &= 1800 \text{ metres}
 \end{aligned}$$

36. A 25 D, B 22 F, D 18 H, G 13 J, **K 7 L**

37. 5 X 8, 7 C 11, 10 U 15, 14 F 20, **19 R 26**

38. D 15 K, F 12 L, H 9 M, J 6 N, **L 3 O**

39. H L 7, E O 10, B R 13, Y U 16, **V X 19**

40. The letter that represents neither a government employee nor an educated but is rural and not a male is C.

41. The letter that indicates rural people and who are government employee but not male is J.

42. The letter that represents the government employee but not a male nor rural and is uneducated is G.

43. The letter that represents the uneducated people and also rural male is L.

44. $5 \text{ CP} = 4 \text{ SP}$
 CP = cost price
 SP = selling price
 $\frac{\text{CP}}{\text{SP}} = \frac{4}{5}$
 profit = $5 - 4 = 1$

$$\begin{aligned}
 \text{Now profit percentage} &= \left(\frac{\text{profit}}{\text{CP}} \times 100 \right) \% \\
 &= \left(\frac{1}{4} \times 100 \right) \% \\
 &= 25\%
 \end{aligned}$$

45. $\frac{W_1}{N_1 D_1} = \frac{W_2}{N_2 D_2}$

Here W_1 and W_2 = work done N_1 and N_2 = total number, D_1 and D_2 = No. of days

Let no. of days be x .

$$\begin{aligned}
 \frac{4}{4 \times 4} &= \frac{8}{8 \times x} \\
 \therefore x &= 4 \text{ days}
 \end{aligned}$$

46. The average of 20 numbers

$$\begin{aligned}
 &= \frac{7 \times 13 + 13 \times 7}{20} \\
 &= \frac{91 + 91}{20} = \frac{182}{20} = 9.1
 \end{aligned}$$

47. From the given question, answer figure (4) is formed

48. From the pieces given in x , answer figure (4) is formed.

49. Answer figure (4) forms from the pieces given in the question.

50. There are 7 squares and 15 triangles in the given figure.

SCHOLASTIC APTITUDE TEST

1. $W = \Delta KE$

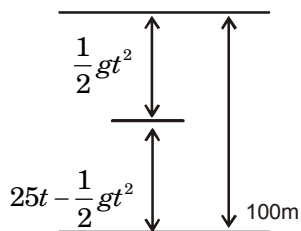
$$v_i = \frac{18 \times 5}{18} = 5 \text{ m/s}$$

$$v_f = \frac{54 \times 5}{18} = 15 \text{ m/s}$$

$$\begin{aligned}
 &= \frac{1}{2} m v_f^2 - \frac{1}{2} m v_i^2 \\
 &= \frac{1}{2} \times 2000 [15^2 - 5^2] \\
 &= 2 \times 10^5 \text{ J}
 \end{aligned}$$

2. (-)ve acceleration for both the cars is equal since μ is same.

3.



$$\frac{1}{2}gt^2 + \left\{25t - \frac{1}{2}gt^2\right\} = 100$$

$$t = 4s$$

Distance from ground

$$25 \times 4 - \frac{1}{2}(10)(4)^2 = 20 \text{ m}$$

5.

$$-30.4 = 12t - \frac{1}{2}(9.8)t^2$$

$$4.9t^2 - 12t - 30.4 = 0$$

$$t = 4s$$

6.

$$d = \frac{vt}{2} = \frac{340 \times 5}{2} = 850 \text{ m} = 0.85 \text{ km}$$

7. Angular momentum

8. Lens should form a virtual image of a distant object at 100 cm from the lens. Thus it should be a divergent lens and its focal length = -100 cm

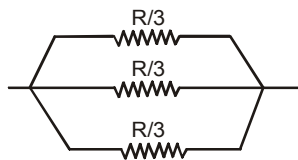
$$f = -100 \text{ cm} = -1 \text{ m}$$

$$\therefore P = \frac{1}{f} = \frac{1}{-1} = -1 \text{ D}$$

9. Apparent depth = $\frac{D}{\mu} = \frac{2}{1.33} = \frac{1}{\frac{4}{3}} = \frac{3}{4} \text{ m}$

10. Ref. Index of medium is greater than ref. index of material of lens.

11.



$$\begin{aligned} \frac{1}{R'} &= \frac{1}{\frac{R}{3}} + \frac{1}{\frac{R}{3}} + \frac{1}{\frac{R}{3}} \\ &= \frac{3}{R} + \frac{3}{R} + \frac{3}{R} = \frac{9}{R} \end{aligned}$$

 $\Rightarrow$

$$\frac{R}{R'} = 9$$

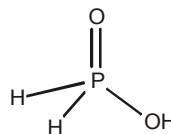
12.

$$I_{\max} = ni = n\left(\frac{P}{V}\right)$$

$$\therefore n = \frac{VI_{\max}}{P} = 110$$

13. Graphite is used as a lubricant due to layer structure.

14. H_3PO_2 is a monobasic acid due to it has only one replaceable hydrogen.



15. Atomic mass of gold (Au) = 197 g (100%)

24 carat gold — 197 g(100%)

20 carat gold — ?

$$\therefore \text{mass of gold (Au)} = \frac{20 \times 197}{24}$$

$$= 164.16 \text{ g}$$

% of gold present in 20 carat gold

$$= \frac{164.16}{197} \times 100$$

$$= 83.33\%$$

16. $\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{Cl}_2 + \text{MnCl}_2 + 2\text{H}_2\text{O}$

87 g ————— 71g

8.7 g ————— ?

mass of Cl_2 produced = 7.1 g

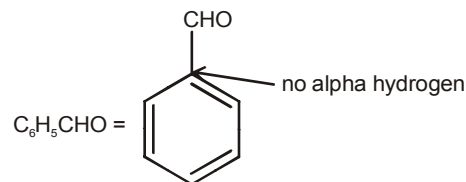
$\text{Cl}_2 + 2\text{KI} \longrightarrow \text{I}_2 + 2\text{KCl}$

71 g ————— 254 g

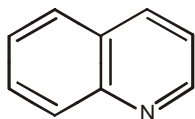
7.1 g ————— ?

$\therefore$ mass of I_2 liberate = 25.4 g

17. Aldehydes lacking hydrogen atom in the alpha position involve in "cannizzaro reaction".

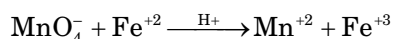


18. Quinoline base is not present in DNA



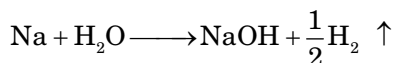
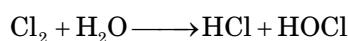
19. Dacron (Terylene) is an example "Condensation of Polymes".

20. It's Mohr's Salt



Ammoniumiron (II) sulphate decolorizes KMnO_4

21. $2\text{F}_2 + 2\text{H}_2\text{O} \longrightarrow 4\text{HF} + \text{O}_2 \uparrow$



P_4 doesn't react with H_2O

22. Molarity (M) = $\frac{n}{V(\text{mL})} \times 100$

$$0.1 = \frac{n}{50} \times 1000$$

$\therefore$ number of moles of

$$\text{KI} = 5 \times 10^{-3}$$

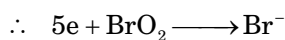
$\therefore$ Number of Iodine atoms

$$= \text{Number of moles} \times 6.023 \times 10^{23}$$

$$= 5 \times 10^{-3} \times 6.023 \times 10^{23}$$

$$= 3.011 \times 10^{21}$$

23. 1 mole of electrons = 1 Farady



$\therefore$ 5 Faradays are required.

36. $\frac{1}{q+r} - \frac{1}{p+q} = \frac{1}{r+p} - \frac{1}{q+r}$

$$p^2 - r^2 = q^2 - p^2$$

$$\Rightarrow 2p^2 = r^2 + q^2$$

$\therefore q^2, p^2, r^2$ are in AP

37. $\alpha + \alpha^2 = \frac{-p}{3}$

$$\alpha^3 = 1$$

$$\alpha^3 - 1 = 0$$

$$\Rightarrow (\alpha - 1)(\alpha^2 + \alpha + 1) = 0$$

$$(\alpha + 1)\left(\frac{-p}{3} + 1\right) = 0$$

$$\alpha = 1$$

$$\therefore p = -6$$

$$38. \quad lb = \frac{22}{7} \times \frac{35}{11} = 10 \quad \dots(i)$$

$$\text{And} \quad \frac{a}{c}l = b + 3 \quad \dots(ii)$$

Solving (i) & (ii),

$$l = 5, b = 2$$

$$39. \quad x + y = 1 \text{ \& } x^3 + y^3 + 3xy \\ = (x + y)^3 - 3xy(x + y) + 3xy \\ = 1$$

$$40. \quad (10a + b) - (10b + a) = 27$$

$$\text{Or} \quad 9(a - b) = 27$$

$$\text{Or} \quad a - b = 3$$

$$41. \quad \text{In a leap year number of days} \\ = 366 = 52$$

complete weeks + 2 days

Remaining two days are

Sunday, Monday

Monday, Tuesday

Saturday, Sunday

Favourable event = 2

Total events = 7

$$\text{Prob} = \frac{2}{7}$$

42. It is obvious

43. No correct option is given

$$44. \quad \sin \theta_1 + \sin \theta_2 + \sin \theta_3 = 3$$

$$\sin \theta_1 = \sin \theta_2$$

$$= \sin \theta_3 = 1$$

$$\therefore \theta_1 = \theta_2$$

$$= \theta_3$$

$$= \frac{\pi}{2}$$

$$\therefore \cos \theta_1 + \cos \theta_2 + \cos \theta_3 = 0$$

45. $\sin \theta + \operatorname{cosec} \theta = 2$

$$\sin \theta + \frac{1}{\sin \theta} = 2$$

$$(1 - \sin \theta)^2 = 0$$

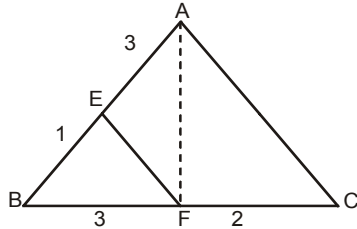
$$\therefore \sin \theta = 1,$$

Similarly $\operatorname{cosec} \theta = 1$

Now, $\sin^{100} \theta + \operatorname{cosec}^{100} \theta = 1 + 1 = 2$

46. Area = $\frac{1}{2} |1(-6-5) + 4(5-2) + 3(2+6)|$
 $= \frac{1}{2} |-11 + 12 + 24|$
 $= \frac{25}{2} = 12.5 \text{ sq units}$

47.



Let Area of $\triangle BEF = x$

$\therefore$ Area of $\triangle AFE = 3x$

Let Area of $\triangle ABF = 3y$

$\therefore$ Area of $\triangle CAF = 2y$

Area $\triangle ABC = \text{Area } \triangle BEF + \text{Area } \triangle AEF$

$$3y = x + 3x \quad \dots(i)$$

$$3y = 4x$$

$$\frac{3}{4} = \frac{x}{y}$$

$$\frac{\text{Area } \triangle BEF}{\text{Area } \triangle ABC} = \frac{x}{y}$$

$$= \frac{1}{5} \times \frac{3}{4} = \frac{3}{20}$$

48. Let r_1 = radius of big circle
 & r_2 = radius of small circle

$$\pi(r_1^2 + r_2^2) = 153\pi$$

$$\therefore r_1^2 + r_2^2 = 153 \quad \dots(i)$$

And $r_1 + r_2 = 15 \quad \dots(ii)$

Solving (i) & (ii)

$$r_1 = 12, r_2 = 3$$

$$\frac{r_1}{r_2} = \frac{12}{3} = 4$$

49. l = length

and b = breadth

$$\therefore \sqrt{l^2 + b^2} + l = 5b \quad \dots(i)$$

$$\sqrt{l^2 + b^2} - b = 8$$

$$l^2 = 64 + 16b \quad \dots(ii)$$

Solving (i) & (ii) we get

$$l^2 + 4l - 96 = 0$$

$$\therefore l = 12, b = 5$$

Area of rectangle = lb

$$= 60 \text{ sq units}$$

51. Combined mean = $\frac{9 \times 100 + 6 \times 80}{15}$
 $= 92$

52. 13 observations are in ascending order
 15, 51, 52, 53, 54, 55, 57, 58, 59, 61, 62,
 62, 68 median = 57

53. Mode = 5

Median = 5

54. Given, $\frac{3a}{b3} = \frac{18}{11}$

$$11a - 6b = -18 \quad \dots(i)$$

$$\frac{a+8}{2b} = \frac{2}{5}$$

$$5a - 4b = -40 \quad \dots(ii)$$

Solving equations (i) and (ii), we get

$$a = 2 \text{ and } b = 25$$

$$a + b = 37$$

55. 5 does not appear

Favourable events = $5 \times 5 = 25$

Total events = $6 \times 6 = 36$

The probability that the number 5 does

$$\text{not appear} = \frac{25}{36}$$

■ ■

NTSE - 2014

RAJASTHAN

PART I : MENTAL ABILITY TEST

Directions (Q. 1 – 4) : In the following some of the letters are missing in the given series with one term missing shown by question mark (?). This term is one of the alternatives among the four groups of letters given under it. Find the right alternative.

1. A, F, J, M, ?,

- (a) O (b) N
(c) Q (d) P

2. BD, HJ, NP, ?, ZB

- (a) QS (b) TV
(c) YC (d) TU

3. FOX, IQV, LST, OUR, ?

- (a) RPW (b) RWP
(c) QVS (d) SXU

4. qpo, nml, ?,

- (a) ghf (b) ijk
(c) kji (d) hgj

Directions (Q. 5 – 8) : In the following some of the numbers are missing in the given series with one term missing shown by question mark (?). This term is one of the alternatives among the four numbers given under it. Find the right alternative.

5. 65, 48, 64, 49, 63, ?

- (a) 53 (b) 52
(c) 51 (d) 50

6. 7, 23, ?, 79, 119

- (a) 47 (b) 49
(c) 44 (d) 46

7. 16, 8, 12, ?, 105

- (a) 6 (b) 30
(c) 24 (d) 35

8. 748, 737, 716, 685, 644, ?

- (a) 634 (b) 643
(c) 503 (d) 593

Directions (Q. 9 – 11) : In each of the questions below are given two statements and two conclusions numbered I and II. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the given conclusions logically follows from the two given statements.

9. Statements :

- (i) All rats are cats.
(ii) All cats are dogs.

Conclusions :

- (I) All rats are dogs.
(II) Some cats are rats.
(a) Only conclusion I is true
(b) Only conclusion II is true
(c) Both conclusions I and II are true
(d) Neither conclusion I nor conclusion II is true.

10. Statements :

- (i) Some chalks are chairs.
(ii) Some chairs are tables.

Conclusions :

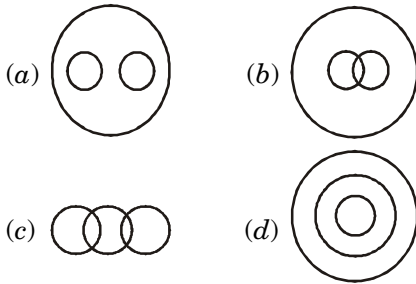
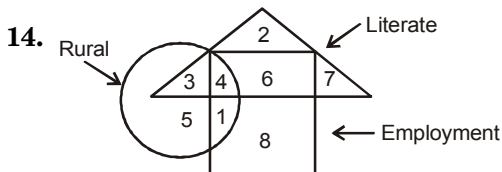
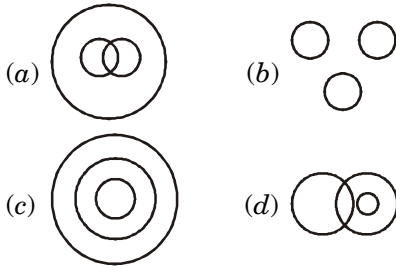
- (I) Some chalks are tables.
(II) Some tables are chalks.
(a) Only conclusion I is true
(b) Only conclusion II is true
(c) Both conclusions I and II are true
(d) Neither conclusion I nor conclusion II is true

11. Statements :

- (i) Without rains the crops will not be good.
 (ii) The crops were good.

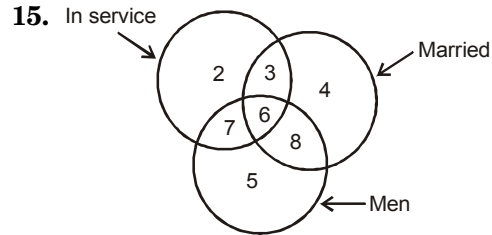
Conclusions :

- (I) There were rains.
 (II) Crops were good due to good fertilizers.
 (a) Only conclusion I is true
 (b) Only conclusion II is true
 (c) Both conclusions I and II are true
 (d) Neither conclusion I nor conclusion II is true

12. Which of the following Venn diagrams correctly represents persons, trees and environment ?**13. Which of the following Venn diagrams correctly represents Jaipur, Rajasthan and India ?**

In the above diagram, how many literates are in employment ?

- (a) 5 (b) 11
 (c) 10 (d) 6

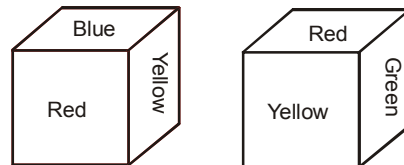


In the above diagram the number of men who are married and in service is

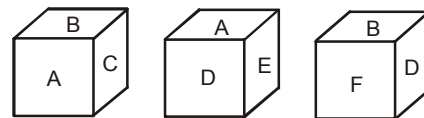
- (a) 2 (b) 6
 (c) 9 (d) 17

Directions (Q. 16 – 19) : Three alternatives are alike in a certain way but the rest one is different. Find out the odd one and write correct answer.

- 16.** (a) ACEGF (b) FHJLK
 (c) KMOQP (d) UWYZA
17. (a) 125 (b) 150
 (c) 300 (d) 250
18. (a) 28, 4 (b) 35, 5
 (c) 63, 7 (d) 56, 8
19. (a) Cement (b) Brick
 (c) Sand (d) Colour

20. In the given dice the colour of opposite side of the face having blue colour will be

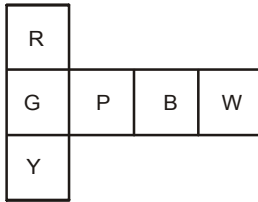
- (a) Red (b) Green
 (c) Yellow (d) Blue

21. Which alternative is correct in the given figures of dice ?

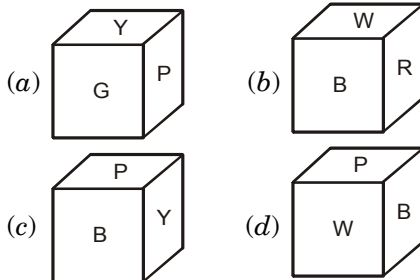
- (a) E is opposite of A
 (b) C is opposite of E
 (c) C is opposite of D
 (d) F is not opposite of A

Directions (Q. 22 – 23) : Answer on the basis of given figure that the different faces are folded in the form of cube.

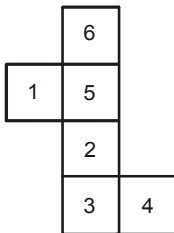
22.



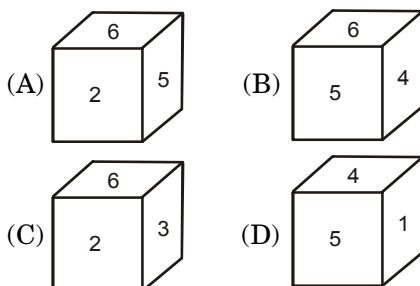
Which figure of cube is not correctly formed in the following figures ?



23.



Which alternative is correct in the following figures of dice ?



- (a) Only A (b) Only B
(c) Both A and C (d) A, B, C and D.

24. If in a coded language the word 'EAST' is written as 'FAST' and 'BAT' is written as 'CAT', then in the same coded language 'RAT' will be written as

- (a) TAP (b) SAT
(c) PAT (d) QAT

25. If P = 16, NC = 17 and AEO = 21, then what is the value of NEHLA ?

- (a) 41 (b) 40
(c) 48 (d) 46

26. In a coded language 'Red colour pen = 276', 'Green colour flower = 789' and 'White colour pen = 247'. Then code for white is

- (a) 2 (b) 5
(c) 4 (d) 7

27. In a coded language 'NUMBER' is written as 'PSOZGP'. Then in the same coded language 'BLOOD' will be written as

- (a) ZJMMB (b) ZNMQB
(c) DJQMF (d) DNQQF

Directions(Q. 28–30): In each of the following questions a statement is given followed by two conclusions I and II. Read the conclusions and then decide which of the given conclusions logically follows from the two given statements.

28. **Statements :**

All students are boys.

No boy is dull.

Conclusions :

(I) There is no girl student in the class.

(II) No student is dull.

- (a) Only conclusion I is true
(b) Only conclusion II is true
(c) Both conclusions I and II are true
(d) Neither conclusion I nor conclusion II is true.

29. **Statements :**

All poets are intelligent.

All singers are intelligent.

Conclusion :

- (I) All singers are poet.
(II) Some intelligent persons are not singers.
(a) Only conclusion I is true
(b) Only conclusion II is true
(c) Both conclusions I and II are true.
(d) Neither conclusion I nor conclusion II is true

30. Statement :

A car is required on rent — an advertisement

Conclusions :

(I) All types of vehicles are available on rent.

(II) People will respond to the advertisement.

(a) Only conclusion I is true

(b) Only conclusion II is true

(c) Both conclusions I and II are true

(d) Neither conclusion I nor conclusion II is true.

31. A and B are brothers, C and D are sisters. The son of A is brother of D. Then the relation of B with C is

(a) Husband (b) Brother

(c) Uncle (d) Nephew

32. Ram is the brother of Deepak, Sunita is sister of Rajesh, Deepak is the son of Sunita. How is Ram related to Sunita ?

(a) Son (b) Brother

(c) Nephew (d) Father

33. If $79 \oplus 86 = 6897$ then the value of $53 \oplus 47 =$

(a) 5347 (b) 7435

(c) 2491 (d) 3574

34. If the numbers 719, 609, 735, 689, 834, 937, 600, 798, 610 are arranged in ascending order, then the multiplication of digits of the mid-number is

(a) 96 (b) 9

(c) 17 (d) 63

35. If $P > Q$, $Q > R$ and $R > S$, then $P \dots ? \dots S$

(a) $P > S$ (b) $P = S$

(c) $P < S$ (d) $P \geq S$

36. Urmila has 23rd rank from the right and 15th rank from the left. Then, how many persons are there in the row ?

(a) 37 (b) 38

(c) 9 (d) 8

37. If 4th day of any month was Sunday, what will be the day on 27th day of the same month ?

(a) Monday (b) Tuesday

(c) Wednesday (d) Saturday

38. If 3rd January, 2004 was Monday, what will be the day on 5th April, 2004 ?

(a) Wednesday (b) Monday

(c) Sunday (d) Tuesday

39. If 14th July of 1995 was Friday, then what was the day on 30th March of 1994 ?

(a) Sunday (b) Monday

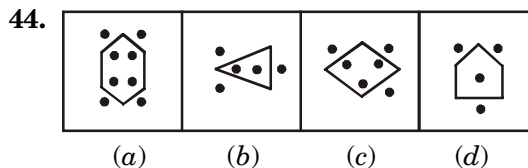
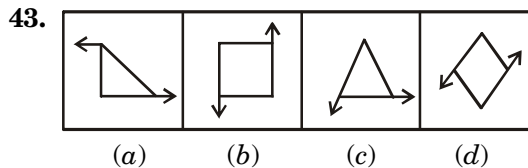
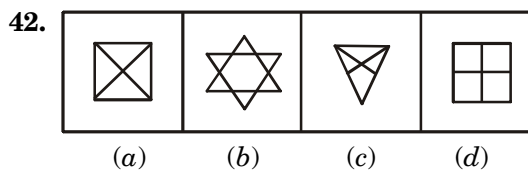
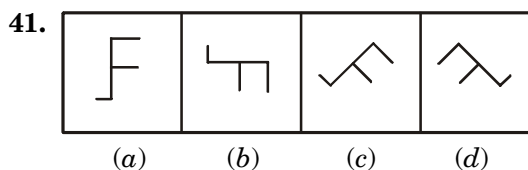
(c) Tuesday (d) Wednesday

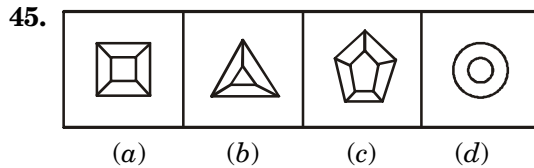
40. If 4 days before today it was Monday, what day will it fall on after 3 days ?

(a) Sunday (b) Monday

(c) Tuesday (d) Wednesday

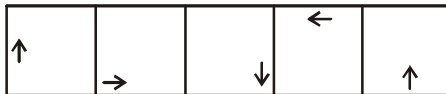
Directions (Q. 41 – 45) : In the following there are four figures given. One of these does not correlate with the rest of the figures. Find out that odd figure.





Directions (Q. 46 – 47) : In the following there are two sets of figures. One set contains problem-figures while the other has answer-figures. There is a sequence according to which the problem-figures are arranged. You have to select one figure from the set of answer-figures which can be placed in sequence after the set of problem-figures. Find out the correct figure.

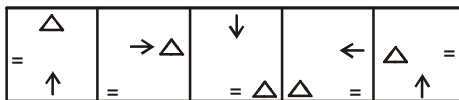
46. Problem figures



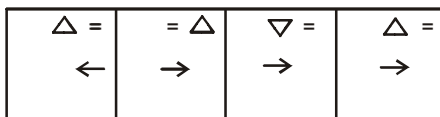
Answer figures



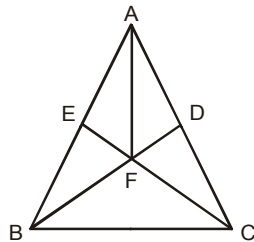
47. Problem figures



Answer figures



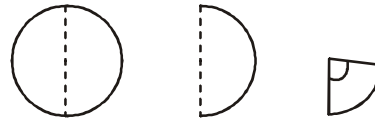
48. How many triangles are present in the following figure ?



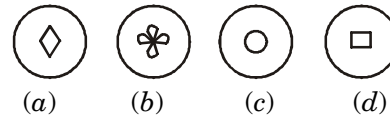
- (a) 14 (b) 10
(c) 12 (d) 09

49. In the following question, three figures showing a sequence of folding a paper are given. Which could resemble the figure when the third figure is unfolded ?

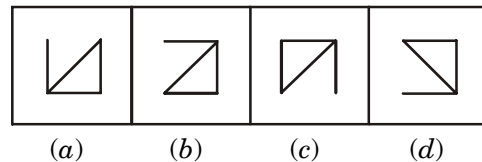
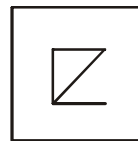
Problem figures



Answer figures



50. Choose the correct mirror image of the given problem figure from given four alternatives.



PART II : ENGLISH

- Wait until I tell this story. It your hair stand on end.
(a) is making (b) will make
(c) made (d) are making
- Rajveer wants to work in France so he French these days.
(a) learn (b) are learning
(c) is learning (d) learnt
- Reckless driving many accidents.
(a) causes (b) cause
(c) are causing (d) have caused
- When the burglar broke into the house all the members of the family the television
(a) watched (b) has watched
(c) was watching (d) were watching

5. Everything is going on well. The Student's Union any problem so far.
 (a) has not presented
 (b) does not present
 (c) have not presented
 (d) do not present
6. William many great poems on nature.
 (a) write (b) are writing
 (c) wrote (d) have written
7. No vehicles to park here
 (a) is allowed (b) has been allowed
 (c) is being allowed (d) are allowed
8. A diary to Mary for her thirteenth birthday last month
 (a) is given (b) was given
 (c) have been given (d) will be given
9. The names of the merit holders next week.
 (a) will be announced
 (b) is announced
 (c) have been announced
 (d) was announced
10. The pressure of steam in the engine by this red button.
 (a) have been controlled
 (b) are controlled
 (c) is controlled
 (d) were controlled
11. The room looks tidy. It just now.
 (a) has been cleaned
 (b) have been cleaned
 (c) are cleaned
 (d) will be cleaned
12. Rekha has been learning swimming for years. She swim very well now.
 (a) could (b) can
 (c) might (d) have to
13. According to the school rules, every student attend the morning assembly.
 (a) might (b) must
 (c) can (d) would
14. you please tell me the way to the airport ?
 (a) Might (b) Shall
 (c) Must (d) Would
15. "..... I get you a chair ?" "Yes, please."
 (a) Shall (b) Have to
 (c) Had to (d) Might
16. I have a lot of new dresses. You buy any for me.
 (a) might not (b) may not
 (c) need not (d) could not
17. The kings were very rich and lead a life of luxury.
 (a) can (b) may
 (c) will (d) could
18. Saroj said to me, "I have no time for you." Saroj told me that
 (a) I have no time for her
 (b) she had no time for her
 (c) I have no time for her
 (d) she had no time for me.
19. Mohit said to Asha, "Why did you insult my brother ?"
 Mohit asked Asha
 (a) why he had insulted her brother
 (b) why she had insulted his brother
 (c) why he has insulted her brother
 (d) why she has insulted his brother.
20. Ashok said to Poonam, "Do you know how to operate a computer ?"
 Ashok asked Poonam if
 (a) she knew how to operate a computer
 (b) he knew how to operate a computer
 (c) she had known how to operate a computer
 (d) he had known how to operate a computer.

- 21.** Rajni said to her brother, "Don't write in my notebooks."
Rajni forbade her brother
(a) not to write in his notebooks
(b) not to write in her notebooks
(c) to write in his notebooks
(d) to write in her notebooks.
- 22.** The teacher said to the boys, "Work hard if you want to get success."
The teacher told the boys
(a) to work hard if he want to get success
(b) to work hard if they wanted to get success
(c) to work hard if they want to get success
(d) to work hard if he wanted to get success.
- 23.** Valli was a small girl but she was able to take care herself.
(a) in (b) on
(c) of (d) to
- 24.** Which company do you work ?
(a) for (b) after
(c) of (d) from
- 25.** The poet was sitting in his house all himself.
(a) between (b) by
(c) to (d) of
- 26.** Her face was bright happiness.
(a) to (b) about
(c) for (d) with
- 27.** The Star Club is superior the Golden Club in cricket.
(a) among (b) at
(c) to (d) about
- 28.** He pushed his way the crowd to the door.
(a) on (b) through
(c) about (d) under
- 29.** When a group of boys sitting under a tree some monkeys came there.
(a) are (b) were
(c) was (d) is
- 30.** Not only my neighbour but all the members of his family honest.
(a) is (b) are
(c) have (d) was
- 31.** Early to bed and early to rise a man healthy, wealthy and wise.
(a) make (b) makes
(c) were making (d) are making
- 32.** Either Hari or I at mistake today.
(a) am (b) is
(c) are (d) were
- 33.** Five years a long period to repay the loan.
(a) are (b) were
(c) has (d) is
- 34.** Both a book and a computer our good friends.
(a) is (b) are
(c) has (d) have
- Directions (Q. 35 – 36) :** Select the word that best expresses the meaning of the given word :
- 35.** Haughtily
(a) confidently (b) proudly
(c) lovingly (d) angrily
- 36.** Hostile
(a) unfriendly (b) politely
(c) friendly (d) kindly
- Directions (Q. 37 – 38) :** Select the word which means the opposite to the given word :
- 37.** Lamentation
(a) sorrow (b) joy
(c) wonder (d) shame
- 38.** Valour
(a) misery (b) pain
(c) suffering (d) cowardice

Directions (Q. 39 – 40) : Select the meaning of the given phrasal verbs :

39. Look for

- (a) in search of
- (b) to remember
- (c) to plan for future
- (d) to show a low opinion

40. Put off

- (a) to decline
- (b) to postpone
- (c) to neglect
- (d) to refuse

PART III

SCHOLASTIC APTITUDE TEST

1. A person takes time t to go once around a circular path of diameter $2R$. The speed (v) of this person would be

- (a) $\frac{t}{2\pi R}$
- (b) $\frac{2\pi R}{t}$
- (c) $\frac{\pi R^2}{t}$
- (d) $2\pi R.t$

2. A body of mass 2 kg is moving on a smooth floor in straight line with a uniform velocity of 10 m/s. Resultant force acting on the body is

- (a) 20 N
- (b) 10 N
- (c) 2 N
- (d) zero

3. The S.I. unit of pressure is

- (a) $N.m^2$
- (b) N/m^2
- (c) m^2/N
- (d) N/m

4. The frequency of a source of sound is 50 Hz. How many times does it vibrate in one minute ?

- (a) 50
- (b) 300
- (c) 3000
- (d) 30000

5. A person of mass 50 kg runs up to staircase of 40 steps in 6 sec. If the height of each step is 15 cm, then his power will be (If $g = 10 \text{ m/s}^2$)

- (a) 300 W
- (b) 500 W
- (c) 600 W
- (d) 1000 W

6. The focal length of a concave mirror in air is f . If it is immersed in water

$\left(n = \frac{4}{3}\right)$, then the focal length will be

- (a) f
- (b) $\frac{4}{3}f$
- (c) $\frac{3}{4}f$
- (d) $4f$

7. A student was asked to draw a ray diagram for formation of image by a convex lens for the following positions of the object :

(A) between F and $2F$

(B) at F

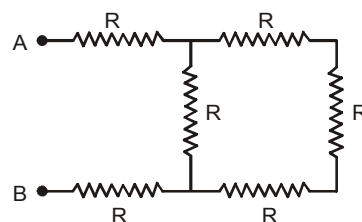
(C) at $2F$

(D) between F and optical centre.

The position for which virtual image can be formed among these is

- (a) B
- (b) A
- (c) C
- (d) D

8. The value of equivalent resistance between the points A and B in the given circuit, will be

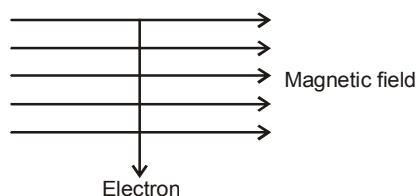


- (a) $6R$
- (b) $\frac{4R}{11}$
- (c) $\frac{11R}{4}$
- (d) $\frac{R}{6}$

9. The far point of a myopic person is 75 cm in front of the eye. The nature and power of the lens required to correct the problem, will be

- (a) convex lens, -1.33 D
- (b) concave lens, -1.33 D
- (c) concave lens, $+1.33 \text{ D}$
- (d) convex lens, $+1.33 \text{ D}$

10. An electron enters in a magnetic field at right angle to it as shown in figure. The direction of force acting on the electron will be



- (a) to the left (b) to the right
(c) out of the page (d) into the page
11. When 1 J of work is done to move a charge of 1 C from one point to another point then the potential difference between two points in a given circuit will be
(a) 1 V (b) 4 V
(c) 8 V (d) zero
12. A certain household has consumed 200 units of energy during a month. Its value in joules will be
(a) 3.6×10^{10} (b) 7.2×10^{10}
(c) 3.6×10^8 (d) 7.2×10^8
13. On addition of which metal the blue coloured copper sulphate solution turns into colourless solution ?
(a) Ag (b) Hg
(c) Zn (d) Au
14. IUPAC name of the first member of homologous series of ketones is
(a) Ethanone (b) Propanol
(c) Methanone (d) Propanone
15. The nature of solution when sodium carbonate is dissolved in water will be
(a) acidic (b) basic
(c) neutral (d) amphoteric
16. An element A belongs to third period and second group of periodic table. The number of valence electron/electrons of element A is
(a) one (b) two
(c) three (d) four
17. The chemical reaction $\text{HNO}_3 + \text{KOH} \rightarrow \text{KNO}_3 + \text{H}_2\text{O}$ is an example of
(a) neutralization
(b) double displacement
(c) neutralization and double displacement
(d) combination
18. pH of a solution is zero. The nature of this solution is
(a) acidic (b) basic
(c) neutral (d) amphoteric
19. The difference in number of crystalline water molecules in a molecule of gypsum and a molecule of plaster of Paris is
(a) $\frac{5}{2}$ (b) 2
(c) $\frac{1}{2}$ (d) $\frac{3}{2}$
20. An alkyne has 4 numbers of hydrogen atoms. What will be the number of carbon atoms in it ?
(a) Two (b) Three
(c) Four (d) Five
21. Number of molecules in 14 g of carbon monoxide is
(a) 12.044×10^{23} (b) 6.022×10^{23}
(c) 3.011×10^{23} (d) 1.5050×10^{23}
22. The boiling point of a gas is -80°C . This temperature is equivalent to
(a) -193 K (b) 193 K
(c) 353 K (d) -353 K
23. Which of the following solutions does not show Tyndall effect ?
(a) Milk (b) Starch solution
(c) Ink (d) Sugar solution
24. The cell organelle storing substances like starch, oil and proteins is
(a) Vacuole (b) Lysosome
(c) Plastid (d) Golgi body
25. The hormone present in higher concentration in fruits and seeds is
(a) Auxin (b) Gibberellin
(c) Cytokinin (d) Ethylene

- 26.** The substance essential for photo synthesis is
 (a) glucose (b) oxygen
 (c) nitrogen (d) water
- 27.** In plants the cells necessary for exchange of gases from atmosphere are
 (a) subsidiary cells
 (b) bark cells
 (c) guard cells
 (d) phloem parenchyma cells
- 28.** The group of amphibian plants is
 (a) Funaria, Marchantia
 (b) Marsilia, Horse-tail
 (c) Pinus, Cycas
 (d) Typha, Hydrilla
- 29.** The human made synthetic chemical used in refrigerator is
 (a) LPG (b) CFC
 (c) CH_4 (d) PVC
- 30.** The example of an egg laying mammal is
 (a) Bat (b) Whale
 (c) Echidna (d) Kangaroo
- 31.** Which of the following follows a general principle of fooling the immune system by putting particular infection into the body ?
 (a) AIDS (b) Vaccination
 (c) Antibiotic (d) Antiseptic
- 32.** Skeletal muscles are
 (a) Striated and voluntary
 (b) unstriated and voluntary
 (c) striated and involuntary
 (d) unstriated and involuntary
- 33.** Sphygmomanometer measures
 (a) wall pressure
 (b) blood pressure
 (c) diffusion pressure
 (d) air pressure
- 34.** Knightia is a fossil of
 (a) tree trunk (b) invertebrate
 (c) fish (d) dinosaur skull
- 35.** The method of mechanical barrier to avoid pregnancy is
 (a) condoms
 (b) contraceptive pills
 (c) surgical methods
 (d) abortion
- 36.** The value of $\left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \cdot \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}} \cdot \left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}}$ is equal to
 (a) 1 (b) -1
 (c) 0 (d) abc
- 37.** The HCF of any two prime numbers a and b , is
 (a) a (b) ab
 (c) b (d) 1
- 38.** The total two-digit numbers which are divisible by 5, are
 (a) 17 (b) 18
 (c) 19 (d) 20
- 39.** If the roots of the equation $2x^2 + ax + b = 0$ are reciprocals to each other, then the value of b is
 (a) -1 (b) -2
 (c) 2 (d) 1
- 40.** If $\sin(A + B) = \cos(A - B)$, then the value of $(A + B)$ is
 (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$
 (c) $\frac{3\pi}{4}$ (d) $\frac{\pi}{8}$
- 41.** If $\sin \theta + \sin^2 \theta = 1$, then the value of $\cos^2 \theta + \cos^4 \theta$ is
 (a) 3 (b) 2
 (c) 1 (d) 0
- 42.** The angle of elevation of the top of a building from the foot of tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 30 m high, then the height of the building is
 (a) 30 m (b) 20 m
 (c) 15 m (d) 10 m

43. If the system of equations $3x + y = 1$, $(2k - 1)x + (k - 1)y = (2k + 1)$, has no solution, then the value of k is

(a) 2 (b) 3
(c) -2 (d) 1

44. The mean of the first ten even natural numbers is

(a) 10 (b) 11
(c) 12 (d) 13

45. A die is thrown twice. The probability of the sum being odd, is

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$
(c) $\frac{1}{4}$ (d) $\frac{1}{6}$

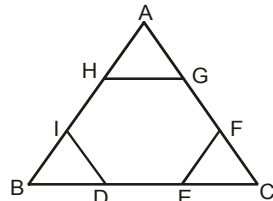
46. If the heights and radii of a cone and a hemisphere are same then the ratio of their volumes is

(a) 1 : 2 (b) 2 : 3
(c) 1 : 3 (d) 1 : 1

47. The lengths of two parallel chords of a circle are 6 cm and 8 cm. If the smaller chord is at distance 4 cm from the centre, then the distance of the other chord from the centre is

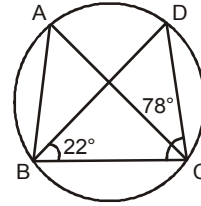
(a) 5 cm (b) 4 cm
(c) 3 cm (d) 2 cm

48. In the figure given below, ABC is an equilateral triangle. D, E, F, G, H and I are the trisector points of the sides as shown. If the side of the triangle ABC is 6 cm, then the area of the regular hexagon DEFGHI is



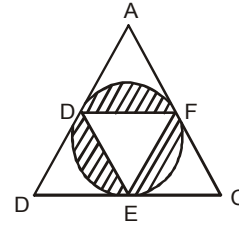
(a) $3\sqrt{3} \text{ cm}^2$ (b) $4\sqrt{3} \text{ cm}^2$
(c) $5\sqrt{3} \text{ cm}^2$ (d) $6\sqrt{3} \text{ cm}^2$

49. In the given figure, $\angle DBC = 22^\circ$ and $\angle DCB = 78^\circ$ then $\angle BAC$ is equal to



(a) 90° (b) 80°
(c) 78° (d) 22°

50. In the given figure, ABC is an equilateral triangle whose side is $2\sqrt{3} \text{ cm}$. A circle is drawn which passes through the midpoints D, E and F of its sides. The area of the shaded region is

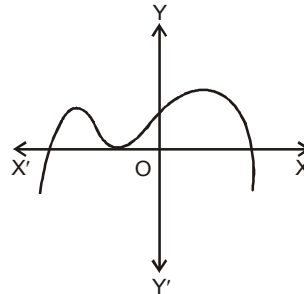


(a) $\frac{1}{4}(4\pi - 3\sqrt{3}) \text{ cm}^2$ (b) $\frac{1}{4}(2\pi - \sqrt{3}) \text{ cm}^2$
(c) $\frac{1}{4}(\pi - 3\sqrt{3}) \text{ cm}^2$ (d) $\frac{1}{4}(3\pi - \sqrt{3}) \text{ cm}^2$

51. If a cylinder of radius 3 cm and height of 10 cm is melted and recast into the shapes of small spheres of diameter 1 cm, then the number of spheres so formed is

(a) 135 (b) 270
(c) 540 (d) 1080

52. The graph of $y = p(x)$ is given below. The number of zeroes of polynomial $p(x)$, is

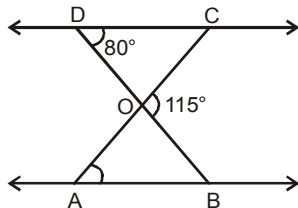


(a) 3 (b) 2
(c) 1 (d) 0

53. The centre of a circle passing through the points $(7, -5)$, $(3, -7)$ and $(3, 3)$ is

(a) $(5, -6)$ (b) $(5, -1)$
(c) $(3, 2)$ (d) $(3, -2)$

54. In the given figure, $\triangle ODC \sim \triangle OBA$, $\angle BOC = 115^\circ$ and $\angle CDO = 80^\circ$. Then $\angle OAB$ is equal to



(a) 80° (b) 35°
(c) 45° (d) 65°

55. $\tan 43^\circ \tan 45^\circ \tan 47^\circ$ is equal to

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$
(c) 1 (d) 2

56. The writer of 'The Social Contract' is

(a) Rousseau (b) Montesquieu
(c) Tilak (d) Mirabeau

57. Napoleon Bonaparte was defeated at Waterloo in

(a) 1518 (b) 1815
(c) 1915 (d) 1819

58. The world's biggest stock exchange 'Wall Street Exchange' is located in

(a) France (b) China
(c) U.S.A. (d) Japan

59. Nazi youth group for children below 14 years of age was

(a) Strom Troopers
(b) Gestapo
(c) Jungvolk
(d) Ghettoes

60. 'Plant more wheat, wheat will win the war'. The statement is of

(a) President Wilson
(b) Churchill
(c) Tzar Nicholas II
(d) Franklin D. Roosevelt

61. The tactful diplomatic alliance between Sardinia-Piedmont and France was engineered by

(a) Mazzini (b) Cavour
(c) Garibaldi (d) Victor Emmanuel

62. The film 'Raja Harishchandra' (1913) was made by

(a) Gulzar
(b) Basu Bhattacharya
(c) Dada Saheb Phalke
(d) C. Ramchandran

63. Which novel is known as the first modern novel of Malayalam ?

(a) Henrietta Temple
(b) Pariksha Guru
(c) Chandrakanta
(d) Indulekha

64. In Trinidad the annual Muharram procession is known as

(a) Karvala (b) Hosay
(c) Hassan (d) Haidos

65. The proposal of 'Non-cooperation Movement' was passed by Congress in the session held at

(a) Nagpur (b) Kanpur
(c) Amritsar (d) Lucknow

66. In India Tropic of Cancer passes through the state of

(a) Bihar (b) Orissa
(c) Jharkhand (d) Uttar Pradesh

67. Match List-I with List-II and select the correct answer :

List-I		List-II	
Peak		Height (metre)	
(A) Mt. Everest		(i) 8598	
(B) Kanchenjunga		(ii) 8481	
(C) Makalu		(iii) 8848	
(D) Dhaulagiri		(iv) 8172	
A	B	C	D
(a) iii	ii	iv	i
(b) ii	i	iii	iv
(c) i	iii	iv	ii
(d) iii	i	ii	iv

68. Which of the following is not tributary of Ganga ?
 (a) Yamuna (b) Satluj
 (c) Ghaghara (d) Kosi
69. In India total forest area as per Forest Report, 2011 is
 (a) 21.05 % (b) 20.06 %
 (c) 22.07 % (d) 19.80 %
70. Which state in India has Kaziranga National Park ?
 (a) Bihar (b) West Bengal
 (c) Jharkhand (d) Assam
71. Which type of resource is solar energy ?
 (a) Replenishable (b) Human-made
 (c) Biotic (d) Non-recyclable
72. Hirakud Dam is situated on the river
 (a) Godavari (b) Tapi
 (c) Mahanadi (d) Yamuna
73. Non-food crop is
 (a) Wheat (b) Rice
 (c) Cotton (d) Bajra
74. Which of the following is a non-ferrous mineral ?
 (a) Bauxite (b) Manganese
 (c) Nickel (d) Cobalt
75. Seaport of India is
 (a) Delhi
 (b) Hyderabad
 (c) Vishakhapatnam
 (d) Amritsar
76. Match **List-I** with **List-II** and select the correct answer :
- | List-I | List-II |
|---------------------------|--------------------|
| (A) Union of India | (i) Prime Minister |
| (B) State | (ii) Sarpanch |
| (C) Municipal Corporation | (iii) Governor |
| (D) Gram Panchayat | (iv) Mayor |
	A	B	C	D
(a)	iv	i	ii	iii
(b)	ii	iii	iv	i
(c)	i	iii	iv	ii
(d)	iii	iv	i	ii
77. The Government body which implements law is
 (a) Legislature (b) Judiciary
 (c) Executive (d) Press
78. Who among the following is the founder of the Bahujan Samaj Party ?
 (a) Kanshiram (b) Sahu Maharaj
 (c) B.R. Ambedkar (d) Jyotiba Phule
79. In a context of assessing democracy which among the following is not according to democratic system?
 (a) Free and fair election
 (b) Dignity of the individual
 (c) Majority rule
 (d) Equal treatment before law.
80. When did the Constitution of India come into effect ?
 (a) 9th November, 1946
 (b) 15th August, 1947
 (c) 26th November, 1949
 (d) 26th January, 1950
81. What is the period of Indian Lok Sabha ?
 (a) 3 years (b) 5 years
 (c) 6 years (d) 4 years
82. Who is the highest formal authority of India ?
 (a) President (b) Prime Minister
 (c) Governor (d) Chief Minister
83. How many seats are reserved for Scheduled Tribes in the Lok Sabha ?
 (a) 84 (b) 41
 (c) 32 (d) 47
84. Which of the following rights is reserved under the Constitution of India ?
 (a) Right to work
 (b) Right to adequate livelihood
 (c) Right to protect one's culture
 (d) Right to privacy

- 85.** What is the literacy rate of women in India ?
 (a) 54% (b) 76%
 (c) 36% (d) 60%
- 86.** Working capital is
 (a) Computer (b) Generator
 (c) Building (d) Raw material
- 87.** Example of barter exchange is
 (a) purchasing wheat with money
 (b) purchasing fruits with money
 (c) purchasing milk with money
 (d) purchasing sugar with wheat
- 88.** Consumer Protection Act was enacted in India in
 (a) 1986 (b) 1982
 (c) 1984 (d) 1988
- 89.** Suitable measure to compare economic development of two countries is
 (a) Gross Domestic Product
 (b) Gross National Product
 (c) Individual income
 (d) Per capita income
- 90.** Private sector's major objective is to
 (a) provide benefits to public
 (b) provide benefits to government
 (c) earn profits
 (d) serve the people

ANSWERS

MENTAL ABILITY TEST

1. (a)	2. (b)	3. (b)	4. (c)	5. (d)	6. (a)	7. (b)	8. (d)	9. (c)	10. (d)
11. (a)	12. (a)	13. (c)	14. (c)	15. (b)	16. (d)	17. (a)	18. (c)	19. (d)	20. (b)
21. (c)	22. (d)	23. (b)	24. (b)	25. (b)	26. (c)	27. (c)	28. (b)	29. (d)	30. (d)
31. (c)	32. (a)	33. (b)	34. (d)	35. (a)	36. (a)	37. (b)	38. (a)	39. (d)	40. (b)
41. (d)	42. (b)	43. (a)	44. (d)	45. (d)	46. (b)	47. (d)	48. (c)	49. (*)	50. (d)

ENGLISH

1. (b)	2. (c)	3. (a)	4. (d)	5. (a)	6. (c)	7. (d)	8. (b)	9. (a)	10. (c)
11. (a)	12. (b)	13. (b)	14. (d)	15. (a)	16. (c)	17. (d)	18. (d)	19. (b)	20. (a)
21. (d)	22. (b)	23. (c)	24. (a)	25. (b)	26. (d)	27. (c)	28. (b)	29. (c)	30. (b)
31. (b)	32. (a)	33. (d)	34. (b)	35. (b)	36. (a)	37. (b)	38. (d)	39. (a)	40. (b)

SCHOLASTIC APTITUDE TEST

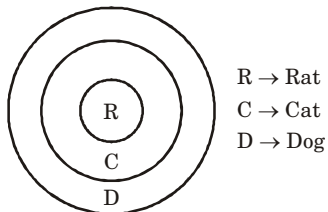
1. (b)	2. (d)	3. (b)	4. (c)	5. (b)	6. (a)	7. (d)	8. (c)	9. (b)	10. (d)
11. (a)	12. (d)	13. (c)	14. (d)	15. (b)	16. (b)	17. (c)	18. (a)	19. (d)	20. (b)
21. (c)	22. (b)	23. (d)	24. (c)	25. (c)	26. (d)	27. (c)	28. (a)	29. (b)	30. (c)
31. (a)	32. (a)	33. (b)	34. (c)	35. (a)	36. (a)	37. (d)	38. (b)	39. (c)	40. (b)
41. (c)	42. (d)	43. (b)	44. (b)	45. (a)	46. (a)	47. (c)	48. (d)	49. (b)	50. (a)
51. (c)	52. (a)	53. (d)	54. (b)	55. (c)	56. (a)	57. (b)	58. (c)	59. (c)	60. (a)
61. (b)	62. (c)	63. (d)	64. (b)	65. (a)	66. (c)	67. (d)	68. (b)	69. (c)	70. (d)
71. (a)	72. (c)	73. (c)	74. (a)	75. (c)	76. (c)	77. (c)	78. (a)	79. (c)	80. (d)
81. (b)	82. (a)	83. (d)	84. (c)	85. (a)	86. (d)	87. (d)	88. (a)	89. (a)	90. (c)

Note : “*” No option is matching

EXPLANATIONS

MENTAL ABILITY TEST

1. A, F, J, M, O
- +5 +4 +3 +2
2. B, D, H, J, N, P, T, V, Z, B
- +2 +4 +2 +4 +2 +4 +2 +4 +2
3. F, O, X, I, Q, V, L, S, T, O, U, R, R, W, P
- +3 +3 +3 +3
- +2 +2 +2 +2
- 2 -2 -2 -2
4. q, p, o, n, m, l, k, j, i
- 3 -3
- 3 -3
- 3 -3
5. 65, 48, 64, 49, 63, 50
6. 7, 23, 47, 79, 199
- +2 +24 +32 +40
7. $(16 \times 1) - (16 \div 2) = 8$
 $(8 \times 2) - (8 \div 2) = 12$
 $(12 \times 3) - (12 \div 2) =$ 30
 $(30 \times 4) - (30 \div 2) = 105$
8. 748, 737, 716, 685, 644, 593
- 11 -21 -31 -41 -51

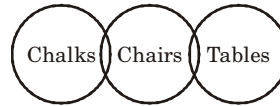


Conclusions

- I. $\checkmark$
II. $\checkmark$

So from the above statements, it is clear that both conclusion I and II are true.

10.



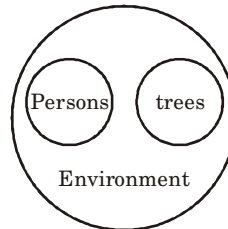
Conclusions

- I. $\times$
II. $\times$

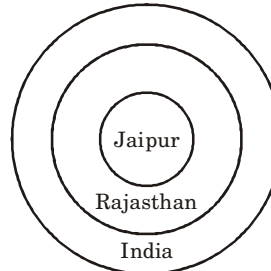
So, it is clear that neither conclusion I nor conclusion II is true.

- 11.** From the given statements, it is clear that conclusion (I), there were rains because without rains the crops will not be good, so the crops were good. And the given conclusion (II) is not related to the given statements (I) and (II). So, only conclusion (I) is true.

12.



13.



So from the given venn diagrams, it is clear that Jaipur is in Rajasthan and Rajasthan is the state of India.

- 14.** The number of literates who are in employment is $= 4 + 6 = 10$
- 15.** From the given diagram, it is clear that the number of men who are married and in service is '6'.

- 16.**
- | | | | | |
|-----|-----|-----|-----|---|
| A | C | E | G | F |
| └─┘ | └─┘ | └─┘ | └─┘ | |
| +2 | +2 | +2 | -1 | |
F	H	J	L	K
└─┘	└─┘	└─┘	└─┘	
+2	+2	+2	-1	
K	M	O	Q	P
└─┘	└─┘	└─┘	└─┘	
+2	+2	+2	-1	
U	W	Y	Z	A
└─┘	└─┘	└─┘	└─┘	
+2	+2	+2	+1	

17. From the given options, it is clear that 125 is the cube of 5.

18. $\frac{28}{4} = 7$

$\frac{35}{5} = 7$

$\frac{63}{7} = 9$

$\frac{56}{8} = 7$

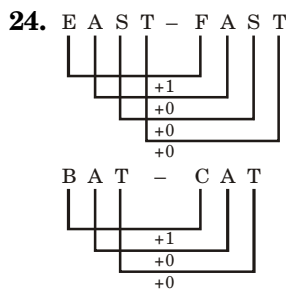
19. Cement, Brick and sand are building material except colour.

20. From the given dice, it is clear that the colour of opposite side of the face having blue colour will be 'Green'.

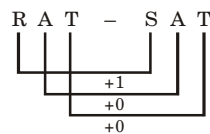
21. From the given figures of dice, it is clear that from option (1), E is opposite to A is not possible because E is adjacent of A, from option (2), also C is opposite of E is not possible and from option (3), it is clear that C is opposite of D.

22. Answer figure (4) of cube is not correctly formed.

23. Answer figure (2) is the correct figures of dice.



Similarly



25. $P = 16$

$NC = 14 + 3 = 17$

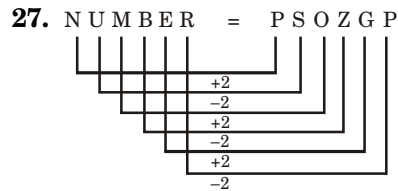
$AEO = 1 + 5 + 15 = 21$

$NEHLA = 14 + 5 + 8 + 12 + 1 = 40$

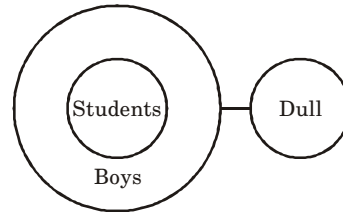
26. The code for colour = 7

pen = 2

So the code for white is '4'.



- 28.

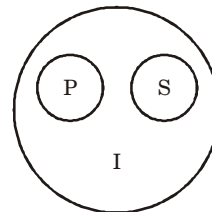


Conclusions

- I. $\times$ II. $\checkmark$

So, from the given statements, it is clear that only conclusion II is true.

- 29.

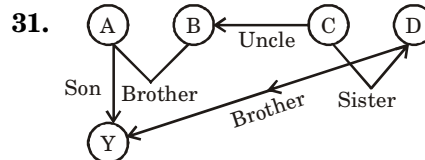


Conclusions

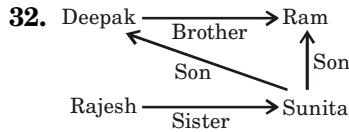
- I. $\times$ II. $\times$

Therefore neither conclusion I nor conclusion II is true.

30. From the given conclusion (I), it is clear that all types of vehicles are available on rent is not possible because only a car is required on rent and also conclusion (II), people will respond to the advertisement is not possible because people will respond to the advertisement only on a car that is required on rent.



From the given relation, it is clear that B is the uncle of C.



So it is clear that Ram is the son of Sunita.

33.
$$\begin{array}{r} 79 \oplus 86 = 6897 \\ \begin{array}{|c|c|c|c|} \hline 4 & 3 & 2 & 1 \\ \hline \end{array} \quad \begin{array}{|c|c|c|c|} \hline 1 & 2 & 3 & 4 \\ \hline \end{array} \end{array}$$

Similarly

$$\begin{array}{r} 53 \oplus 47 = 7435 \\ \begin{array}{|c|c|c|c|} \hline 4 & 3 & 2 & 1 \\ \hline \end{array} \quad \begin{array}{|c|c|c|c|} \hline 1 & 2 & 3 & 4 \\ \hline \end{array} \end{array}$$

34. The numbers are arranged in ascending order

600, 609, 610, 689, 719, 735, 798, 834, 937

Here the mid number = 719

Now the multiplication of digits

$$= 7 \times 1 \times 9 = 63$$

35. Given $P > Q > R > S$

So it is clear that $P > S$.

36. The number of persons in the row
 $= 23 + 15 - 1 = 37$

37. Number of days from 4th day of any month to 27th day of the same month

$$= 27 - 4 = 23 \text{ day}$$

So we have 3 week and 2 days that is there are 3 sundays after 2 days there will Tuesday.

38. Number of days from 3rd January, 2004 to 5th April, 2004

$$= 28 + 29 + 31 + 5$$

(2004 = leap year

February = 29 day)

$$= 93 \text{ days}$$

So there will be 13 week and 2 days, it means there will be 13 Monday and after 2 days, there will be Wednesday.

39. Number of days from 30th March of 1994 to 14th July of 1995 was = 471 days

So, there were 67 week and 2 days mean 67th Friday and 2 days before, it was Wednesday.

40. From the given question it is clear that today is Friday (Monday after 4 days). Now the day it will fall on after 3 days will be Monday.

41. From the given figures answer figure (d) is an odd figure.

42. In the given figures (a), (c) and (d), it is clear that two lines are intersect to each other except figure (b).

43. In the given figures (b), (c) and (d), the length of sides is produced to get arrow except figure (a).

45. Answer figure (d) is different from others.

46. Answer figure (b) is the next figure.

47. In the given sequence, answer figure (d) is the next figure.

48. There are 12 triangles in the given figure.

49. Given answer is not correct.

50. Answer figure (d) is the mirror image of the given problem figure.

SCHOLASTIC APTITUDE TEST

36.
$$\begin{aligned} & \left(\frac{x^b}{x^c} \right)^{\frac{1}{bc}} \cdot \left(\frac{x^c}{x^a} \right)^{\frac{1}{ca}} \cdot \left(\frac{x^a}{x^b} \right)^{\frac{1}{ab}} \\ &= (x^{b-c})^{\frac{1}{bc}} \cdot (x^{c-a})^{\frac{1}{ca}} \cdot (x^{a-b})^{\frac{1}{ab}} \left[\frac{a^m}{a^n} = a^{m-n} \right] \\ &= x^{\frac{b-c}{bc}} \cdot x^{\frac{c-a}{ca}} \cdot x^{\frac{a-b}{ab}} \\ &= x^{\frac{b-c}{bc} + \frac{c-a}{ca} + \frac{a-b}{ab}} \left[x^a \cdot x^b \cdot x^c = x^{a+b+c} \right] \\ &= x^{\frac{ab-ca+bc-ab+ca-bc}{abc}} = x^0 \\ &= 1 \end{aligned}$$

37. The HCF of any two prime numbers a and b is 1.

For example if we take two prime number 3 and 5. Now, the HCF of the given numbers is

$$\begin{array}{r} 3 \overline{)5} 1 \\ \underline{3} \\ 2 \overline{)3} 1 \\ \underline{2} \\ 1 \overline{)2} 2 \\ \underline{1} \\ 1 \overline{)1} 1 \\ \underline{1} \\ 0 \end{array}$$

HCF = 1

38. The total two digit numbers which are divisible by 5 is from 10 to 95.

10, 15, ..., 95.

$$t_n = a + (n-1)d$$

$$95 = 10 + (n-1)5$$

$$\therefore n = 18$$

39. Given roots of the equation is

$$2x^2 + ax + b = 0 \quad \dots(i)$$

If α and β be the roots, then

$$\alpha + \beta = \frac{-a}{2}$$

$$\alpha \cdot \beta = \frac{b}{2}$$

Now if roots are reciprocals to each other, then

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha \cdot \beta} = \frac{\frac{-a}{2}}{\frac{b}{2}} = \frac{-a}{b}$$

$$\frac{1}{\alpha} \cdot \frac{1}{\beta} = \frac{1}{\alpha \cdot \beta} = \frac{2}{b}$$

Now the required equation is

$$x^2 - \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)x + \frac{1}{\alpha \cdot \beta} = 0$$

$$x^2 - \left(\frac{-a}{b} \right)x + \frac{2}{b} = 0$$

$$bx^2 + ax + 2 = 0 \quad \dots(ii)$$

Now the given equation (ii) is compared with equation (i), we get

$$b = 2$$

40. $\sin(A+B) = \sin[90^\circ - (A-B)]$

$$A+B = 90 - (A-B)$$

$$90^\circ = 2A$$

$$\therefore A = 45^\circ$$

Again $\sin(A+B) = \sin[90 + (A-B)]$

$$A+B = 90 + A-B$$

$$\therefore B = 45^\circ$$

So $A+B = 45^\circ + 45^\circ = 90 = \frac{\pi}{2}$

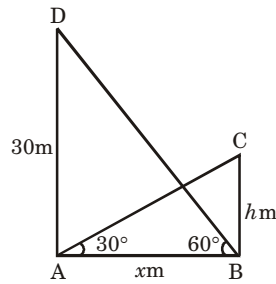
- 41.

$$\sin \theta = 1 - \sin^2 \theta$$

$$\sin \theta = \cos^2 \theta \quad \dots(i)$$

$$\begin{aligned} \text{Now } \cos^2 \theta + \cos^4 \theta &= \cos^2 \theta + (\cos^2 \theta)^2 \\ &= \cos^2 \theta + \sin^2 \theta \\ &= 1 \end{aligned}$$

- 42.



In right angle triangle ABD

$$\tan 60^\circ = \frac{AD}{AB}$$

$$\sqrt{3} = \frac{30}{x}$$

$$x = \frac{30}{\sqrt{3}} \text{ m}$$

Again in right angle triangle ABC

$$\tan 30^\circ = \frac{BC}{AB}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{x}$$

$$\begin{aligned} \therefore h &= \frac{x}{\sqrt{3}} \\ &= \frac{30}{3} \end{aligned}$$

So, the height of the building = 10 m

43. Given equation has no solution, if

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

Now $\frac{3}{2k-1} = \frac{1}{k-1}$

$$3k-3 = 2k-1$$

$$\therefore k = 2$$

44. The sum of first ten even natural numbers

$$S_{10} = \frac{10}{2} [2.2 + (10 - 1)2]$$

$$= 110$$

Now Mean = $\frac{110}{10}$

$$= 11$$

45. If a die is thrown twice, then number of event
 $= 6 \times 6 = 36$

Total event = (6,6), (6,5), (6,4), (6,3), (6,2), (6,1)
 (5,6), (5,5), (5,4), (5,3), (5,2), (5,1)
 (4,6), (4,5), (4,4), (4,3), (4,2), (4,1)
 (3,6), (3,5), (3,4), (3,3), (3,2), (3,1)
 (2,6), (2,5), (2,4), (2,3), (2,2), (2,1)
 (1,6), (1,5), (1,4), (1,3), (1,2), (1,1)

Total numbers whose sum being odd
 $= 18$

Now the probability of the sum beings odd

$$= \frac{18}{36} = \frac{1}{2}$$

46. Given $h_c = h_h$
 $r_c = r_h$

Here r_c and h_c be the radius and height of a cone.

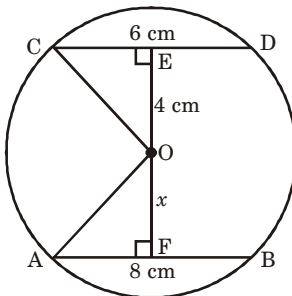
r_h and h_h be the radius and height of a hemisphere.

According to question

$$= \frac{\frac{1}{3} \pi r_c^2 h_c}{\frac{2}{3} \pi r_h^3}$$

$$= \frac{1}{2} = 1 : 2$$

47.



$\triangle OCE$ and $\triangle AFO$ is right angle triangle at $\angle E = 90^\circ$ and $\angle F = 90^\circ$

Here $OC = OA =$ radius of a circle

$$(3)^2 + (4)^2 = x^2 + (4)^2 \quad \left[\begin{array}{l} CE = \frac{CD}{2} \\ \text{and } AF = \frac{AB}{2} \end{array} \right]$$

$$\therefore x = 3 \text{ cm}$$

48. In the given figure, the length of each side of a regular hexagon DEFGHI

$$DE = \frac{BC}{3} = \frac{6}{3} = 2 \text{ cm}$$

Now, the area of the regular hexagon

$$= 6 \times \frac{\sqrt{3}}{4} \times (2)^2 = 6\sqrt{3} \text{ cm}^2$$

49. In $\triangle BCD$

$$\angle DBC + \angle DCB + \angle BDC = 180^\circ$$

$$22^\circ + 78^\circ + \angle BDC = 180^\circ$$

$$\therefore \angle BDC = 80^\circ$$

$$\text{since } \angle BAC = \angle BDC$$

$$\therefore \angle BAC = 80^\circ$$

50. ABC is an equilateral triangle with side length = $2\sqrt{3}$ cm

$$\text{So, } AB = BC = AC = 2\sqrt{3} \text{ cm}$$

Also D, E and F is the midpoints of the sides AB, BC and AC. So the length of sides DE, EF and DF is

$$DE = EF = DF = \frac{2\sqrt{3}}{2} = \sqrt{3} \text{ cm}$$

Since DEF is an equilateral triangle with side is $\sqrt{3}$ cm. and an equilateral triangle DEF is inside the given circle.

So, the circum radius of the given circle is

$$R = \frac{a}{\sqrt{3}}$$

$$R = \frac{\sqrt{3}}{\sqrt{3}} = 1 \text{ cm}$$

Now the area of the shaded region

$$\begin{aligned}
 &= \text{Area of the given circle} \\
 &\quad - \text{Area of an equilateral triangle DEF} \\
 &= \left(\pi(1)^2 - \frac{\sqrt{3}}{4} \times (\sqrt{3})^2 \right) \text{ cm}^2 \\
 &= \pi - \frac{3\sqrt{3}}{4} \text{ cm}^2 \\
 &= \frac{1}{4} (4\pi - 3\sqrt{3}) \text{ cm}^2
 \end{aligned}$$

51. According to question

volume of a cylinder = $n \times$ volume of a sphere

$$\pi(3)^2 \times 10 = n \times \frac{4}{3} \times \pi \times \left(\frac{1}{2}\right)^3$$

$$\therefore n = 540$$

So, the number of spheres is 540

53. Here the mid-point of (7, -5) and (3, -7)

$$= \left(\frac{7+3}{2}, \frac{-5-7}{2} \right) = (5, -6)$$

Slope of perpendicular bisector = -2

Equation of perpendicular bisector

$$y + 6 = -2(x - 5)$$

$$2x + y = 4 \quad \dots(i)$$

Also the mid-point of (3, -7) and (3, 3)

$$= \left(\frac{3+3}{2}, \frac{-7+3}{2} \right) = (3, -2)$$

$$\text{slope} = \frac{3+7}{0} = \infty$$

Slope of perpendicular bisector = 0

Equation of perpendicular bisector

$$y + 2 = 0(x - 3)$$

$$y = -2 \quad \dots(ii)$$

From equation (i)

$$x = 3$$

So the centre of the given circle is (3, -2)

54. In the given figure, $\angle CDO = \angle ABO = 80^\circ$

Also $\angle AOB + \angle BOC = 180^\circ$

$$\therefore \angle AOB = 180^\circ - 115^\circ = 65^\circ$$

Now in DABO

$$\angle ABO + \angle AOB + \angle OAB = 180^\circ$$

$$\therefore \angle OAB = 180^\circ - (80^\circ + 65^\circ) = 35^\circ$$

55. $\tan(90^\circ - 47^\circ) \cdot \tan 45^\circ \tan 47^\circ$

$$= \cot 47.1. \tan 47^\circ$$

$$= 1 \quad (\tan \theta \cdot \cot \theta = 1)$$

■■

NTSE - 2014

MADHYA PRADESH

PART I : MENTAL ABILITY TEST

Directions(Q.1–5): In each question there is a number series with one term missing shown by question mark (?). This term is one of the alternative given. Choose that number

1. 260, 216, 128, 108, 62, 54, ?, 27
(a) 19 (b) 29
(c) 39 (d) 49
2. 7, 15, 32, ?, 138, 281
(a) 87 (b) 77
(c) 67 (d) 57
3. 3, 8, 18, 23, 33, ?, 48
(a) 37 (b) 38
(c) 40 (d) 45
4. 2, 12, 36, 80, 150, ?
(a) 194 (b) 210
(c) 242 (d) 252
5. 36, 30, 24, 18, ?
(a) 12 (b) 11
(c) 22 (d) 21

Directions(Q.6–10) : In each of the following questions, there is a question mark in blank space and it is only one of the four alternatives given under the question which statisifies the same relationship as is found between the two letters to the left of the sign :: given in the question. Find the correct alternatives

6. LJH : KKI :: CIA : ?
(a) BJB (b) BBB
(c) DBB (d) BBZ
7. EJOT : VQLG :: BGLQ : ?
(a) ZUPK (b) YTOJ
(c) AFKP (d) AEIM
8. NUMBER : UNBMRE :: GHOST : ?
(a) HOGST (b) HOGTS
(c) HGOST (d) HGSOT

9. LUX : 57 :: SIT : ?

(a) 42 (b) 44
(c) 46 (d) 48

10. MUMBAI : LTLAZH :: DELHI : ?

(a) CDKGG (b) CDKGH
(c) IHLED (d) BCKGH

11. In a certain code, ROUNDS is written as RONUDS. How is PLEASE written in that code ?

(a) LPAESE (b) LPAEES
(c) PLAESE (d) PLASEE

12. In a certain code, VACATE is written as AVACET. How is LITERATE written in that code ?

(a) ILETRAET (b) ILTEARTE
(c) ILTREATE (d) ILETARET

13. If in the word RECRUITMENT the first letter is interchanged with the last letter, the second letter is interchanged with the second last letter and so on. Which letter would come after I in the newly formed word.

(a) E (b) M
(c) U (d) E

14. If the position of the third and tenth letters of the word DOCUMENTATION are interchanged and likewise the position of the fourth and seventh letters, the second and sixth letters is also interchanged, which of the following will be eleventh letter from the right end ?

(a) U (b) C
(c) T (d) I

15. Harish is 40 years old and Rais is 60 years old. How many years ago was the ratio of their ages 3 : 5 ?

(a) 5 years (b) 10 years
(c) 20 years (d) 30 years

16. A can do a certain job in 12 days. B is 60% more efficient than A. How many days does B alone take to do the same job ?

- (a) $5\frac{1}{2}$ (b) $6\frac{1}{2}$
(c) $7\frac{1}{2}$ (d) $8\frac{1}{2}$

17. In a mixture of 30 litres, the ratio of milk and water is 2 : 1. If this ratio is to 1 : 2, then the quantity of water to be further added is -

- (a) 5 litre (b) 10 litre
(c) 20 litre (d) 30 litre

Directions(Q.18–19) : In the following questions, some relationships have been expressed through symbols which are explained below

- $\times$ = Greater than
 Δ = Not less than
 $\div$ = Not equal to
 ϕ = Equal to
 $+$ = Not greater than
 $\square$ = Less than

In each question find the correct answer based on these signs.

18. If $a \times b \Delta c$, it follows

- (a) $b \phi a \times c$
(b) $a \Delta b + c$
(c) $c + b \square a$
(d) $b \Delta a \phi c$

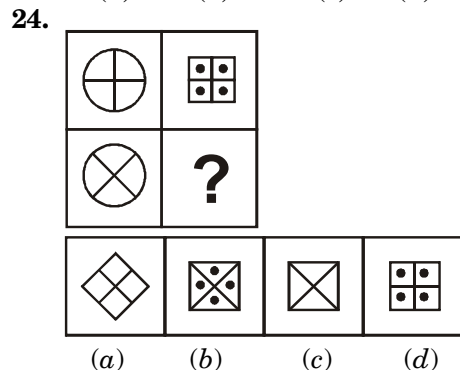
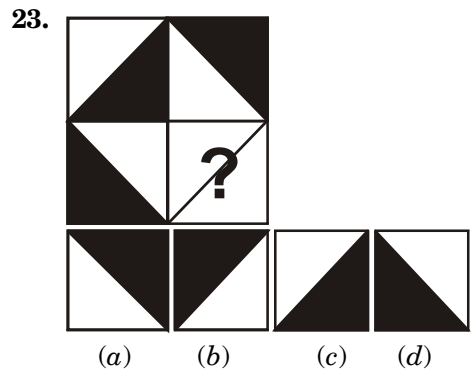
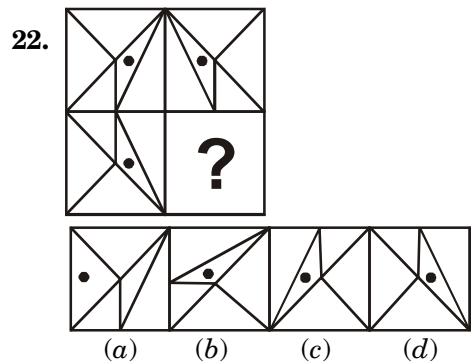
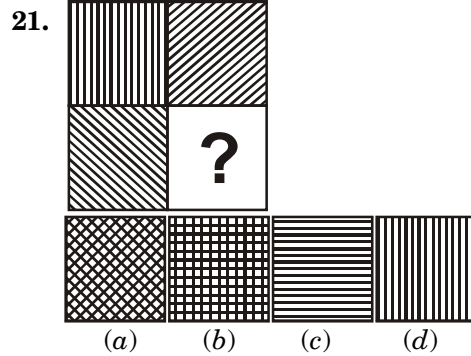
19. If $a \times b \times c$, it does not imply

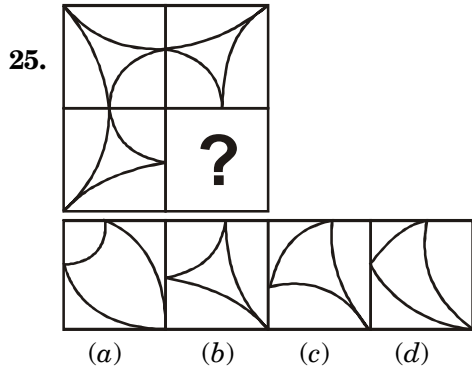
- (a) $b \times a \phi c$
(b) $c \times b \Delta a$
(c) $a \div c \times b$
(d) $b + a \square c$

20. How many natural numbers are there between 23 and 100 which are exactly divisible by 6 ?

- (a) 10 (b) 11
(c) 12 (d) 13

Directions(Q.21–25): In each of the following question, complete the missing segment by selecting from the given four (A, B, C, D) alternatives.

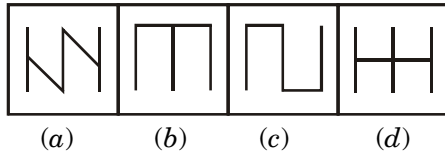




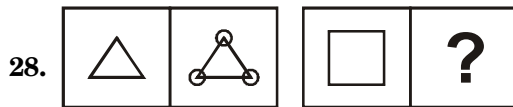
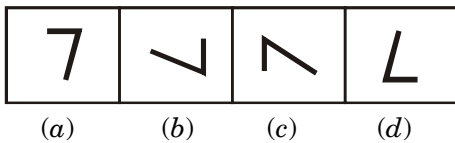
Directions(Q.26–30): The first two figures bear a definite relation with each other. Bearing that relation in mind pickup the fourth figure from the answer figures.



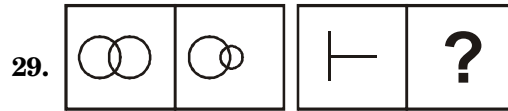
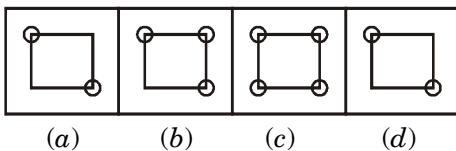
Answer figures



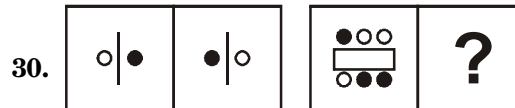
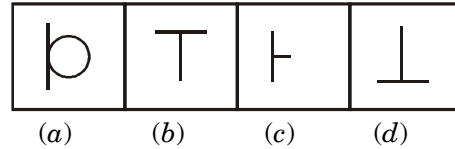
Answer figures



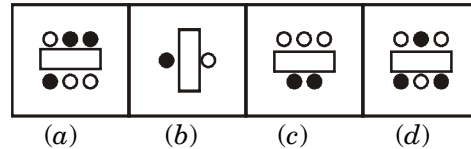
Answer figures



Answer figures



Answer figures



31. While climbing a tower with 180 steps, a man rests after every 30 steps for 2 minutes. How long did he rest before reaching the top ?

- (a) 10 minutes (b) 12 minutes
(c) 18 minutes (d) 15 minutes

32. In a party 100 students shake hands with each and every other student. How many hand shakes will there be ?

- (a) 2000 (b) 4000
(c) 4950 (d) 9900

33. If 1 January 2012 falls on Sunday which day will be 1 December 2012

- (a) Sunday (b) Saturday
(c) Friday (d) Thursday

34. Which of the following cannot be the first day of a century year ?

- (a) Monday (b) Tuesday
(c) Wednesday (d) Thursday

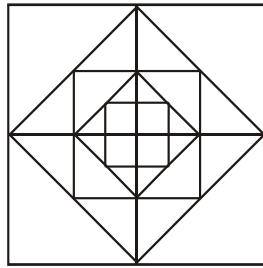
35. A clock is set right at 5 am. The clock loses 16 minutes in 24 hours. What will be the true time when the clock indicates 10 pm on 4th day ?

- (a) 9 pm (b) 10 pm
(c) 11 pm (d) 12 pm

36. Which of the following angles is made between the two numbers of a clock ?

- (a) 40° (b) 30°
(c) 20° (d) 10°

37. Count the number of squares in the given figure.

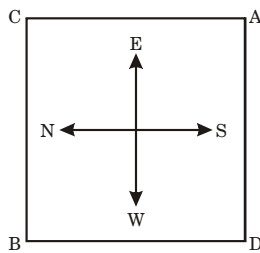


- (a) 13 (b) 15
(c) 16 (d) 17

38. The sum of all the numbers from 1 to 12 (including 1 and 12 too).

- (a) 84 (b) 78
(c) 72 (d) 60

Directions(Q.39–40): Given question are based on the following figure showing four persons at the four corners of a square piece of plot. Find the correct answer from among the alternatives given under each question.



39. A starts crossing the field diagonally. After walking half the distance he turns right, walks some distance and turns left. Which direction is A facing now ?

- (a) North-East (b) North- West
(c) South-East (d) South-West

40. From the original position in the figure, D and B move one and a half length of sides clockwise and anticlockwise respectively. Which one of the following statement is true?

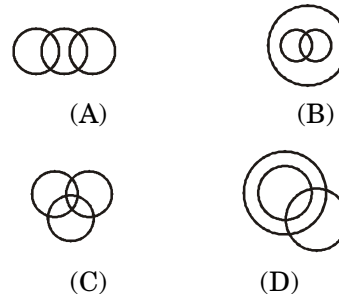
(a) B and D are both at the midpoint between A and C

(b) D is at the midpoint between A and C, and B at the corner originally occupied by A

(c) B and D are both at the midpoint between A and D

(d) B is at the midpoint between A and original position of D and D at the midpoint between original position of B and C.

Directions (Q.41–45): Each of the following questions given below contains three groups of things. You are to choose from the following four lettered (A, B, C and D) diagrams, the one that depicts the correct relationship among the groups of things in each question.



41. Tennis fans, Cricket players, Students

42. Flowers, Clothes, White

43. Human beings, Teachers, Graduates

44. Males, Fathers, Doctors

45. Authors, Teachers, Male

46. X is brother of Y. B is brother of Y. X is brother of D but N is not brother of D. How Y is related to D ?

- (a) Sister (b) Brother
(c) Cousin (d) Nephew

47. Pointing towards a man another man said, he is the son of my father's sister. Then what is the relation between them?

- (a) Father-Son
(b) Brother
(c) Cousin
(d) Uncle-Nephew

48. $34.95 + 240.016 + 23.98 = ?$
 (a) 298.0946 (b) 298.11
 (c) 299.09 (d) 298.946
49. The sum of the present ages of a father and his son is 60 years. Six years ago, father's age was five times the age of the son. After six years, son's age will be
 (a) 12 years (b) 14 years
 (c) 18 years (d) 20 years
50. Bablu has ₹ 480 in the denominations of one rupee notes, five rupee notes and ten rupee notes. The number of notes of each denomination is equal. What is the total no. of notes that he has ?
 (a) 45 (b) 90
 (c) 60 (d) 75

PART II : ENGLISH

Directions(Q.1-6): Choose the word which best fills the blank from the four options given

- The country..... its highest medal on the war hero
 (a) donated (b) bestowed
 (c) handed over (d) delivered
- The of the criminal ended in a three month police chase.
 (a) kidnapping (b) abduction
 (c) seizure (d) grasping
- Leh is very beautiful, I've to visit this place once in a year
 (a) resolved (b) resolution
 (c) determination (d) elucidated
- Homophones are words that.....
 (a) rhyme
 (b) sound alike
 (c) mean the same thing
 (d) mean the opposite
- As night..... people crawled into the camping sites
 (a) arrived (b) came down
 (c) descended (d) moved
- Shomu, my neighbour's son, is a
 (a) danger (b) menace
 (c) evil (d) mischief

Directions (Q. 7-11) : Select the meaning of the given phrases / idioms.

- Poke one's nose in (to)
 (a) interfere
 (b) interval
 (c) clean the nose
 (d) surgery of the nose
- a heat of gold
 (a) very costly (b) very kind
 (c) very tough (d) very soft
- to put up with
 (a) to wear clothes
 (b) to make someone feel small
 (c) to tolerate
 (d) to communicate
- (an) old hand
 (a) a wrinkled person
 (b) an experienced person
 (c) an aged person
 (d) an intelligent person
- wild goose chase
 (a) futile search
 (b) run here and there
 (c) chase the target
 (d) help somebody

Directions (Q.12-14) : Select the word which means the opposite of the given words.

- sane
 (a) sensible (b) insane
 (c) unsane (d) saint
- create
 (a) make (b) destroy
 (c) stop (d) cease
- flimsy
 (a) sturdy (b) thin
 (c) weak (d) fling

Directions(Q.15-19): Select the most appropriate option to fill in the blanks from the given alternatives.

- I am looking more free time.
 (a) to have
 (b) forward to having
 (c) for having
 (d) forward to have

16. The child smiled and went out.
 (a) sweetly (b) sweet
 (c) loudly (d) happy
17. The dress you were wearing yesterday was very indeed.
 (a) who (b) what
 (c) that (d) whom
18. Just then, somebody into me quite roughly.
 (a) had bumped
 (b) was bumping
 (c) bumping
 (d) bumped
19. Bhopal is than most of the cities in Madhya Pradesh.
 (a) coldest (b) as cool as
 (c) cooler (d) more cooler

Directions (Q.20–27): In the following passage there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the given options.

The Delhi Police (20) issued the following description of a man who was last (21) in (22) Kwaliti Restaurant on Parliament Street. The man is (23) 45, 5'8" tall with a thick moustache and a big scar (24) his left eye. Two witnesses who saw him (25) the restaurant last night (26) that he was wearing a dark suit and (27) an umbrella.

20. (a) has (b) have
 (c) was (d) had
21. (a) seen (b) see
 (c) saw (d) to see
22. (a) a (b) some
 (c) any (d) the
23. (a) about (b) of
 (c) about to (d) into
24. (a) over (b) in
 (c) behind (d) in front of
25. (a) to leave (b) left
 (c) leaving (d) was left

26. (a) reported (b) reports
 (c) report (d) has reported
27. (a) carry (b) carried
 (c) carries (d) carrying

Directions (Q. 28–32) : Read the following passage and answer the questions given after it.

Speech is a great blessing but can also be a great curse, for it helps us to make our intentions and desires known to our fellows, it can also, if we use it carelessly, make our attitude completely misunderstood. A slip of tongue, the use of unusual word, or of an ambiguous word, and so on, may create an enemy where we had hoped to win a friend. Again different classes of people use different vocabularies, and the ordinary speech of an educated person may strike an uneducated listener as pompous. Unwittingly, we may use a word which bears a different meaning to our listener from what it does to men of our own class. Thus speech is not a gift to be used lightly without thought, but one which demands careful handling. Only a fool will express himself alike to all kinds of conditions and men.

28. Speech if used carelessly can
 (a) become a blessing
 (b) create misunderstanding
 (c) help us to make friends
 (d) make others happy
29. Only will use the same kind of language with everyone.
 (a) an uneducated person
 (b) a sensible person
 (c) a foolish person
 (d) an intelligent person
30. A 'slip of tongue' refers to
 (a) something said accidentally.
 (b) something said to hurt others.
 (c) something said wrongly on purpose.
 (d) something said to comfort others.

31. The ordinary speech of an educated person may sound to an uneducated person

- (a) verbose (b) boring
(c) foolish (d) pompous

32. The gift of speech should be used

- (a) thoughtlessly
(b) carefully
(c) ambiguously
(d) carelessly

Directions (Q. 33-37) : Read the passage and answer the questions given below it.

Mark Twain, who had earned a reputation as a humour writer, got an invitation to address a public meeting. He reached that city on the day of the meeting. He felt that his programme had not sufficiently been publicised. There were not many posters either on the city walls or in the area near the railway station. He decided to find out if the citizens had ample knowledge of his programme. So he went to a shop.

He asked at the shop's counter, "Brother, is there any interesting programme in the city, where a traveller could spend his evening usefully and relax?"

"I think there is some lecture in the evening", the shopkeeper replied in comforting tone.

"On what basis have you reached the surmise?"

"I will tell you that, today we have had a tremendous sale of eggs," said the shopkeeper and busied himself in work.

33. 'basis' here best means

- (a) have information
(b) knowledge of something
(c) reason for saying something
(d) an important fact or idea

34. Mark Twain was invited to address

- (a) ordinary people
(b) political leaders
(c) social workers
(d) writers of the city

35. He thought that his programme was not advertised much because

- (a) there were not a lot of posters on the city walls or in the area near the bus station
(b) nobody recognised him in the city
(c) nobody came to receive him
(d) there were few posters on the city walls, or in the area near the railway station.

36. He asked the shopkeeper whether there is any interesting programme in the city that day because

- (a) he wanted to know if the people in the city were aware of his programme
(b) he wanted to attend that programme
(c) he wanted to relax there
(d) he wanted to know about the city as he was new there

37. The shopkeeper came to the conclusion that there was some lecture in the evening because

- (a) there were many posters on the walls of the city
(b) of the heavy sale of eggs that day at his shop
(c) he was told about this by Mark Twain himself
(d) he himself got an invitation to attend the lecture

Directions (Q.38-39): The following five sentences come from a paragraph. The first and the last sentences are given, Choose the order in which the three sentences (PQR) should appear to complete the paragraph.

38. S1: At last the great morning arrived and crowds assembled to see the 'Taking of the Seat'.

S2 : _____

S3 : _____

S4 : _____

S5 : When he had done this, however, and was just about to sit down, one of the twenty five stone angels began to speak.

P : Then, as he reached the Throne of Judgement, they parted into two lines

Q : Pacing through the long hall came the judges and priests of the kingdom, followed by the sovereign.

R : And he walked up in the middle and went up close to the marble slab.

Choose from the options below

- (a) PQR (b) QPR
(c) RPQ (d) RQP

39. S1 : This is a known fact that animals are necessary for maintaining ecological balance

S2 : _____

S3 : _____

S4 : _____

S5 : The extinction of these animals will lead to an ecological disaster and the very survival of the human beings will be threatened.

P : But for centuries, man has been capturing and killing animals to appease his greed and commercial interest.

Q : The years of ruthless killing have left number of several species of animals severely depleted.

R : Thus many species of animals which once roamed the earth have become extinct.

Choose from the options below

- (a) RQP (b) QRP
(c) PRQ (d) PQR

40. The following question has the second sentence missing. Choose the appropriate sentence from the given options to complete it.

- A. Rickets is a common disease among the children
B. _____
C. The places with dense fog do not get sufficient light

(a) It is perhaps because their bodies are covered with more clothes during winter

(b) The disease is more common in winter

(c) It occurs in those children who are never exposed to the sun

(d) However, there are many reasons for this disease apart from lack of exposure to the sunlight.

PART III

SCHOLASTIC APTITUDE TEST

PHYSICS

1. Unit of frequency is

- (a) Cycle/sec² (b) Cycle/sec³
(c) Cycle/sec⁴ (d) Hertz

2. One electron volt is equal to

- (a) 1.6×10^{-19} Joule
(b) 16×10^{-19} Joule
(c) 1.6×10^{-10} Joule
(d) 1.6×10^{-9} Joule

3. Power of a lens is measured in.....

- (a) Meter (b) Centimeter
(c) Kilometer (d) Diopter

4. Correct relation is

- (a) $v^2 = u^2 + 2a^2s^2$ (b) $v^2 = u^2 - 2a^2s^2$
(c) $v^2 = u^2 + 2as$ (d) $v^2 = u^2 + 2a^2s$

5. If the velocity of a wave is 400 m/sec and frequency is 100 Hz, then the wavelength of the wave is

- (a) 6 m (b) 2.8 m
(c) 3 m (d) 4 m

6. According to Newton's Second law of Motion-

- (a) $f = m \times v$ (b) $f = m \times a$
(c) $f = \frac{m}{a}$ (d) $f = \frac{m}{v}$

7. Relation between mass of body and its weight is.....

- (a) $w = mg$ (b) $w = \frac{m}{g}$
(c) $g = m - w$ (d) $w = m + g$

8. When we rub our hands, which of the following is true ?
 (a) Kinetic energy converted to heat energy
 (b) Heat energy converted to mechanical energy
 (c) Mechanical energy converted to heat energy
 (d) Heat energy converted to kinetic energy
9. Correct relation is
 (a) 1 Horse power = 746 W
 (b) 2 Horse power = 746 W
 (c) 1 Horse power = 740 W
 (d) 1 Horse power = 373 W
10. The kinetic energy of an object is K. If its velocity is doubled, then its kinetic energy will be.....
 (a) K (b) 2K
 (c) 4K (d) $\frac{K}{4}$
11. Frequency of Ultrasonic waves is
 (a) less than 20,000 Hz
 (b) greater than 20,000 Hz
 (c) less than 20 Hz
 (d) 1000Hz
12. Which is the important constituent (95%) of natural gas ?
 (a) Methane (b) Propane
 (c) Ethane (d) Chlorine
13. Structure of nuclei of three atoms X, Y and Z are as follows :
 A. X has 90 Protons and 146 Neutrons
 B. Y has 92 Protons and 146 Neutrons
 C. Z has 90 Protons and 148 Neutrons
 Which of the following statement is correct based on above data ?
 (a) X and Z are isotopes; Y and Z are isobars
 (b) X and Y are isotopes; X and Z are isobars
 (c) Y and Z are isobars; X and Y are isotopes
 (d) X and Z are isotopes; X and Y are isobars
14. Electron was discovered by.....
 (a) Chadwick (b) Rutherford
 (c) Thomson (d) Niel's Bohr
15. An acid, obtained by destructive distillation of wood, which in turn gives acetic acid is
 (a) Oxalic acid
 (b) Pyroligneous acid
 (c) Chloro acetic acid
 (d) Citric acid
16. The reagent obtained by dissolving Copper sulphate in aqueous solution of Citric acid and Sodium carbonate is.....
 (a) Bayer's reagent
 (b) Tollen's reagent
 (c) Fehling reagent
 (d) Benedict reagent
17. The bond, in compound formed from combination of 14 group and 17 group elements of Periodic table will be
 (a) Electrovalent bond
 (b) Co-ordinate bond
 (c) Van der Waals bond
 (d) Covalent bond
18. Which of the following is thermoresistant polymer ?
 (a) Orlon (b) Polythene
 (c) Teflon (d) Bakelite
19. Aluminium ore is
 (a) Haematite (b) Dolomite
 (c) Bauxite (d) Calamine
20. When Sodium carbonate (Na_2CO_3) reacts with Silica (SiO_2) gives.....
 (a) Soda glass (b) Water glass
 (c) Crook's glass (d) Pyrex glass
21. In Haber process of Ammonia production, the element used as catalytic promotor to increase the activity of Iron catalyst is
 (a) Ni (Nickel)
 (b) W (Tungston)
 (c) V (Vanadium)
 (d) Mo (Molybednum)

CHEMISTRY

22. In order to decrease the rate of setting of Cement, which compound is mixed in it ?
 (a) $\text{Ca}(\text{OH})_2$ (Slaked lime)
 (b) CaCO_3 (Calcium Carbonate)
 (c) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (Gypsum)
 (d) Al_2O_3 (Alumina)
23. Which element forms maximum multiple bonds ?
 (a) N (b) P
 (c) As (d) Bi

BIOLOGY

24. Which scientist discovered "Tricarboxylic acid" ?
 (a) Krab
 (b) Watson and Crick
 (c) Sanger
 (d) Edison
25. Which nitrogen base is absent in D.N.A ?
 (a) Adenine (b) Guanine
 (c) Uracil (d) Cytosine
26. Fossils are found in
 (a) Igneous rocks
 (b) Sedimentary rocks
 (c) Metamorphic rocks
 (d) All of the above
27. Chlorophyll contains
 (a) Potassium (b) Iron
 (c) Manganese (d) Magnesium
28. In plants "Auxin" is used for
 (a) Division of cell
 (b) Ripening of fruits
 (c) Root growth inhibition
 (d) Elongation and division of cell
29. Botanical name of Amla is
 (a) *Ocimum sanctum*
 (b) *Phyllanthus emblica*
 (c) *Saraca indica*
 (d) *Ficus bengalensis*
30. Bicuspid valve is present in the human heart in between which of the following?
 (a) Right auricle and right ventricle
 (b) Left auricle and left ventricle
 (c) Right and left auricle
 (d) Left auricle and systemic aorta

31. Which is a prokaryotic cell, amongst the following ?
 (a) Amoeba (b) Bacteria
 (c) Yeast (d) Euglena
32. Excretory organs of Earthworm are
 (a) Malpighian tubules
 (b) Nephridia
 (c) Kidneys
 (d) Flame cells
33. Which hormone is not found in plants?
 (a) Gibberellin (b) Auxin
 (c) Cytokinin (d) Glucagon
34. Example of omnivorous animals is-
 (a) Sheep (b) Deer
 (c) Lion (d) Cockroach
35. Which of the following is an example of Insectivorous plant-
 (a) *Cuscuta* (b) *Rafflesia*
 (c) *Drosera* (d) *Tulsi*

HISTORY

36. Which pillar in inscription describes about 'Samudragupta' ?
 (a) Prayag Prashasti
 (b) Girinar Prashasti
 (c) Mehroli Prashasti
 (d) Sarnath Prashasti
37. Which epic describes about the 'Indraprasth Nagar' ?
 (a) Ramayan
 (b) Mahabharata
 (c) Rigveda
 (d) Mudra Rakshasa
38. The War of Tarain was fought among
 (a) Shivaji and Jai Singh
 (b) Prithviraj Chouhan and Mohammad Gouri
 (c) Mohammad Gouri and Jai Singh
 (d) Prithviraj Chouhan and Ghajnavi
39. Which state was established by Harihar I and Bukha ?
 (a) Raj Nagar
 (b) Shri Nagar
 (c) Vijay Nagar
 (d) Chandra Nagar

40. Who wrote Ramcharit Manas ?
 (a) Ramdas (b) Surdas
 (c) Haridas (d) Tulsidas
41. Hiuen sang came in the period of
 (a) Raj Vardhan
 (b) Harsha Vardhan
 (c) Bali Vardhan
 (d) Shri Vardhan
42. Jungle Satyagraha happened in
 (a) Seoni district
 (b) Rewa district
 (c) Bhopal district
 (d) Indore district
43. After independence, who was the pioneer of Integration of States ?
 (a) Sardar Patel
 (b) Jawaharlal Nehru
 (c) Mahatma Gandhi
 (d) Dr. Rajendra Prasad
44. Which Article of the Constitution of India gives special status to Jammu and Kashmir ?
 (a) Article 365 (b) Article 370
 (c) Article 375 (d) Article 380
45. Red Fort was built by
 (a) Babar (b) Akbar
 (c) Shahjahan (d) Aurangzeb
49. Tata Iron and Steel Company (TISCO) is located in.....
 (a) Jamshedpur (b) Rourkela
 (c) Bhilai (d) Bhopal
50. Which of the following river is not a tributary of Ganges ?
 (a) Yamuna (b) Ghaghra
 (c) Gandak (d) Satluj
51. Write the factor that does not help in the formation of soil
 (a) Wind and water
 (b) Decomposed plants and animals
 (c) Rocks and temperature
 (d) Water accumulation
52. Kaziranga National Park is located in which state ?
 (a) Kerala
 (b) Assam
 (c) West Bengal
 (d) Madhya Pradesh
53. Blue revolution is related to
 (a) Fruit production
 (b) Fish production
 (c) Sheep rearing
 (d) Milk production
54. Ganges of Southern India is
 (a) Narmada (b) Krishna
 (c) Kaveri (d) Godavari
55. World Population Day is celebrated every year on
 (a) 11 July (b) 5 June
 (c) 8 March (d) 8 December

GEOGRAPHY

46. Which of the following is not a radioactive element ?
 (a) Uranium (b) Thorium
 (c) Strontium (d) Platinum
47. Which of the following gas is responsible for 'Global-Warming' ?
 (a) Methane (b) Ozone
 (c) Carbon-dioxide (d) Nitrogen
48. According to Census 2011, the number of females per thousand males is
 (a) 950 (b) 943
 (c) 940 (d) 942

CIVICS

56. In which year, Right to Information was enacted in India ?
 (a) 2000 (b) 2001
 (c) 2004 (d) 2005
57. Indian Constitution was formulated by
 (a) Drafting Committee
 (b) Constitutional Assembly
 (c) Simon Commission
 (d) Lok Sabha

58. How many members are there in the Election Commission of India ?
 (a) 1 (b) 2
 (c) 3 (d) 5
59. 'Right to Freedom' is related to which article ?
 (a) Article - 14 (b) Article - 16
 (c) Article - 19 (d) Article - 20
60. Who presides over the meeting of 'Council of Ministers' in India ?
 (a) President
 (b) Vice President
 (c) Prime Minister
 (d) None of these
61. Main objective of Political Parties is
 (a) To get power
 (b) To criticize
 (c) To support
 (d) Formulation of public opinion
62. Who said "Democracy is the Government, of the people, by the people and for the people" ?
 (a) Abraham Lincoln
 (b) George Washington
 (c) Mahatma Gandhi
 (d) Rajendra Prasad
63. When was the voting age reduced from 21 years to 18 years in India ?
 (a) 1977 (b) 1980
 (c) 1985 (d) 1990
64. Distribution of powers between the Centre and States is mentioned in which schedule ?
 (a) I (b) III
 (c) V (d) VII
65. The right to provide free and compulsory education to the children in the age group of 6 to 14 has been provided in which article ?
 (a) 20 A (b) 21 A
 (c) 22 A (d) 23 A

ECONOMICS

66. Under the capitalistic economy, the factors of production are owned by
 (a) Government
 (b) Private individuals
 (c) Both
 (d) None of the above
67. Minimum Support Price is related to the
 (a) Agricultural sector
 (b) Industrial sector
 (c) Service sector
 (d) None of the above
68. The Reserve Bank of India was established in the year
 (a) 1947 (b) 1951
 (c) 1935 (d) 1969
69. The duration of the First Five Year Plan of India was
 (a) 1947-1952 (b) 1950-1955
 (c) 1955-1960 (d) 1951-1956
70. The concept of Poverty Line was first given in India by
 (a) Dr. Manmohan Singh
 (b) Dr. Dandekar
 (c) Dr. Amartya Sen
 (d) Mahatma Gandhi

MATHEMATICS

71. Simple form of $\frac{\sqrt{5}-2}{\sqrt{5}+2} + \frac{\sqrt{5}+2}{\sqrt{5}-2}$ is
 (a) $9 + \sqrt{5}$ (b) 18
 (c) $18 + \sqrt{5}$ (d) 9
72. If $\sqrt{b} = 3a$, then $\frac{a^2}{b} = ?$
 (a) $\frac{a^2}{3a}$ (b) $\frac{1}{9}$
 (c) 9 (d) $\frac{b}{3a}$

73. The total number of symmetry axis for a square is

- (a) 1 (b) 2
(c) 3 (d) 4

74. Simple form of $\frac{1}{3 - \frac{1}{2 - \frac{1}{7}}}$ is

- (a) $\frac{13}{32}$ (b) $\frac{32}{13}$
(c) $\frac{7}{13}$ (d) $\frac{13}{7}$

75. Factors of polynomial $x^2 + 15x - 3250$ will be

- (a) $(x - 50)(x + 35)$
(b) $(x - 65)(x + 50)$
(c) $(x - 50)(x - 35)$
(d) $(x + 65)(x - 50)$

76. The value of the following is :

$$\frac{(0.44)^2 + (0.06)^2 + (0.024)^2}{(0.044)^2 + (0.006)^2 + (0.0024)^2}$$

- (a) 0.100 (b) 0.01
(c) 100 (d) 1

77. The product of two numbers is 110 and the sum of their squares is 264, then the sum of these numbers will be ...

- (a) 22 (b) 24
(c) 20 (d) 28

78. If two chords of a circle are equidistance from the centre of the circle, then they are

- (a) Equal to each other
(b) Not equal to each other
(c) Intersect each other
(d) None of these

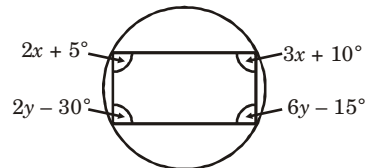
79. If $A : B = 1 : 2$, $B : C = 3 : 4$, $C : D = 5 : 6$, then value of $A : D$ will be

- (a) $\frac{5}{8}$ (b) $\frac{8}{5}$
(c) $\frac{5}{16}$ (d) $5 : 16$

80. $\sqrt{\frac{1 - \sin \theta}{1 + \sin \theta}}$ is equal to

- (a) $\operatorname{cosec} \theta - \cot \theta$ (b) $\tan \theta - \sec \theta$
(c) $\sec \theta - \tan \theta$ (d) $\cot \theta - \operatorname{cosec} \theta$

81. In the given figure, the values of x and y are



- (a) $x = 60^\circ, y = 12^\circ$
(b) $x = 60^\circ, y = 10^\circ$
(c) $x = 12^\circ, y = 60^\circ$
(d) $x = 50^\circ, y = 20^\circ$

82. The value of

$$\sin 12^\circ \cos 78^\circ + \cos 12^\circ \sin 78^\circ \text{ is } \dots\dots\dots$$

- (a) 0 (b) 1
(c) -1 (d) None of these

83. Five years ago the sum of ages of the father and the son was 40 years. In present it's ratio is 4 : 1, then the present age of father is

- (a) 30 years (b) 40 years
(c) 45 years (d) 42 years

84. The marks of 10 students in a certain subject in a class are 20, 19, 50, 48, 50, 36, 35, 50, 40, 40. The mean and mode are respectively as

- (a) 40, 50 (b) 50, 40
(c) 40, 35 (d) 35, 40

85. The sum of the squares of two consecutive natural numbers is 313. Then the numbers will be

- (a) 12, 13 (b) 13, -12
(c) 12, -13 (d) -12, -13

86. The sum of two numbers is 100 and one number is two less than twice the other number. Then the numbers are

- (a) 34, 66 (b) 24, 76
(c) 44, 56 (d) 46, 54

87. $(ab + bc + ca)$ can be expressed as

(a) $abc(a + b + c)$ (b) $ab(a + c)$

(c) $abc\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$ (d) $c\left(\frac{1}{a} + \frac{1}{b}\right)$

88. If the L.C.M. of two numbers is 2520 and H.C.F. is 12. Its one number is 504, then the other number will be

(a) 50 (b) 65

(c) 40 (d) 60

89. The sum of first n natural numbers is

(a) $\frac{n}{2}$ (b) $\frac{n(n+1)}{2}$

(c) $\frac{n+1}{2}$ (d) $n + 1$

90. Calculate compound interest on ₹ 2000 for 2 years at the rate 5%.

(a) 105 (b) 200

(c) 205 (d) 2205

ANSWERS

MENTAL ABILITY TEST

1. (b) 2. (c) 3. (b) 4. (d) 5. (a) 6. (a) 7. (b) 8. (d) 9. (d) 10. (b)
 11. (c) 12. (d) 13. (c) 14. (c) 15. (b) 16. (c) 17. (d) 18. (c) 19. (*) 20. (d)
 21. (c) 22. (c) 23. (b) 24. (a,b) 25. (b) 26. (c) 27. (d) 28. (c) 29. (c) 30. (a)
 31. (a) 32. (c) 33. (b) 34. (c) 35. (c) 36. (b) 37. (d) 38. (b) 39. (b) 40. (d)
 41. (c) 42. (a) 43. (b) 44. (d) 45. (c) 46. (*) 47. (c) 48. (d) 49. (d) 50. (b)

ENGLISH

1. (a) 2. (b) 3. (b) 4. (c) 5. (a) 6. (a) 7. (a) 8. (b) 9. (a) 10. (a)
 11. (a) 12. (d) 13. (b) 14. (d) 15. (c) 16. (b) 17. (d) 18. (c) 19. (b) 20. (c)
 21. (c) 22. (a) 23. (d) 24. (b) 25. (c) 26. (d) 27. (b) 28. (a) 29. (a) 30. (c)
 31. (d) 32. (a) 33. (a) 34. (c) 35. (c) 36. (a) 37. (a) 38. (c) 39. (b) 40. (b)

SCHOLASTIC APTITUDE TEST

1. (d) 2. (a) 3. (d) 4. (c) 5. (d) 6. (b) 7. (a) 8. (c) 9. (a) 10. (c)
 11. (b) 12. (a) 13. (a) 14. (c) 15. (b) 16. (d) 17. (d) 18. (c) 19. (c) 20. (b)
 21. (d) 22. (c) 23. (a) 24. (a) 25. (c) 26. (b) 27. (d) 28. (d) 29. (b) 30. (b)
 31. (b) 32. (b) 33. (d) 34. (d) 35. (c) 36. (a) 37. (b) 38. (b) 39. (c) 40. (d)
 41. (b) 42. (a) 43. (a) 44. (b) 45. (c) 46. (d) 47. (c) 48. (b) 49. (a) 50. (d)
 51. (d) 52. (b) 53. (b) 54. (d) 55. (a) 56. (d) 57. (b) 58. (c) 59. (c) 60. (c)
 61. (d) 62. (a) 63. (d) 64. (d) 65. (b) 66. (b) 67. (a) 68. (c) 69. (d) 70. (b)
 71. (b) 72. (b) 73. (d) 74. (a) 75. (d) 76. (c) 77. (a) 78. (a) 79. (d) 80. (c)
 81. (*) 82. (b) 83. (b) 84. (*) 85. (a) 86. (a) 87. (c) 88. (d) 89. (b) 90. (c)

Note : ‘*’ No option is matching

EXPLANATIONS**MENTAL ABILITY TEST**

1. 260, 216, 128, 108, 62, 54, 29, 27

108×2 54×2 27×2

2. $7 \times 2 + 1 = 15$
 $15 \times 2 + 2 = 32$
 $32 \times 2 + 3 = \boxed{67}$
 $67 \times 2 + 4 = 138$
 $138 \times 2 + 5 = 281$

3. 3, 8, 18, 23, 33, 38, 48

$+5$ $+10$ $+5$ $+10$ $+5$ $+10$

4. 2, 12, 36, 80, 150, 252

$+14$ $+20$ $+26$ $+32$

5. 36, 30, 24, 18, 12

-6 -6 -6 -6

6. L J H : K K I

-1 -1 -1 -1

Similarly

C I A : B J B

-1 -1 -1 -1

7. E J O T : V Q L G

5 10 15 20 5 10 15 20

8. NWMBRE : WNBMR

2 1 4 3 6 5 1 2 3 4 5 6

Similarly

GHOST : HGSOT

2 1 4 3 5 1 2 3 4 5

9. L U X

12 21 24

$L + U + X = 12 + 21 + 24 = 57$

(Here given letters denote the position of alphabet)

Similarly

S I T

19 9 20

$S + I + T = 19 + 9 + 20 = 48$

10. M U M B A I : L T L A Z H

-1 -1 -1 -1 -1 -1

11. ROUNDS → RONUDS

1 2 4 3 5 6 1 2 3 4 5 6

Similarly

PLEASE → PLA ESE

1 2 3 4 5 6

12. VACATE → AVACET

$\uparrow$ $\uparrow$ $\uparrow$

Similarly

LITERATE → ILETARET

$\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$

13. According to question

RECRUITMENT

$\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$

Now interchange the position

R E C R U I T M E N T

$\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$

→ T N E M T I U R C E R

So U letter will come after I in the newly formed word.

14. DOCUMENTATION

1 2 3 4 5 6 7 8 9 10 11 12 13

Now if third and tenth letter of the word are interchanged, then

DOTUMENTACTION

Also likewise the position of the fourth and seventh letters, the second and six letter is also interchanged, then

DET NMOU TAC ION

13 12 11 10 9 8 7 6 5 4 3 2 1

So the eleventh letter from the right end will be T.

15. Let x years ago, the ratio of their age was 3 : 5.

According to question

$$\frac{40-x}{60-x} = \frac{3}{5}$$

$$200 - 5x = 180 - 3x$$

$$2x = 20$$

$$\therefore x = 10 \text{ years}$$

So 10 years ago, the ratio of their age was 3 : 5.

16. B is 60% more efficient than A, the efficiency of A and B

$$\begin{aligned} A : B \\ 100 : 100 + 100 \text{ of } 60\% \\ A : B \\ 100 : 160 \\ A : B \\ 5 : 8 \end{aligned}$$

So work done by A and B alone is

$$\begin{aligned} A : B \\ 8 : 5 \end{aligned}$$

Let the work done by A and B be $8x$ and $5x$ respectively.

$$8x = 12$$

$$\therefore x = \frac{12}{8} = \frac{3}{2} \text{ days}$$

$$\begin{aligned} \text{Work done by B} = 5x &= \frac{15}{2} \\ &= 7\frac{1}{2} \text{ days} \end{aligned}$$

17. The quantity of water = $\frac{1}{3} \times 30 = 10$ litre

According to question

$$\frac{30+x}{10+x} = \frac{1+2}{2}$$

$$60 + 2x = 30 + 3x$$

$$\therefore x = 30 \text{ litre}$$

18. Given $a \times b \Delta c = a > b \geq c$

From option (a),

$$b \not\subset a \times c$$

$\Rightarrow b = a > c$ is not possible.

From option (b),

$$a \geq b \leq c, \text{ which is not possible.}$$

From option (c),

$$a \geq b < a \text{ is possible, which give the correct answer.}$$

19. Given $a \times b \times c$

$$\Rightarrow a > b > c$$

From option (a),

$$b > a = c \text{ is not possible.}$$

From option (b),

$$c > b \geq c \text{ is not possible.}$$

From option (c),

$$\text{or } \left. \begin{aligned} a &> c > b \\ a &< c > b \end{aligned} \right\} \text{ is not possible.}$$

From option (d),

$$b \leq a < c \text{ is not possible.}$$

20. The natural numbers between 23 and 100 which are exactly divisible by 6 is

$$24, 30, \dots, 96.$$

Let n be the no. of natural numbers.

$$\begin{aligned} t_{n2} &= a + (n-1)d \\ 96 &= 24 + (n-1)6 \\ 72 &= (n-1)6 \\ n &= 13 \end{aligned}$$

21. In the given question, answer figure (c) will complete the pattern because the given lines move 90° anticlockwise direction.

22. Answer figure (c) will complete the given question.

23. In the given question figure, answer figure (b) will complete the given pattern.
25. Answer figure (b) will complete the given question figure.
26. In the given figure, second figure is the mirror image of the first. Similarly answer figure (c) is the mirror image of third figure.
27. In the given, first figure moves 180° anti clockwise direction to get second figure. Similarly third figure moves to get answer figure (d).
28. In the given figure there is a small circle on each vertices of a triangle similarly in the next figure there is a small circle on each vertices of a square.
30. Second figure is the mirror image of first. Similarly answer figure (a) is the mirror image of third.
31. No. of times a man takes rest

$$= \frac{180}{30} - 1 = 5$$

For each time, a man takes a rest for 2 minutes.

Now total rest before reaching the top

$$= 5 \times 2 \text{ minutes}$$

$$= 10 \text{ minutes}$$

32. Number of hand shakes

$$= \frac{n(n-1)}{2} = \frac{100 \times 99}{2}$$

$$= 99 \times 5 = 4950$$

33. Number of days from 1 january 2012 to 1 December 2012

$$= 30 + 29 + 31 + 30 + 31 + 30 + 31 + 31 + 30 + 31 + 30 + 1$$

(2012 is a leap year so number of days will be 29).

$$= 335 \text{ days}$$

$$\text{No of week} = \frac{335}{7} = 47 \text{ week and 6 days.}$$

So there will be 47 Sunday.

Therefore after 6 days, there will be saturday on 10 December 2012.

35. Total number of hours between 5 am and 10 pm on 4th day

$$= 24 + 24 + 24 + 17 = 89 \text{ hours}$$

The clock lose 16 minutes in 24 hours

$$\therefore 1 \text{ hours lose } \frac{16}{24} \text{ minutes}$$

$$\therefore 89 \text{ hour lose } \frac{2}{3} \times 89 = 59.33 \text{ minutes}$$

$$= 60 \text{ minutes (appox)}$$

$$= 1 \text{ hour}$$

So true time 1 hour after 10 pm on 4th day will be 11 pm.

36. There are 12 numbers in a clock that is 1 to 12 make 360°

$$\therefore 1 \text{ number} = \frac{360^\circ}{12} = 30^\circ$$

(Here number denotes hour hand in a clock)

So the angle is made between the two numbers of a clock is 30° .

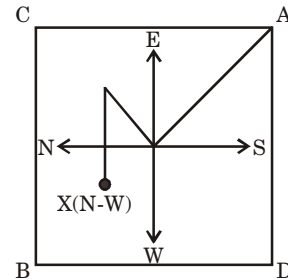
37. In the given figure, there are 17 squares.

38. The sum of all the numbers for 1 to 12 is

$$s_n = \frac{n(n+1)}{2}$$

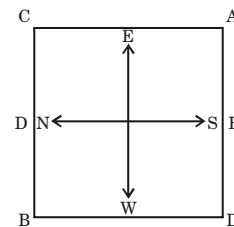
$$s_{12} = \frac{12(12+1)}{2} = 78$$

39. C



From the figure, it is clear that A is facing North-West direction.

40. C



From option (a),

B and D are not a mid-point of A and C.

From option (b),

D is not the mid-point of A and C and also B at the corner is not occupied by A.

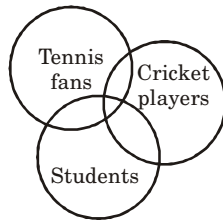
From option (c),

B is the mid-point between A and D but D is not the mid point between A and D.

From option (d),

B is at the midpoint between A and original position of D and D at the midpoint between original position of B and C. So option d, statement is true.

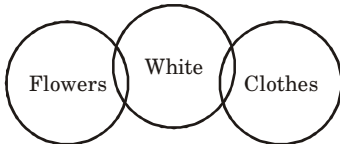
41.



From the given figure it is clear that some tennis fans are cricket players.

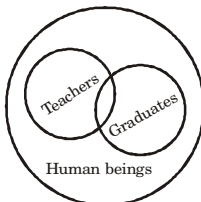
Some cricket players are students and some students are tennis fans. So option (c) depicts the correct relationship among the groups of things.

42.



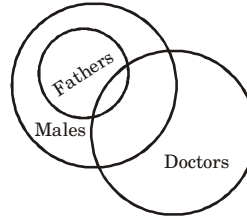
Some flowers are white and some clothes are white.

43.



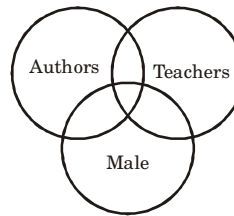
Some teachers are graduates. Some graduates are teachers. And all teachers and all graduates are human beings.

44.



All fathers are male. Some males are doctors and some fathers are doctors.

45.



According to question, some authors are teachers and male. Some teachers and male and some male are authors.

47. According to statement, my (another man) father's sister means another man's aunt and he(man) is the son of another man's aunt mean man is the cousin of another man.

$$48. = 34.950 + 240.016 + 23.980 \\ = 298.946$$

49. Let the present age of father and son be x and y years

According to question,

$$x + y = 60 \quad \dots(i)$$

$$\text{Also } x - 6 = (y - 6) \times 5$$

$$x - 5y = -24 \quad \dots(ii)$$

Solving equation (i) and (ii), we get

$$x = 46 \text{ years}$$

$$\therefore y = 14 \text{ years}$$

Now after 6 years, son age will be

$$= 14 + 6 = 20 \text{ years}$$

50. The ratio of the number of notes of each denomination is

$$1 : 1 : 1$$

Now change the denomination of five rupee notes and ten rupee notes into one rupee, the ratio will be

$$1 : 5 : 10$$

Number of one rupee note

$$= \frac{1}{1+5+10} \times 480$$

$$= \frac{1}{16} \times 480 = 30$$

Now total number of notes

$$= (30 + 30 + 30) = 90$$

SCHOLASTIC APTITUDE TEST

$$71. = \frac{\sqrt{5}-2}{\sqrt{5}+2} \times \frac{\sqrt{5}-2}{\sqrt{5}-2} + \frac{\sqrt{5}+2}{\sqrt{5}-2} \times \frac{\sqrt{5}+2}{\sqrt{5}+2}$$

$$= \frac{(\sqrt{5}-2)^2}{(\sqrt{5})^2 - (2)^2} + \frac{(\sqrt{5}+2)^2}{(\sqrt{5})^2 - (2)^2}$$

$$= (\sqrt{5}-2)^2 + (\sqrt{5}+2)^2$$

$$= 2(5+4) [(a+b)^2 + (a-b)^2 = 2(a^2 + b^2)]$$

$$= 18$$

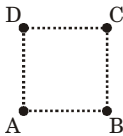
$$72. \text{ Given } \sqrt{b} = 3a$$

$$\therefore b = 9a^2 \quad \dots(i)$$

$$\text{Now } \frac{a^2}{b} = \frac{a^2}{9a^2} \quad (\text{from equation (i)})$$

$$= \frac{1}{9}$$

73. In a square there are 4 symmetry axis.



$$74. \frac{1}{3 - \frac{1}{\frac{13}{7}}} = \frac{1}{3 - \frac{7}{13}} = \frac{1}{\frac{32}{13}} = \frac{13}{32}$$

$$75. x^2 + 15x - 3250 = x^2 + 65x - 50x - 3250$$

$$= x(x + 65) - 50(x + 65)$$

$$= (x + 65)(x - 50)$$

$$76. \frac{(0.44)^2 + (0.06)^2 + (0.024)^2}{\left(\frac{0.44}{10}\right)^2 + \left(\frac{0.06}{10}\right)^2 + \left(\frac{0.024}{10}\right)^2}$$

$$= \frac{100[(0.44)^2 + (0.06)^2 + (0.024)^2]}{(0.44)^2 + (0.06)^2 + (0.024)^2}$$

$$= 100$$

77. Let the numbers be x and y .

According to question

$$xy = 110$$

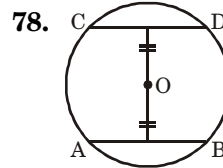
$$\text{also } x^2 + y^2 = 264$$

$$\text{Now } (x+y)^2 = x^2 + y^2 + 2xy$$

$$(x+y)^2 = 264 + 2 \times 110$$

$$(x+y)^2 = 484$$

$$\therefore x + y = 22$$



78.

If two chords of a circle are equidistance from the centre of the circle, then they are equal to each other.

79. $A : B = 1 : 2$, $B : C = 3 : 4$, $C : D = 5 : 6$

$$A : B$$

$$B : C$$

$$C : D$$

$$\frac{ABC : BBC : BCC : BCD}{A : B : C : D}$$

$$1 : 2$$

$$3 : 4$$

$$5 : 6$$

$$\frac{15 : 30 : 40 : 48}{A : D = 15 : 48}$$

$$\therefore A : D = 15 : 48$$

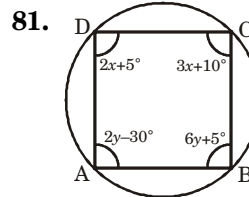
$$= 5 : 16$$

$$80. \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} \times \frac{1-\sin\theta}{1-\sin\theta} = \sqrt{\frac{(1-\sin\theta)^2}{1-\sin^2\theta}}$$

$$= \sqrt{\left(\frac{1-\sin\theta}{\cos\theta}\right)^2}$$

$$= \frac{1-\sin\theta}{\cos\theta}$$

$$= \sec\theta - \tan\theta$$



81.

In a cyclic quadrilateral ABCD, the sum of the opposite angles is 180° .

$$A + C = 180^\circ$$

and $B + D = 180^\circ$

$$3x + 2y = 200 \quad \dots(i)$$

$$2x + 6y = 190 \quad \dots(ii)$$

equation $[(i) \times 3 - (ii)]$

$$9x + 6y = 600$$

$$2x + 6y = 190$$

$$7x = 410$$

$$\therefore y = \frac{410^\circ}{7}$$

From equation (i), $x = \frac{200^\circ}{7}$

82. $\sin(90^\circ - 78^\circ) \cdot \cos 78^\circ + \cos(90^\circ - 78^\circ) \cdot \sin 78^\circ$

$$= \cos 78^\circ \cdot \cos 78^\circ + \sin 78^\circ \cdot \sin 78^\circ$$

$$= \cos^2 78^\circ + \sin^2 78^\circ$$

$$[\cos(90^\circ - \theta) = \sin \theta, \sin(90^\circ - \theta) = \cos \theta]$$

$$= 1$$

83. Sum of the present age of father and

$$\text{son} = 40 + 5 + 5 = 50 \text{ years}$$

Let the present age of father and son be $4x$ and x .

According to question

$$4x + x = 50$$

$$\therefore x = 10 \text{ years}$$

So present age of father

$$= 4x = 4 \times 10 = 40 \text{ years}$$

84. Mean of 10 student

$$= \frac{20+19+50+48+50+36+35+50+40+40}{10}$$

$$= \frac{388}{10} = 38.8$$

We know that mode of a sample is the element that occurs most often in the collection. So, the marks of 10 students that occurs most is 50. Therefore mode is 50.

85. Let the two consecutive natural numbers be n and $n + 1$

According to question

$$n^2 + (n + 1)^2 = 313$$

$$n^2 + n^2 + 1 + 2n = 313$$

$$2n^2 + 2n - 312 = 0$$

$$n^2 + n - 156 = 0$$

$$n^2 + 13n - 12n - 156 = 0$$

$$n(n + 13) - 12(n + 13) = 0$$

$$(n - 12)(n + 13) = 0$$

$$\therefore n = 12$$

So the numbers are 12, 13.

86. Let the two numbers be x and y .

According to question

$$x + y = 100 \quad \dots(i)$$

$$\text{also } x = 2y - 2 \quad \dots(ii)$$

Put the value of x in equation (i), we get

$$3y = 102$$

$$\therefore y = 34$$

From equations (i)

$$x = 66$$

87. $ab + bc + ca = \frac{abc}{c} + \frac{abc}{a} + \frac{abc}{b}$

$$= abc \left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c} \right)$$

88. We know that

$$\text{LCM} \times \text{HCF} = \text{First number}$$

$$\times \text{Second number}$$

$$2520 \times 12 = 504 \times \text{other number}$$

$$\therefore \text{Other number} = \frac{2520 \times 12}{504} = 60$$

89. The sum of first n natural numbers

$$= \frac{n(n+1)}{2}$$

90. $\text{CI} = P \left[\left(1 + \frac{r}{100} \right)^n - 1 \right]$

Here

CI = Compound Interest

P = Principal

r = rate of interest

n = time

Now

$$\text{CI} = 2000 \left[\left(1 + \frac{5}{100} \right)^2 - 1 \right]$$

$$= 2000 \left[\left(\frac{21}{20} \right)^2 - 1 \right]$$

$$= 2000 \times \frac{41}{400}$$

$$= ₹ 205$$



NTSE - 2014

ANDHRA PRADESH

PART I : MENTAL ABILITY TEST

Directions (Q. 1–6) : In the number series given below, one number is missing. Each series is followed by five alternative answers, (a), (b), (c), (d) and (e). One of them is the right answer. Identify and indicate it as per the “Instructions”.

1. 4, 13, 31, 58, ...
(a) 90 (b) 85
(c) 49 (d) 40
(e) 94
2. 90, 81, 74, 69, ...
(a) 64 (b) 66
(c) 65 (d) 78
(e) 72
3. 785, 664, 543, 422, ...
(a) 301 (b) 201
(c) 101 (d) 300
(e) 303
4. 1875, ..., 75, 15, 3
(a) 370 (b) 275
(c) 380 (d) 375
(e) 365
5. 3, 6, 24, 192, ...
(a) 2972 (b) 576
(c) 3072 (d) 1536
(e) 1152
6. 365, 345, 320, 290, ...
(a) 300 (b) 245
(c) 255 (d) 260
(e) 265

Directions (Q. 7–10) : Following questions are based on letter analogy. There are two pairs of letter combinations in each question. The first (left side) pair has some relationship between its members. In the second pair one member is missing. Find this out from answers (a), (b), (c), (d) and (e) such that this pair has similar relationship as the first pair. Indicate your answer as per the “Instructions”.

7. PBL : NDJ :: VCR : ?
(a) SEP (b) SEO
(c) SEN (d) SFO
(e) SFN
8. ACEG : BDEF :: JLNP : ?
(a) KLNO (b) KMNP
(c) LMNP (d) LMNO
(e) KMNO
9. SRCA : ONDB :: TSGE : ?
(a) POHF (b) POFH
(c) POGH (d) POHG
(e) OPHF
10. ABCDE : CDEAB :: RSTUV : ?
(a) TUVSR (b) SRTUV
(c) RTUVS (d) TUVRS
(e) STUVR

Directions (Q. 11–14) : In the following questions Letters / Letter groups are arranged in a particular order with some underlying criterion. Study the order and choose the answer from the alternatives to fill the gaps.

11. ACFH, BDGI, CEHJ, ...
(a) DEIK (b) DFIK
(c) DFJK (d) DEJK
(e) DEHJ

12. UABP, TBCO, SCDN, ...

- (a) RDEN (b) RDEO
(c) RDEM (d) RDFM
(e) REFM

13. YXV, BCE, UTR, ...

- (a) FGI (b) FGH
(c) FHI (d) EGI
(e) FGJ

14. LMNOP, MNOPL, NOPLM, ...

- (a) PLMNO (b) PONLM
(c) ONMLP (d) NMLOP
(e) OPLMN

Directions (Q.15–20) : In each of the following questions, five words are given. Four of them are alike in some way. One is different from them. Identify and indicate it as per the "Instructions".

15. (a) Korea (b) China
(c) Thailand (d) Finland
(e) Bangladesh
16. (a) Leopard (b) Elephant
(c) Tiger (d) Cheetah
(e) Lion
17. (a) Moon (b) Earth
(c) Saturn (d) Neptune
(e) Venus
18. (a) Portuguese
(b) Romanian
(c) Italian
(d) Russian
(e) Pali
19. (a) Srinivasa Ramanujan
(b) Sir C. V. Raman
(c) U. R. Anantha Murthy
(d) U. R. Rao
(e) M. S. Swaminathan
20. (a) Coimbatore (b) Shimoga
(c) Patiala (d) Ranchi
(e) Kozhikode

Directions (Q. 21–25) : In these questions there is a certain relationship between two words on one side of :: and only one word is given on the other side of ::. The missing word is to be found out from the given alternatives (a), (b), (c), (d) and (e) so that the relationship is the same as for the other pair. Identify the correct answer and indicate it as per "Instructions".

21. Rome : Italy :: Helsinki : ?

- (a) Sweden (b) Finland
(c) Latvia (d) Estonia
(e) Denmark

22. Godaan : Munshi Premchand :: Anandamath : ?

- (a) K. M. Munshi
(b) Lokmanya Tilak
(c) Bankim Chandra Chatterjee
(d) Sitakand Mahapatra
(e) Tripuraneni Gopichand

23. Theory of evolution : Darwin :: Crescograph : ?

- (a) S. S. Bhatnagar
(b) Raja Ramanna
(c) Srinivasa Ramanujan
(d) C. R. Rao
(e) Jagadish Chandra Bose

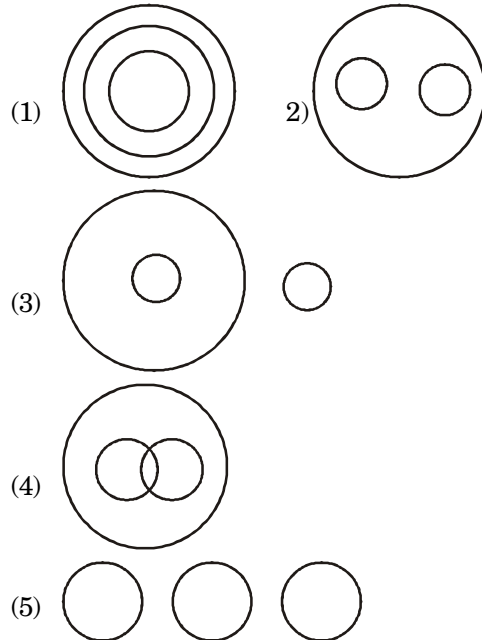
24. Jaipur : Rajasthan :: Dehradun : ?

- (a) Jharkhand
(b) Chattisgarh
(c) Meghalaya
(d) Manipur
(e) Uttarakhand

25. Rahul Bajaj : Business :: Chandrasekhar Azad : ?

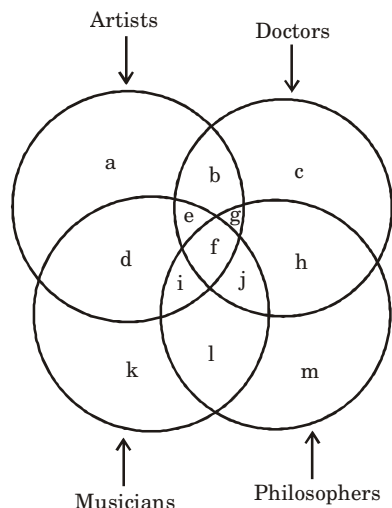
- (a) Freedom Struggle
(b) Literature
(c) Social Reforms
(d) Music
(e) Theatre

Directions (Q. 26–30) : Are based on the following diagrams. Study them carefully and indicate correct answer as per “Instructions”.



26. Snakes, Cobra, Vipers
 27. Elephants, Camel, Cows
 28. Kilogram, Centigram, Milligram
 29. Apple, Fruits, Potato
 30. Musicians, Pianist, Guitarist

Directions (Q. 31–35) : With the help of the given diagram, answer the following questions making the right choice from the given alternatives. Indicate the answer as per the “Instructions”.



31. Doctors who are also Artists and Philosophers are indicated by the letter.

- (a) h (b) e
 (c) f (d) b
 (e) g

32. Which letter indicates Philosophers who are also Musicians and Artists ?

- (a) f (b) i
 (c) e (d) g
 (e) l

33. Which letter indicates Philosophers who are also Doctors, Artists and Musicians ?

- (a) g (b) j
 (c) e (d) f
 (e) i

34. Which letter indicates Philosopher Doctors who are neither Musicians nor Artists ?

- (a) h (b) j
 (c) l (d) f
 (e) b

35. Which letter indicates Doctors who are also Philosophers and Musicians ?

- (a) f (b) g
 (c) j (d) l
 (e) i

Directions (Q. 36–38) : If HEART is coded as 12345 and DISK is coded as 6789 respectively. How are the following words coded ? Identify the right answer and indicate it as per the “Instructions”.

36. HASTE

- (a) 13852 (b) 13942
 (c) 13952 (d) 13752
 (e) 13762

37. KARATE

- (a) 934351 (b) 934342
 (c) 933452 (d) 914152
 (e) 934352

38. RISK

- (a) 4879 (b) 4789
 (c) 4798 (d) 4869
 (e) 4779

Directions (Q.39–42) : Are based on simple arithmetic principles. Find the right answer from among the alternatives and indicate it as per the “Instructions”.

39. $159 \div \dots = 15900$

- (a) 10.0 (b) 1.0
(c) 0.001 (d) 0.01
(e) 0.1

40. $(65 \div 100) \times 7$

- (a) 4.55 (b) 4.05
(c) 4.5 (d) 4.65
(e) 4.75

41. $\frac{40 + (6 \times .04)}{8}$

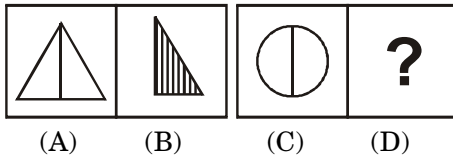
- (a) 0.503 (b) 5.3
(c) 5.003 (d) 5.13
(e) 5.03

42. $\frac{5x + 215}{3} = 4x + 60 \quad x = ?$

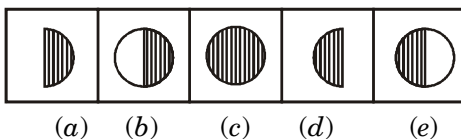
- (a) 3 (b) 4
(c) 5 (d) 2
(e) 0.5

Directions (Q. 43-46) : Each question has four problem figures (A), (B), (C), (D). Figure (D) has only a question mark ‘?’ Figure (B) bears a certain relationship to (A). One of the answer figures bears similar relationship to (C). Find this out and indicate it as per the “Instructions”.

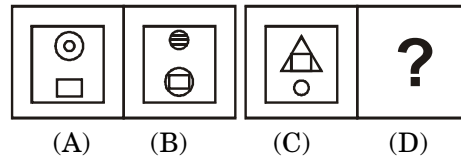
43. Problem Figures



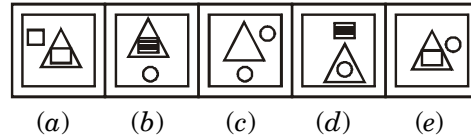
Answer Figures



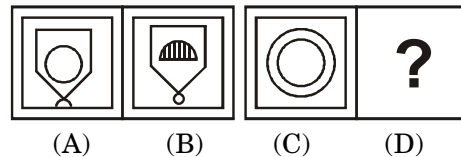
44. Problem Figures



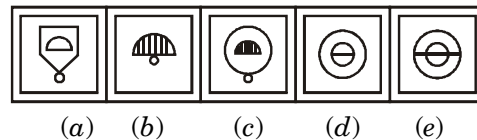
Answer Figures



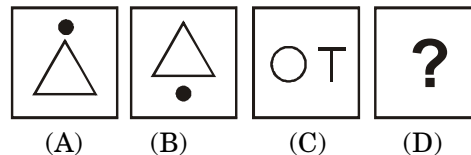
45. Problem Figures



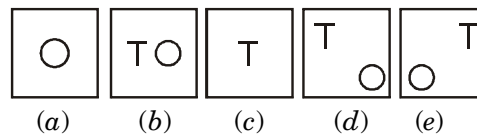
Answer Figures



46. Problem Figures

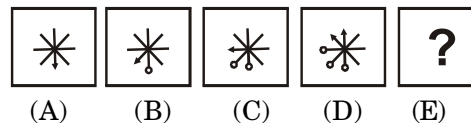


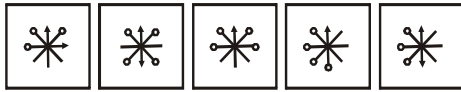
Answer Figures



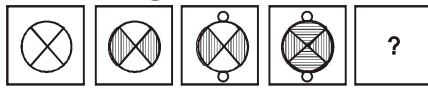
Directions (Q. 47-50) : In these questions there are five problem figures (A), (B), (C), (D) and (E). Figure (E) has a question mark ‘?’ Select one figure from answer figures (a), (b), (c), (d) and (e) such that the series is completed. Indicate your answer as per the “Instructions”.

47. Problem Figures

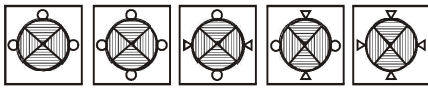


Answer Figures

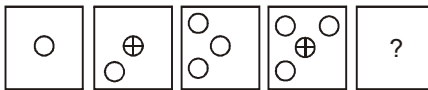
(a) (b) (c) (d) (e)

48. Problem Figures

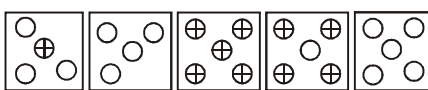
(A) (B) (C) (D) (E)

Answer Figures

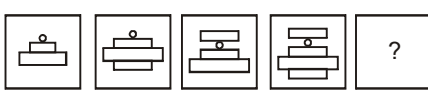
(a) (b) (c) (d) (e)

49. Problem Figures

(A) (B) (C) (D) (E)

Answer Figures

(a) (b) (c) (d) (e)

50. Problem Figures

(A) (B) (C) (D) (E)

Answer Figures

(a) (b) (c) (d) (e)

PART II : ENGLISH

Directions (Q. 51–55) : Read the following passage and answer the questions given after it.

The surprisingly abundant life of the Indian Ocean is confined to the upper layers; the deeper especially the bottom waters are devoid of oxygen and are often permeated with hydrogen sulphide.

Choose the correct answer for the following questions :

51. The passage gives information about

- (a) The life of the people near Indian Ocean
- (b) The reasons why life exists in particular water layers
- (c) The reason why oxygen is not found in the bottom layer
- (d) The reasons why hydrogen sulphide is found in the bottom layers

52. The bottom water of the Indian Ocean

- (a) Have no oxygen
- (b) Contain hydrogen sulphide
- (c) Have large amount of oxygen
- (d) Contain a lot of sea plants and animals

53. The water of Indian Ocean

- (a) Are devoid of life
- (b) Are always permeated with hydrogen sulphide
- (c) Have life only in the lower layers
- (d) Have life only in the upper layers

54. Which of the following is the most opposite of the word ABUNDANT, as used in the passage ?

- (a) Plentiful
- (b) Minute
- (c) Meagre
- (d) Insufficient

55. The passage suggests which one of the following :

- (a) Observers are surprised at abundant life exists in the Indian Ocean
- (b) Hydrogen sulphide is necessary to life
- (c) Oxygen is not necessary for marine life
- (d) There are different layers of water in the Ocean

Directions (Q. 56–60) : Read the following passage and answers the questions given after it.

Up the river Hudson in North America are the Catskill mountains. They are not so high as the Himalayas in India. In certain village at the foot of these mountains there lived a long ago a man called Rip Van Winkle. He

was simple and good natured. A very kind neighbour and great favourite of all the good wives in the neighbourhood. The women took his side and put the blame on Dam Van Winkle.

The children of the village too would shout with joy whenever they saw him. He made play things for them. He told them fairy tales. So they liked him.

- 56.** Where are the Catskill mountains ?
 (a) In South America (b) In Africa
 (c) In North America (d) In asia
- 57.** Where did Rip Van Winkle live ?
 (a) On the top of the Catskill mountains
 (b) At the foot of the Catskill mountains
 (c) In a city in North America
 (d) Far away from the Catskill mountains
- 58.** Who like the Rip Van Winkle very much ?
 (a) All the wives in the neighbourhood
 (b) All the husbands in the neighbourhood
 (c) All the children in the village
 (d) All the friends in the village
- 59.** Who shouted with joy on seeing Rip Van Winkle ?
 (a) The women
 (b) The men
 (c) All the persons
 (d) All the children
- 60.** Why did children like Rip Van Winkle ?
 (a) As he played with them
 (b) As he told them fairy tales and made playing things for them
 (c) He took them to the Catskill mountains
 (d) None of the above

Directions (Q. 61–65) : Read the following passage and answer the questions given after it.

An elephant does not work mechanically, like many other animals. He never stops learning because he is always thinking. Not even really a good sheep, dog can compare with an

elephant in intelligence. An elephant never forgets. His little actions reveal an intelligence which finds in prompt solutions for new difficulties. If he can not reach with his trunk some part of his body that itches, he does not rub it against a tree, he may pick up a long stick and give himself a good stretch with that instead. If he pulls up some grass, and it comes up by the roots with the lump of earth, he will smack it against foot until all the earth is shaken off or, if the water is handy, he will wash it clean, before putting it into his mouth.

- 61.** What is the passage about ?
 (a) An elephant
 (b) An elephant's learning
 (c) An elephant's training
 (d) An elephant resourcefulness
- 62.** What does a little actions of an elephant reveal ?
 (a) His ways of solving difficulties
 (b) His food habits
 (c) His power of remembrance
 (d) His clean habits
- 63.** Why does an elephant want a long stick ?
 (a) To dig out a lump of earth
 (b) To smack it against his foot
 (c) To rub that part of his body that itches
 (d) To defend himself from the enemy
- 64.** Why does the elephant smack some grass against his foot ?
 (a) To grind it
 (b) To shake off the grass
 (c) To rub his body with
 (d) To chew the roots
- 65.** What does the elephant do before putting the grass roots with a lump of earth into his mouth ?
 (a) He smacks it against his foot
 (b) He washes it clean
 (c) He either smacks it against the foot or washes it clean
 (d) He grinds it under his feet

Directions (Q. 66–67) : *The following five sentences come from a paragraph. The first and the last sentences are given, choose the order in which the three sentences (PQR) should appear to complete the paragraph.*

66. S₁. It rains continuously in the rainy season.

S₂. _____

S₃. _____

S₄. _____

S₅. Indians are still ill equipped to utilize this rain water.

Choose from the options given below :

- (a) PQR (b) RPQ
(c) QRP (d) RQP

67. S₁. The train arrived from Tirupathi.

S₂. _____

S₃. _____

S₄. _____

S₅. The platform was finally empty.

Choose from the options given below :

- (a) RPQ (b) QRP
(c) PQR (d) RQP

Directions (Q. 68–74) : *Choose the word which best fills the blank from the four options given :*

68. Rani can use both of her hands equally well as she is _____

- (a) fallacious (b) ambitious
(c) ambidextrous (d) artistic

69. Whom would you prefer _____ the two of us ?

- (a) among (b) of
(c) between (d) to

70. If you make a promise, you must be sure to _____ it.

- (a) accomplish (b) keep
(c) follow (d) succeed

71. The volcanic _____ was the cause of great devastation.

- (a) outburst (b) eruption
(c) erosion (d) movement

72. I congratulate you _____ your success.

- (a) on (b) for
(c) at (d) in

73. This legend has been _____ from father to son.

- (a) handed in (b) handed out
(c) handed over (d) handed down

74. Suitable steps are taken to bring _____ the cost of living.

- (a) up (b) over
(c) on (d) down

Directions (Q. 75–78) : *Select the meaning of the given / underlined phrases / idioms.*

75. Our schools within a stone's throw of the railway station.

- (a) very far away
(b) within certain radius
(c) at a short distance
(d) within a definite circumference

76. The leader must have the Lion's share of the booty.

- (a) the stronger one (b) the smaller part
(c) the worthy part (d) the larger part

77. We kept our fingers crossed till the final results were declared.

- (a) waited expectantly (b) kept praying
(c) felt scared (d) kept hopeful

78. In this competition there is a complete fair play.

- (a) good name
(b) honest means
(c) good chances
(d) no cheating

Directions (Q. 79–83) : *In the following passage there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank from the given options.*

The first problem to be tackled was that of feeding the huge population of our country. It became 79 to adopt 80 for agricultural

development. The construction of multi purpose **81** with the development of **82** as one of its major components was the **83** step towards the provision of agricultural infrastructure.

- 79.** (a) essential (b) desirable
(c) notional (d) optional
- 80.** (a) crops (b) families
(c) regions (d) strategies
- 81.** (a) offices (b)
organisations (d) projects
(c) agencies
- 82.** (a) markets (b) irrigation
(c) villages (d) fields
- 83.** (a) last (b) least
(c) first (d) intermediate

Directions (Q. 84–86) : Select the most appropriate option to fill in the blanks from the given alternatives.

- 84.** She _____ that she was in the wrong floor.
(a) remembered (b) told
(c) realised (d) reprimanded
- 85.** I could not _____ what he wanted to say.
(a) make up (b) make out
(c) make in (d) make away
- 86.** He is too _____ to be deceived easily.
(a) strong (b) kind
(c) honest (d) intelligent

Directions (Q. 87–90) : Select the word which means the opposite of the given words.

- 87. DEMISE**
(a) growth (b) live
(c) birth (d) request
- 88. PAUCITY**
(a) surplus (b) scarcity
(c) presence (d) richness
- 89. DEARTH**
(a) extravagance (b) scarcity
(c) abundance (d) sufficiency

90. GENUINE

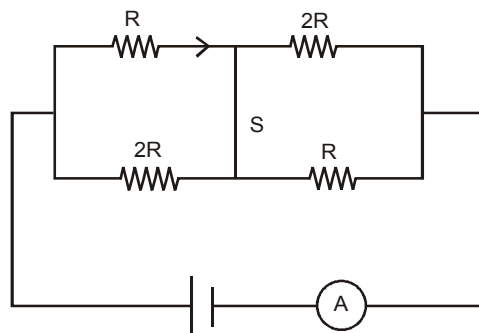
- (a) rotten (b) bogus
(c) unsound (d) impure

PART III

SCHOLASTIC APTITUDE TEST

PHYSICS

- 91.** A circuit is shown in the figure. If switch 'S' is closed, the reading of an ammeter(A)



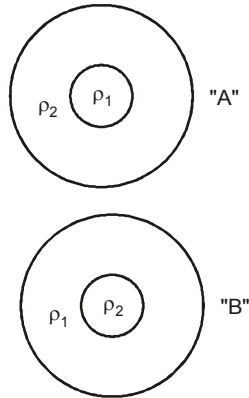
- (a) does not change
(b) increases
(c) decreases
(d) may decrease or increase
- 92.** Four students discuss about the possible paths of a particle moving with constant speed. See the table for the results of the discussion.

Name	Possible path or paths
Anand	Any path
Srinu	Straight line, Circle, Helix
Krishna	Straight line
Somesh	Straight line, Circle

Who is correct ? Assume that the forces acting on the particle are time independent.

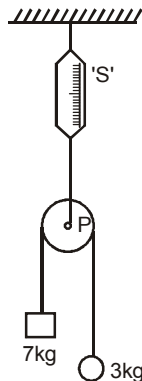
- (a) Srinu (b) Anand
(c) Somesh (d) Krishna
- 93.** Two planets 'A' and 'B' of same mass and same radius are shown in the figure. ρ_1 and ρ_2 are densities of the materials in the planets and $\rho_1 > \rho_2$. If the

accelerations due to gravity on the surface of the planets A and B are g_A and g_B respectively, then



- (a) Given information is not sufficient
 (b) $g_A < g_B$
 (c) $g_A > g_B$
 (d) $g_A = g_B$
94. An electric stove boils 1 kg of water in time 2 min and another stove boils 1 kg of water in time 3 min. Both electric stoves are designed for the same voltage. When they are joined in parallel, the time required to boil 1 kg of water is
- (a) 1.2 min (b) 5 min
 (c) 2.4 min (d) 1 min
95. In the figure, a pulley of negligible weight is suspended by a spring balance 'S'. Masses of 3 kg and 7 kg respectively are attached to opposite ends of a string passing over a pulley 'P'. The spring balance reads

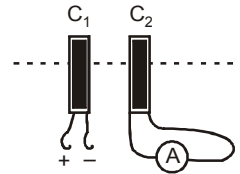
- (a) equal to 10 kg
 (b) less than 10 kg
 (c) more than 10 kg
 (d) equal to 4 kg



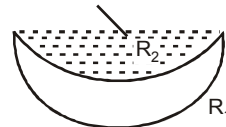
96. A small ball is dropped from a balloon moving vertically up at a speed 10 m/s when the balloon is at a height 15 m from the ground. Neglect air friction and take $g = 10 \text{ m/s}^2$. Which of the following is not suitable to the present situation?

- (a) The ball reaches the ground in 3 s
 (b) The ball covers a distance of 25 m
 (c) The magnitude of average velocity of the ball is 8.33 m/s
 (d) The ball moves up at a speed 10 m/s at an instant when it is dropped from the balloon

97. Two coils C_1 and C_2 are arranged coaxially as shown in figure. The ends of the coil ' C_2 ' are connected to an ammeter A. The current sent through the coil C_1 is directly proportional to the time. If the magnetic field induction produced by the coil C_1 is proportional to the current in it, then the induced current through the coil C_2 is

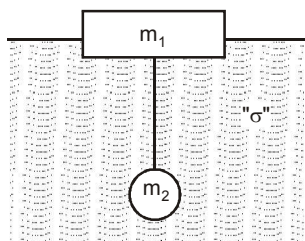


- (a) zero
 (b) increasing with time
 (c) constant
 (d) decreasing with time
98. As shown in figure, a liquid of refractive index ' n_2 ' is poured onto the concave surface of concave-convex lens. R_1 and R_2 are the radii of curvature of convex and concave surfaces of the lens respectively and $R_1 = 2R_2$. The refractive index of material of lens is n_1 . For which combination of n_1 and n_2 , the whole system behaves as a diverging lens.



- (a) $n_1 = 1.2$ and $n_2 = 1.8$
 (b) $n_1 = 1.63$ and $n_2 = 1.35$
 (c) $n_1 = 1.56$ and $n_2 = 1.33$
 (d) $n_1 = 1.72$ and $n_2 = 1.33$

99. A cork of mass m_1 and a steel of mass m_2 are tied to the ends of a massless string. The whole system is kept in a liquid of density ' σ ' as shown in figure. ρ_1 and ρ_2 are densities of cork and steel respectively. Which of the following is wrong?



- (a) The tension in the string

$$T = m_2 g \left(1 - \frac{\sigma}{\rho_2} \right) \text{ when the system is in equilibrium}$$

- (b) The cork is completely immersed in the liquid if

$$(m_1 + m_2) \rho_1 \rho_2 < (m_1 \rho_2 + m_2 \rho_1) \sigma$$

- (c) The volume of submerged part of cork is

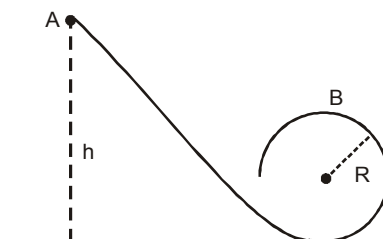
$$\text{equal to } \frac{m_1}{\sigma} + \frac{m_2}{\sigma} \left(1 - \frac{\sigma}{\rho_2} \right) \text{ when the system is in equilibrium}$$

- (d) The system sinks if $T > m_2 g \left(\frac{\sigma}{\rho_1} - 1 \right)$

100. One vessel with ice of 10 gr to 0°C and another similar vessel with water of 100 gr at 0°C are taken and hung in a room. After 15 min, the temperature of water is raised to 2°C . The time required for the ice to be converted completely into water is

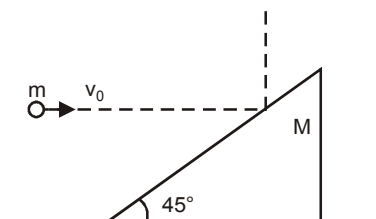
- (a) 1 hr (b) $\frac{1}{2}$ hr
(c) $1\frac{1}{2}$ hr (d) 2 hr

101. In the figure shown, a particle is released from the position A on a smooth track. If $h = 3R$, then the normal force on the particle by the track at B is



- (a) $\frac{mg}{2}$ (b) $\frac{3mg}{2}$
(c) mg (d) $2mg$

102. A body is made in the form of wedge with an angle 45° . See figure. A ball of mass m , moving horizontally at speed $v_0 = \sqrt{2}$ m/s, collides with the wedge of mass $M = 2m$. As a result of the impact, the ball bounces vertically upward. Neglect the friction between the wedge and horizontal surface. The speed of the ball just after the impact is



- (a) 0.5 m/s (b) 2 m/s
(c) $\sqrt{2}$ m/s (d) 1 m/s

CHEMISTRY

103. What are the values of the quantum numbers of 19th electron of Scandium ($Z = 21$) ?

- (a) $n = 4; l = 0; m = 0; m_s = +\frac{1}{2}$
(b) $n = 4; l = 1; m = 0; m_s = +\frac{1}{2}$
(c) $n = 4; l = 2; m = 1; m_s = +\frac{1}{2}$
(d) $n = 4; l = 3; m = 2; m_s = +\frac{1}{2}$

- 104.** First and second ionisation energies of magnesium are 7.646 eV and 15.035 eV respectively. The amount of energy in kJ needed to convert all the atoms of magnesium into Mg^{2+} ions present in 12×10^{-3} g of magnesium vapour is $[1 \text{ eV atom}^{-1} = 96.5 \text{ kJ mol}^{-1}]$
- (a) 2.0 (b) 1.5
(c) 1.1 (d) 0.5
- 105.** Which one of the following possesses covalent, ionic as well as co-ordinate covalent bonds ?
- (a) HCl (b) NH_4Cl
(c) Cl_2 (d) CH_4
- 106.** $\text{Mg} + \text{CuO} \longrightarrow \text{MgO} + \text{Cu}$
Which of the following is wrong relating to the above reaction ?
- (a) CuO gets reduced
(b) Mg gets oxidised
(c) CuO gets oxidised
(d) It is a redox reaction
- 107.** How many number of 'sigma' bonds are present in $\text{CH}_3 - \text{C} \equiv \text{N}$?
- (a) 4 (b) 3
(c) 2 (d) 5
- 108.** The IUPAC name of
- $$\begin{array}{c} \text{CH}_3\text{CH}_2 - \text{CH}_2 - \text{CH} - \text{CH}_2\text{CH}_2\text{CH}_3 \\ | \\ \text{CH} = \text{CH}_2 \end{array}$$
- is
- (a) 4-ethelene-1-heptane
(b) 3-propyl-hex-1-ene
(c) 4-propyl-hex-6-ene
(d) 3-propyl-1-heptane
- 109.** How many number of protons and electrons are present in Ca^{2+} ?
- (a) 20 protons; 20 electrons
(b) 20 protons; 22 electrons
(c) 18 protons; 18 electrons
(d) 20 protons; 18 electrons
- 110.** What is the wavelength of radiation whose frequency is $2 \times 10^{14} \text{ S}^{-1}$?
Velocity of radiation is $3 \times 10^8 \text{ m/s}$.
- (a) $1.5 \times 10^{+6} \text{ m}$ (b) $1.8 \times 10^{-6} \text{ m}$
(c) $1.2 \times 10^6 \text{ m}$ (d) $1.5 \times 10^{-6} \text{ m}$
- 111.** The electronic configuration of the atom of an element 'X' is
- $$(n-2)s^2(n-1)s^2(n-1)p^6ns^2np^5$$
- If $n = 3$, the element 'X' is placed in modern periodic table
- (a) 7th group, 3rd period
(b) 17th group, 3rd period
(c) 17th group, 5th period
(d) 3rd group, 3rd period
- 112.** How many moles of electrons weigh one kilogram ?
Mass of electron = $9.108 \times 10^{-31} \text{ kg}$;
Avagadro number = 6.023×10^{23}
- (a) $\frac{1}{9.108 \times 6.023} \times 10^8$
(b) 6.023×10^{23}
(c) $\frac{1}{9.108} \times 10^{31}$
(d) $\frac{6.023}{9.108} \times 10^{54}$
- 113.** Which one of the following oxides gives pink colour with phenolphthalein indicator in aqueous solution ?
- (a) N_2O (b) NO
(c) CaO (d) CO_2

BIOLOGY

- 114.** Plant cells can withstand greater changes in surrounding medium than animal cells because of their _____
- (a) Cell wall
(b) Plasma membrane
(c) Chlorophyll
(d) Root system

- 115.** The following eukaryotic cells do not contain nucleus
 (A) Red blood cells
 (B) Slime molds
 (C) Phloem sieve tube
 (D) White blood cells
 (a) (A) and (B) (b) (B) and (C)
 (c) (A) and (C) (d) (D) and (A)
- 116.** Study of tissues is
 (a) Cytology (b) Pathology
 (c) Tissueology (d) Histology
- 117.** The element present in Chlorophyll
 (a) Iron (b) Magnesium
 (c) Manganese (d) Copper
- 118.** In animals, the protective tissue inside or outside the body is _____
 (a) Epithelial tissue
 (b) Nerve tissue
 (c) Muscular tissue
 (d) Connective tissue
- 119.** In paramoecium, food enters the body through _____
 (a) Mouth (b) Pseudopodia
 (c) Cilia (d) Cytosome
- 120.** The longest part in human alimentary canal is _____
 (a) Oesophagus
 (b) Small intestine
 (c) Large intestine
 (d) Stomach
- 121.** In this disease, caused due to protein deficiency face and limbs are swollen
 (a) Kwashiorkor (b) Marasmus
 (c) Rickets (d) Pellagra
- 122.** During respiration, gaseous exchange takes place in _____
 (a) Alveoli (b) Pharynx
 (c) Trachea (d) Nasal cavity
- 123.** Metanephridia are the excretory organs in _____
 (a) Reptilians
 (b) Arthropodans
 (c) Annelids
 (d) Molluscans
- 124.** Scopolamine, a sedative is produced from _____
 (a) Neem (b) Rose
 (c) Datura (d) Tobacco
- 125.** The hormone that effects urination is _____
 (a) Adrenalin (b) Vasopressin
 (c) Estrogen (d) Thyroxin
- MATHEMATICS**
- 126.** Triangle ABC has a right angle at C. If $\sin A = \frac{2}{3}$ then $\tan B$ is
 (a) $\frac{3}{5}$ (b) $\frac{\sqrt{5}}{3}$
 (c) $\frac{2}{\sqrt{5}}$ (d) $\frac{\sqrt{5}}{2}$
- 127.** Find the smallest positive number from the numbers below.
 (a) $10 - 3\sqrt{11}$ (b) $3\sqrt{11} - 10$
 (c) $51 - 10\sqrt{26}$ (d) $18 - 5\sqrt{13}$
- 128.** If $x = 9ab$ where a is an integer consists of a sequence of 2014 eights and the integer b consists of a sequence of 2014 fives. What is the sum of the digits of x?
 (a) 9000 (b) 18135
 (c) 18000 (d) 8585
- 129.** If $a^2 + b^2 + 2c^2 - 4a + 2c - 2bc + 5 = 0$ then the possible value of $a + b - c$
 (a) 1 (b) 2
 (c) -1 (d) -2
- 130.** a and b are both 4-digit numbers $a > b$ and one is obtained from the other by reversing the digits.

Then the value of b if $\frac{a+b}{5} = \frac{b-1}{2}$ is

- (a) 2003 (b) 1002
(c) 2005 (d) 2015

131. The value of

$$\frac{(10^4 + 324)(22^4 + 324)(34^4 + 324)(46^4 + 324)(58^4 + 324)}{(4^4 + 324)(16^4 + 324)(28^4 + 324)(40^4 + 324)(52^4 + 324)}$$

is

- (a) 324 (b) 400
(c) 373 (d) 1024

132. Let $x = 0.123456789101112.....$

998999 where the digits are obtained by writing the integers 1 through 999 in order. Then the 2014th digit to right of the decimal point is

- (a) 7 (b) 6
(c) 5 (d) 9

133. ABC is a right angled triangle with $\angle B = 90^\circ$. M is the mid point of AC and $BM = \sqrt{117}$ cm. Sum of the lengths of the sides AB and BC is 30 cm. The area of the triangle is

- (a) 96 cm² (b) 108 cm²
(c) 114 cm² (d) 125 cm²

134. In a triangle ABC, the incircle touches the sides BC, CA and AB at D, E, F respectively. If the radius of the incircle is 4 units and if BD, CE and AF are consecutive integers the lengths of the sides of the triangle are

- (a) 13, 14, 15 (b) 6, 8, 10
(c) 3, 4, 5 (d) 5, 12, 13

135. In the coordinate plane, the set of points $A_0, A_1, A_2, A_3, \dots, A_n$ are determined as follows. A_0 is the origin. A_1 is the point (3, 4), A_2 is the image of A_1 reflected through the origin, for $k \geq 3$ A_k is the image of A_{k-1} reflected through A_{k-2} . Then the length of the line segment A_0A_7 is

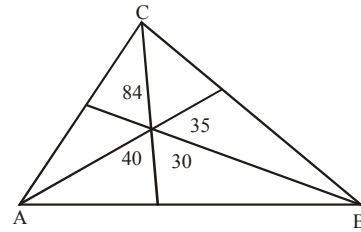
- (a) 100 (b) 215
(c) 125 (d) 251

136. The value of

$$\frac{(2014^2 - 2020)(2014^2 + 4028 - 3)(2015)}{(2011)(2013)(2016)(2017)}$$
 is

- (a) 2014 (b) 2015
(c) 2016 (d) 2017

137. As shown in the figure on the right $\triangle ABC$ is divided into six smaller triangles by lines drawn from the vertices through a common interior point. The areas of four of these triangles are indicated in the figure. Then the area of the triangle is



- (a) 315 (b) 240
(c) 275 (d) 185

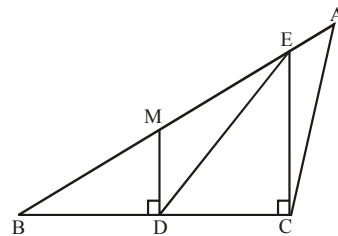
138. If α and β are the angles in the first Quadrant $\tan \alpha = \frac{1}{7}$, $\sin \beta = \frac{1}{\sqrt{10}}$ then the value of $\alpha + 2\beta$ is

- (a) 0° (b) 45°
(c) 60° (d) 90°

139. The point which is equidistant from the points (0, 0) (0, 8) and (4, 6) is

- (a) $\left(\frac{1}{2}, -4\right)$ (b) $\left(\frac{-1}{2}, 4\right)$
(c) $\left(\frac{1}{2}, 4\right)$ (d) $\left(\frac{-1}{2}, -4\right)$

140. In the obtuse triangle ABC, $AM = MB$, $MD \perp BC$, $EC \perp BC$. If the area of $\triangle ABC$ is 24, then the area of $\triangle BED$ is



- (a) 9 (b) 12
(c) 15 (d) 18

141. Let $p(x) = x^2 + bx + c$ where b and c are integers. If $p(x)$ is a factor of both $x^4 + 6x^2 + 25$ and $3x^4 + 4x^2 + 28x + 5$ what is $p(1)$?

(a) 0 (b) 1
(c) 2 (d) 4

142. Given a quadrilateral ABCD inscribed in a circle with side AB extended beyond B to point E. If $\angle BAD = 92^\circ$ and $\angle ADC = 68^\circ$ then the value of $\angle EBC$ is

(a) 66° (b) 68°
(c) 70° (d) 92°

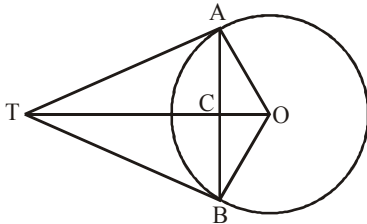
143. If $x^2 + x + 1 = 0$, then what is the value of

$$\left(x^3 + \frac{1}{x^3}\right)^3 ?$$

(a) -8 (b) -1
(c) 0 (d) 1

144. TA, TB are tangents to a circle intersecting TO at C.

Given $\frac{1}{OA^2} + \frac{1}{TA^2} = \frac{1}{36}$
then the value of AB



(a) 10 (b) 12
(c) 14 (d) 8

145. The coefficient of x^7 in the polynomial expansion of $(1 + 2x - x^2)^4$ is

(a) -8 (b) 12
(c) 6 (d) -12

HISTORY

146. After the death of Komaram Bheem, whom did the Nizams government appoint to do some research on the life of tribal people?

(a) Furor Haimondorf
(b) Begum Rukaya Sakhawath Hussain
(c) Chandu Menon
(d) Ramashankar Ray

147. Which of the following is not correct?

(a) The spirit of laws – Montesquieu
(b) Reign of Terror – Maximilian Robespierre
(c) Social Contract Theory – Rousseau
(d) French Revolution – July 4, 1789

148. Which of the following is not correctly matched?

(a) Reichstag – German Parliament
(b) Duma – Russian Parliament
(c) DIET – France Parliament
(d) All of above

149. In which year was the Indian Forest Services set up?

(a) 1864 (b) 1972
(c) 1905 (d) 1988

150. Find out the correctly matched.

(a) Hambledon – The first Cricket Club of the world
(b) Dubai – The headquarters of International Cricket Council
(c) MCC stands for – Marylebone Cricket Club
(d) All of above

151. Who is the author of 'Indulekha' which was the first modern novel in Malayalam?

(a) Narayana Guru
(b) Sahadaran
(c) Chandu Menon
(d) Srinivas Das

152. Find out the wrong statement.

(a) The first known printing press was developed by Gutenberg.
(b) The first known printing press was started in Strasbourg in Germany.
(c) The first book printed by him was 'The Bible'.
(d) The second book printed by him was 'The Prince'.

153. 'Irish Potato Famine' occurred in

- (a) 1845 to 1849
- (b) 1863 to 1867
- (c) 1858 to 1863
- (d) 1929 to 1934

154. Find out the wrongly matched.

- (a) 1929 – Lahore Congress; Congress adopts the demand for Purna Swaraj
- (b) 1930 – Ambedkar establishes Depressed Classes Association
- (c) 1930 – Gandhiji begins Civil Disobedience Movement
- (d) 1931 – First Round Table Conference

155. Sun Yat Sen's, ideas became the basis of the Political Philosophy of the

- (a) Communist Party of China
- (b) Guomindang
- (c) China Liberation Party
- (d) Socialist Party

GEOGRAPHY

156. "There is enough for everybody's need and not for anybody's greed" – Who's concern about the resource conservation are the above words ?

- (a) Malthus
- (b) Sundarlal Bahuguna
- (c) Medha Patkar
- (d) M.K. Gandhi

157. Based on the International Union for Conservation of Nature and Natural Resources (IUCN) which species are considered as vulnerable species ?

- (a) Asiatic Elephant
- (b) Indian Rhino
- (c) Pink head duck
- (d) Brown Bear

158. Which of the following pairs are correctly matched ?

- (a) Mettur – Periyar
- (b) Salal Project – Ravi
- (c) Pravara – Godavari
- (d) Rihand – Chambal

159. Which of the following pairs are correctly matched ?

- (a) Ladang – Indonesia
- (b) Podu – Andhra Pradesh
- (c) Roca – Brazil
- (d) All the above

160. Initially coffee cultivation was introduced on the _____

- (a) Shevoroy Hills
- (b) Palakonda Range
- (c) Javadi Hills
- (d) Baba Buden Hills

161. Which is the finest iron ore with a very high content of iron upto 70% ?

- (a) Hematite
- (b) Magnetite
- (c) Limonite
- (d) Goethite

162. Which two of the following extreme locations are connected by east-west corridor ?

- (a) Mumbai and Nagpur
- (b) Mumbai and Kolkata
- (c) Silcher and Porbander
- (d) Nagpur and Siligudi

163. The highest peak in Western Ghats is

- (a) Anaimudi
- (b) Dodabetta
- (c) Mahendragiri
- (d) Khasi

164. The magnitude of population growth refers to

- (a) The total population of an area
- (b) The number of persons added each year
- (c) The rate at which the population increases
- (d) The number of females per thousand males

- 165.** The average density of population in India during 2001 was _____
- (a) 257
 - (b) 275
 - (c) 340
 - (d) 324

POLITICAL SCIENCE

- 166.** What Act under British rule first prescribed a federation for India ?
- (a) Government of India Act, 1919
 - (b) Government of India Act, 1935
 - (c) Indian Council Act, 1909
 - (d) The Indian Independence Act, 1947
- 167.** The most profound influence was exerted on the Constitution of India by
- (a) The Government of India Act, 1935
 - (b) England Constitution
 - (c) US Constitution
 - (d) Canadian Constitution
- 168.** Which part of our constitution deals with fundamental rights ?
- (a) Part II
 - (b) Part III
 - (c) Part IV
 - (d) Part V
- 169.** The constitution provides three methods of amendments of different portions of the constitution under Article _____
- (a) 326
 - (b) 356
 - (c) 368
 - (d) 370
- 170.** The Constituent Assembly that finally framed India's constitution was set up
- (a) Under the Indian Independence Act
 - (b) Under the Government of India Act 1935
 - (c) Under the Cabinet Mission Plan, 1946
 - (d) By the Wavell Plan

- 171.** The right against exploitation prohibits children
- (a) Below 14 years of age from employment in family businesses
 - (b) Below 14 years of age from being employed in hazardous occupations
 - (c) Below 14 years from working on family farms
 - (d) From doing all the above
- 172.** By Parliament, we mean
- (a) Lok Sabha
 - (b) Lok Sabha and Rajya Sabha
 - (c) Rajya Sabha
 - (d) Lok Sabha, Rajya Sabha and the President
- 173.** According to 'Act of Judicial Services Authority' who are not eligible for availing Judicial Assistance ?
- (a) Citizens belonging to scheduled castes and scheduled tribes
 - (b) Victims of immoral human trafficking, beggars, woman and children
 - (c) Victims of natural Disasters
 - (d) Citizens earning annual income less than ₹ 2,00,000
- 174.** Name the party led by Aung San Suu Kyi
- (a) National League for Democracy
 - (b) ZANU – PF
 - (c) Revolutionary Command Council
 - (d) Myanmar Nationalist Party
- 175.** In the context of assessing democracy which among the following is odd one out ?
- (a) Free and fair elections
 - (b) Dignity of the individual
 - (c) Majority Rule
 - (d) Equal treatment before law

ECONOMICS

- 176.** Human Development Report published by UNDP compares countries based on the

- _____
- (a) Educational levels of the people
(b) Per capita income
(c) Health status
(d) All the above

- 177.** Match list A with list B and select the correct answer using the codes given below the lists.

List-A

- A. Women Employment
B. World Development
C. Health and Education
D. Low per Capita Income
E. Per capita income

List-B

- (i) World Bank
(ii) Average Income Report
(iii) Bihar
(iv) Social indicators
(v) Increases family income

Codes :

	A	B	C	D	E
(a) v	i	iv	iii	ii	
(b) v	i	iii	ii	iv	
(c) i	v	iii	iv	ii	
(d) i	iii	ii	iv	v	

- 178.** Which of these following occupations not belongs to tertiary sector ?

- (a) Fishermen
(b) Milk Vendor
(c) Priest
(d) Bank Manager

- 179.** Consider the following statements

- A. Economic development is a broader and normative concept. It concerns with structural change in economy.
B. Economic growth is a narrow concept. It concerns with increase in the economy's output.

Which of the statement (s) given above is/are true ?

- (a) Only A
(b) Only B
(c) Both A and B
(d) None of the above

- 180.** Real National Income refers to

- (a) National income growth adjusted for inflation
(b) National income growth adjusted for population growth
(c) National income growth adjusted for depreciation rate
(d) National income growth adjusted for saving growth

ANSWERS**MENTAL ABILITY TEST**

1. (d) 2. (b) 3. (a) 4. (d) 5. (c) 6. (c) 7. (d) 8. (e) 9. (a) 10. (d)
11. (b) 12. (c) 13. (a) 14. (e) 15. (d) 16. (a) 17. (a) 18. (e) 19. (c) 20. (d)
21. (b) 22. (c) 23. (e) 24. (e) 25. (a) 26. (b) 27. (e) 28. (a) 29. (c) 30. (d)
31. (e) 32. (b) 33. (d) 34. (a) 35. (c) 36. (a) 37. (e) 38. (b) 39. (d) 40. (a)
41. (e) 42. (c) 43. (a) 44. (d) 45. (c) 46. (b) 47. (d) 48. (b) 49. (e) 50. (c)

ENGLISH

51. (b) 52. (b) 53. (d) 54. (c) 55. (d) 56. (c) 57. (b) 58. (a) 59. (d) 60. (b)
61. (d) 62. (a) 63. (c) 64. (Bonus) 65. (c) 66. (Bonus) 67. (Bonus)
68. (c) 69. (c) 70. (b) 71. (b) 72. (a) 73. (d) 74. (d) 75. (c) 76. (d) 77. (a)
78. (b) 79. (a) 80. (d) 81. (d) 82. (b) 83. (c) 84. (c) 85. (b) 86. (d) 87. (c)
88. (a) 89. (c) 90. (b)

SCHOLASTIC APTITUDE TEST

91. (b) 92. (a) 93. (d) 94. (a) 95. (b) 96. (c) 97. (c) 98. (d) 99. (b) 100. (a)
101. (c) 102. (d) 103. (a) 104. (c) 105. (b) 106. (c) 107. (d) 108. (b) 109. (d) 110. (d)
111. (b) 112. (a) 113. (c) 114. (a) 115. (c) 116. (d) 117. (b) 118. (a) 119. (d) 120. (b)
121. (a) 122. (a) 123. (d) 124. (c) 125. (b) 126. (d) 127. (c) 128. (Bonus) 129. (b)
130. (a) 131. (c) 132. (a) 133. (b) 134. (a) 135. (b) 136. (b) 137. (a) 138. (b) 139. (c)
140. (b) 141. (d) 142. (b) 143. (Bonus) 144. (b) 145. (a) 146. (a) 147. (d) 148. (c)
149. (a) 150. (d) 151. (c) 152. (d) 153. (a) 154. (b) 155. (b) 156. (d) 157. (b) 158. (a)
159. (d) 160. (d) 161. (a) 162. (c) 163. (b) 164. (b) 165. (d) 166. (b) 167. (a) 168. (b)
169. (c) 170. (c) 171. (b) 172. (d) 173. (d) 174. (a) 175. (b) 176. (d) 177. (a) 178. (a)
179. (c) 180. (c)

EXPLANATIONS**MENTAL ABILITY TEST**

1. 4, 13, 31, 58, 94

$$\begin{array}{cccc} \square & \square & \square & \square \\ 9 & 18 & 27 & 36 \end{array}$$

2. 90, 81, 74, 69, 66

$$\begin{array}{cccc} \square & \square & \square & \square \\ -9 & -7 & -5 & -3 \end{array}$$

3. 785, 664, 543, 422, 301

$$\begin{array}{cccc} \square & \square & \square & \square \\ -121 & -121 & -121 & -121 \end{array}$$

4. $1875 \div 5 =$ 375

$$375 \div 5 = 75$$

$$75 \div 5 = 15$$

$$15 \div 5 = 3$$

5. $3 \times 2 = 6$

$$6 \times 4 = 24$$

$$24 \times 8 = 192$$

$$192 \times 16 =$$
 3072

6. 365, 345, 320, 290, 255

$$\begin{array}{cccc} \square & \square & \square & \square \\ -20 & -25 & -30 & -35 \end{array}$$

7. P B L : N D J :: V C R : S F O

$$\begin{array}{cccc} \square & \square & \square & \square \\ -2 & & & \\ +2 & & & \\ +2 & & & \end{array} \quad \begin{array}{cccc} \square & \square & \square & \square \\ -3 & & & \\ +3 & & & \\ -3 & & & \end{array}$$

8. A C E G : B D E F :: J L N P : K M N O

$$\begin{array}{cccc} \square & \square & \square & \square \\ +1 & & & \\ +1 & & & \\ +0 & & & \\ -1 & & & \end{array} \quad \begin{array}{cccc} \square & \square & \square & \square \\ +1 & & & \\ +1 & & & \\ +0 & & & \\ -1 & & & \end{array}$$

9. S R C A : O N D B :: T S G E : P O H F

$$\begin{array}{cccc} \square & \square & \square & \square \\ -4 & & & \\ -4 & & & \\ +1 & & & \\ +1 & & & \end{array} \quad \begin{array}{cccc} \square & \square & \square & \square \\ -4 & & & \\ -4 & & & \\ +1 & & & \\ +1 & & & \end{array}$$

10. A B C D E : C D E A B :: R S T U V : T U V R S

$$\begin{array}{cccc} \square & \square & \square & \square \\ +2 & & & \\ +2 & & & \\ +2 & & & \\ -3 & & & \\ -3 & & & \end{array} \quad \begin{array}{cccc} \square & \square & \square & \square \\ +2 & & & \\ +2 & & & \\ +2 & & & \\ -3 & & & \\ -3 & & & \end{array}$$

11. A C F H, B D G I, C E H J, D F I K

$$\begin{array}{cccc} \square & \square & \square & \square \\ +1 & & & \\ +1 & & & \\ +1 & & & \\ +1 & & & \end{array}$$

12. U A B P, T B C O, S C D N, R D E M

$$\begin{array}{cccc} \square & \square & \square & \square \\ -1 & & & \\ +1 & & & \\ +1 & & & \\ -1 & & & \end{array}$$

13. Y X V, B C E, U T R, F G I

$$\begin{array}{cccc} \square & \square & \square & \square \\ 4 & & & \\ 4 & & & \\ 4 & & & \\ 4 & & & \\ 4 & & & \end{array}$$

14. L M N O P, M N O P L, N O P L M, O P

$$\begin{array}{cccc} \square & \square & \square & \square \\ \square & \square & \square & \square \\ \square & \square & \square & \square \\ \square & \square & \square & \square \end{array}$$

15. Korea, China, Thailand and Bangladesh are Asian countries, while Finland is a European country.

16. Leopard, Tiger, Cheetah and Lion, all are carnivorous animals while Elephant is a herbivorous animal.

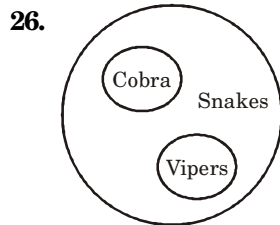
17. Earth Saturn, Neptune and Venus are planets in a solar system, while moon is a satellite of the planet Earth.

18. Portuguese, Romanian, Italian and Russian, all are the national languages of Portugal, Romania, Italy and Russia, while Pali is a middle Indo-Aryan language.

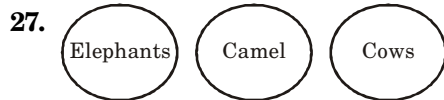
19. Srinivasa Ramanujan, Sir C.V. Raman, U.R. Rao and Ms. Swaminathan all are related to science while U.R. Anantha Murthy was a contemporary writer.

20. Coimbatore, Shimoga, Patiala and Kozhikode are cities, while Ranchi is the capital of Jharkhand.

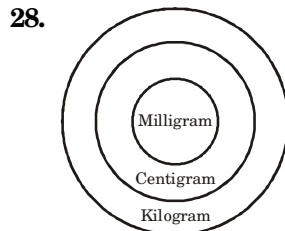
21. Rome is the capital of Italy, while Helsinki is the capital of Finland.
22. The author of Godaan was Munshi premchand and the author of Anandamath was Bankim chandra chatterjee.
23. Theory of evolution was given by Darwin Similarly crescograph device was invented by Jagadish chandra Bose.
24. Jaipur is the capital of the state Rajasthan similarly Dehradun is the capital of the state Uttarakhand.
25. Rahul Bajaj is related to Business while chandrasekhar Azad was the freedom struggle.



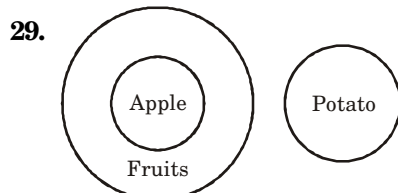
Cobra and vipers are types of snakes.



Elephants, camel and cows are animals belong to different groups.

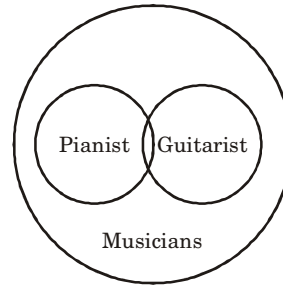


Milligram is the smallest unit of weight. Milligrams are combined to get a centigram and centigrams are combined to get a kilogram.



All apples are fruits, while potato is a type of vegetable.

30.



Some pianist are Guitarist. Some Guitarist are pianist and All pianists and Guitarists are musicians.

31. In the given diagram Doctors who are also Artists and philosophers are indicated by letter 'g'.
32. The letter 'i' indicates philosophers who are also Musicians and Artists.
33. The letter indicates philosophers who are also Doctors, Artists and Musicians is 'f'.
34. The letter 'h' indicates philosophers, Doctors who are neither Musicians nor Artists.
35. The letter that indicates Doctors who are also philosophers and Musicians is 'j'.

Solution (36 – 38) :

H	E	A	R	T	D	I	S	K
↓	↓	↓	↓	↓	↓	↓	↓	↓
1	2	3	4	5	6	7	8	9

36. H A S T E
↓ ↓ ↓ ↓ ↓
1 3 8 5 2

37. K A R A T E
↓ ↓ ↓ ↓ ↓
9 3 4 3 5 2

R I S K
↓ ↓ ↓ ↓
4 7 8 9

39. $159 \div ? = 15900$

$$\frac{159}{?} = 15900$$

$$\therefore ? = \frac{1}{100} = 0.01$$

$$40. \frac{65}{100} \times 7 = \frac{455}{100}$$

$$= 4.55$$

$$41. \frac{40 + 0.24}{8} = \frac{40.24}{8}$$

$$= 5.03$$

$$42. \frac{5x + 215}{3} = 4x + 60$$

$$\Rightarrow 5x + 215 = 12x + 180$$

$$7x = 35$$

$$\therefore x = 5$$

43. In the given figure (b) is half of the first figure (a) and also the second figure (b) is shaded, similarly answer figure (1) is the required figure of the question figure (c).

44. In the given question figure (a) the upper part there is a concentric circle and the lower part, there is a rectangle. so in the second figure (b), there is a circle which is shaded is the inner circle of the first figure (a) and also there is a rectangle in a circle similarly answer (4) is the required figure of the question figure (c).

45. Answer figure (3) is required figure of the question figure (c).

46. In the given figure (b) is the mirror image of the first figure similarly answer figure (2) is the correct mirror image of the question figure (c).

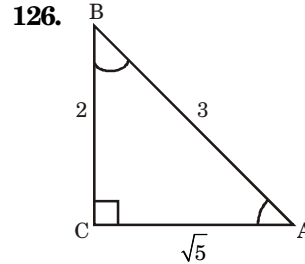
47. In the given question figure, arrow move 45° clockwise direction, so the answer figure (4), is the next figure in the given series.

48. Answer figure (2) is the required figure of the given series.

49. In the given series, answer figure (5) is next figure.

50. Answer figure (3) is the next figure of the given series.

SCHOLASTIC APTITUDE TEST



ABC is a right angle at C.

Here $\sin A = \frac{2}{3} = \frac{BC}{AB}$

Now $CA = \sqrt{(AB)^2 - (BC)^2}$

$$= \sqrt{(3)^2 - (2)^2} = \sqrt{5}$$

$$\tan B = \frac{CA}{BC} = \frac{\sqrt{5}}{2}$$

127.

3	11.00 00	3.31
+3	9	
63	200	
+3	189	
661	1100	
+1	661	
662	439	

So the square root of 11 = 3.31

Now $10 - 3\sqrt{11} = 10 - 3.31 \times 3$

$$= 0.07$$

$$3\sqrt{11} - 10 = 9.93 - 10$$

$$= -0.07$$

5	26.00 00	5.09
+5	25	
1009	10000	
9	9081	
1018	919	

$$\begin{aligned}
 51 - 10\sqrt{26} &= 51 - 10 \times 5.09 \\
 &= 51 - 50.9 \\
 &= 0.1
 \end{aligned}$$

3	13.00	
+3	9	3.60
66	400	
+6	396	
720	400	

$$\begin{aligned}
 18 - 5\sqrt{13} &= 18 - 5 \times 3.605 \\
 &= 18 \times 18.03 \\
 &= -0.3
 \end{aligned}$$

So $51 - 10\sqrt{26}$ is the smallest positive number.

$$\begin{aligned}
 \text{129. } a^2 + b^2 + 2c^2 - 4a + 2c - 2bc + 5 &= 0 \\
 (a^2 - 4a + 4) + (b^2 + c^2 - 2bc) + (c^2 + 1) &= 0 \\
 (a - 2)^2 + (b - c)^2 + (c^2 + 1) &= 0
 \end{aligned}$$

$$a = 2$$

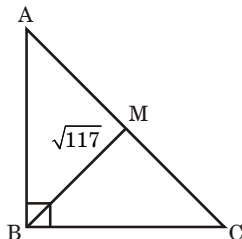
$$b = c$$

$$c = -1$$

$$\therefore b = -1$$

$$\text{Now } a + b - c = 2 - 1 + 1 = 2$$

133.



ABC is a right angled triangle at

$$\angle B = 90^\circ.$$

$$\text{Also } BM = \sqrt{117} \text{ cm}$$

If M is the mid-point of AC, then

$$AC = 2 BM = 2\sqrt{117} \text{ cm}$$

we have

$$AB + BC = 30$$

Now let the length of the sides AB and BC of right-angle triangle ABC be x and $30 - x$.

According to question

$$AC^2 = AB^2 + BC^2$$

$$(2\sqrt{117})^2 = x^2 + (30 - x)^2$$

$$468 = 2x^2 - 60x + 900$$

$$x^2 - 30x + 216 = 0$$

$$x^2 - 18x - 12x + 216 = 0$$

$$x(x - 18) - 12(x - 18) = 0$$

$$(x - 12)(x - 18) = 0$$

$$\therefore x = 12, 18$$

$$\text{Now if } AB = x = 12 \text{ cm}$$

$$\text{then } BC = 18 \text{ cm}$$

Now area of the triangle ABC

$$= \frac{1}{2} \times BC \times AC$$

$$= \frac{1}{2} \times 18 \times 12 = 108 \text{ cm}^2$$

134. Here the radius of an incircle $r = 4$ units

Now the given options are the sides of a triangle ABC, if

$$r = \frac{\Delta}{s}$$

From option (1)

$$r = \sqrt{\frac{5(5-a)(5-b)(5-c)}{5}}$$

$$= \sqrt{\frac{21 \times 8 \times 7 \times 6}{21}}$$

$$= \frac{7 \times 2 \times 6}{21}$$

$$= 4 \text{ units}$$

So the given length is the sides of a triangle ABC.

138. Given

$$\tan \alpha = \frac{1}{7}$$

$$\sin \beta = \frac{1}{\sqrt{10}}$$

$$\operatorname{cosec} \beta = \sqrt{10}$$

$$\operatorname{cosec}^2 \beta - \cot^2 \beta = 1$$

$$\therefore \cot \beta = \sqrt{(10)^2 - 1} = 3$$

$$\therefore \tan \beta = \frac{1}{3}$$

$$\text{Now } \tan(\alpha + 2\beta) = \frac{\tan \alpha + \tan 2\beta}{1 - \tan \alpha \cdot \tan 2\beta}$$

$$= \frac{\tan \alpha + \frac{2 \tan \beta}{1 - \tan^2 \beta}}{1 - \tan \alpha \left(\frac{2 \tan \beta}{1 - \tan^2 \beta} \right)}$$

$$= \frac{\frac{1}{7} + \frac{2 \left(\frac{1}{3} \right)}{1 - \frac{1}{9}}}{1 - \frac{1}{7} \left(\frac{2 \left(\frac{1}{3} \right)}{1 - \frac{1}{9}} \right)}$$

$$= \frac{\frac{1}{7} + \frac{3}{4}}{1 - \frac{1}{7} \times \frac{3}{4}}$$

$$\tan(\alpha + 2\beta) = 1 = \tan 45^\circ$$

$$\therefore \alpha + 2\beta = 45^\circ$$

139. Let $p(x, y)$ be the point.

The distance between (x, y) and $(0, 0)$ is

$$D = \sqrt{(x-0)^2 + (y-0)^2}$$

$$D = \sqrt{x^2 + y^2}$$

$$D^2 = x^2 + y^2 \quad \dots(i)$$

The distance between (x, y) and $(0, 8)$ is

$$D = \sqrt{(x-0)^2 + (y-8)^2}$$

$$D^2 = x^2 + (y-8)^2 \quad \dots(ii)$$

The distance between (x, y) and $(4, 6)$ is

$$D = \sqrt{(x-4)^2 + (y-6)^2}$$

$$D^2 = (x-4)^2 + (y-6)^2 \quad \dots(iii)$$

Since the point (x, y) is equi-distant from the points $(0, 0)$, $(0, 8)$ and $(4, 6)$

So equation (i) and (ii),

$$x^2 + y^2 = x^2 + (y-8)^2$$

$$64 - 16y = 0$$

$$\therefore y = 4$$

and from equation (i) and (iii), we have

$$x^2 + y^2 = (x-4)^2 + (y-6)^2$$

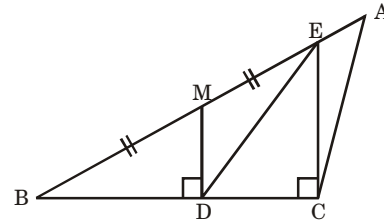
$$x^2 + 16 = x^2 + 16 - 8x + 4$$

$$8x = 4$$

$$\therefore x = \frac{1}{2}$$

So the point is $\left(\frac{1}{2}, 4\right)$

140.



In the obtuse triangle ABC,

$$AM = MB$$

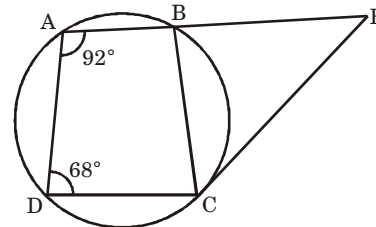
$MD \perp BC$ and $EC \perp BC$

Now area of $\triangle ABC = 24$

$$\text{So the area of } \triangle BED = \frac{\text{area of } \triangle ABC}{2}$$

$$= \frac{24}{2} = 12$$

142.



ABCD is a quadrilateral inscribed in a circle. All the points lie on the circle. So ABCD is a cyclic quadrilateral.

$$\begin{aligned}
 \therefore \quad \angle BAD + \angle BCD &= 180^\circ \\
 \text{and } \angle ADC + \angle ABC &= 180^\circ \\
 \therefore \quad \angle ABC &= 180^\circ - 68^\circ = 112^\circ \\
 \text{Now } \angle EBC + \angle ABC &= 180^\circ \\
 \therefore \quad \angle EBC &= 180^\circ - 112^\circ = 68^\circ
 \end{aligned}$$

143. Given $x^2 + x + 1 = 0$

$$x^2 + 1 = -x$$

$$x \left(x + \frac{1}{x} \right) = -x$$

$$\left(x + \frac{1}{x} \right) = -1 \quad \dots(i)$$

$$\begin{aligned}
 \text{Now } \left(x^3 + \frac{1}{x^3} \right)^3 &= \left[\left(x + \frac{1}{x} \right)^3 - 3 \left(x + \frac{1}{x} \right) \right]^3 \\
 &= [(-1)^3 - 3(-1)]^3 \\
 &= [-1 + 3]^3 = 8
 \end{aligned}$$

None of the option is correct.

■ ■

NTSE - 2014

TAMIL NADU

PART I : MENTAL ABILITY TEST

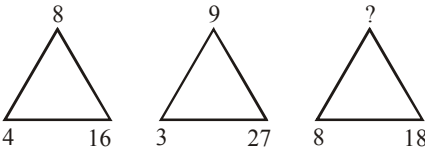
Directions(Q.1-10): In each of the following questions, the numbers / letters are arranged based on some pattern or principle. Choose the correct answer for the term marked by the symbol (?).

1. 0, 3, 9, 18, 30, ?

- (a) 48 (b) 42
(c) 36 (d) 45

2. 6, 9, 18, 21, 30, ?

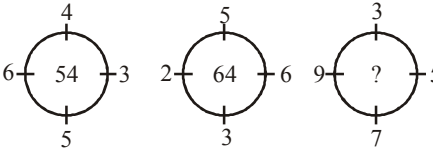
- (a) 38 (b) 33
(c) 36 (d) 39

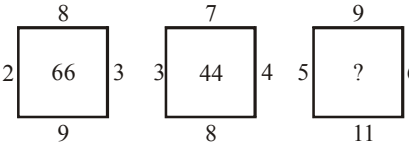
3. 
(a) 16 (b) 10
(c) 9 (d) 12

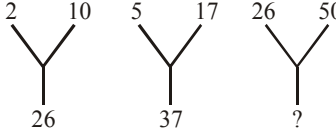
4.

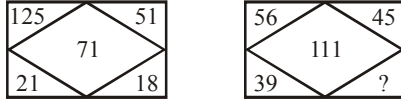
5	3	3
8	10	8
35	27	?

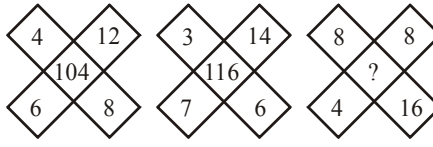
- (a) 18 (b) 40
(c) 21 (d) 24

5. 
(a) 86 (b) 138
(c) 76 (d) 120

6. 
(a) 22 (b) 88
(c) 69 (d) 153

7. 
(a) 82 (b) 81
(c) 48 (d) 26

8. 
(a) 195 (b) 139
(c) 121 (d) 84

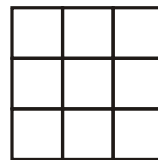
9. 
(a) 160 (b) 116
(c) 150 (d) 128

10. How many triangles are there in the given figure ?



- (a) 8 (b) 10
(c) 12 (d) 11

11. The number of squares in the given figure is

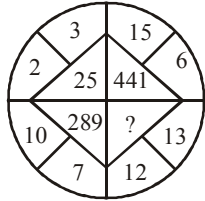


- (a) 9 (b) 10
(c) 14 (d) 12

12. $2*5 = 83325$; $4*6 = 6410036$, $3*7 = 277649$
then $5*9 = \underline{\hspace{2cm}}$.

(a) 12520681 (b) 1254481
(c) 25704729 (d) 125604729

13. Insert the missing number :

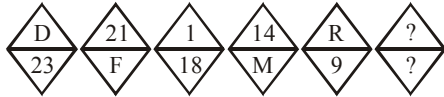


(a) 625 (b) 125
(c) 225 (d) 25

14. Which one of the following pairs is different from other three pairs ?

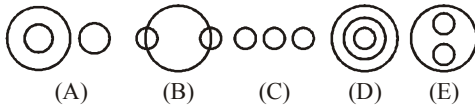
(a) BFJN : YUQM (b) EIMQ : VRNJ
(c) GLQV : TOJE (d) KOSW : PLHD

15. Choose from the given options, the correct letter-number pair to replace the ? and to continue the series.



(a) $\frac{S}{10}$ (b) $\frac{U}{4}$
(c) $\frac{3}{X}$ (d) $\frac{6}{U}$

Directions (Q. 16–20) : According to the relevance of three elements in each question, choose the sets of elements which exactly fit in one of the diagrams marked as (A), (B), (C), (D) and (E).



16. Crow : Pigeon : Bird

(a) (B) (b) (C)
(c) (A) (d) (E)

17. India : Earth : Jupiter

(a) (D) (b) (A)
(c) (E) (d) (B)

18. Music : Rhythm : Dance

(a) (D) (b) (A)
(c) (B) (d) (E)

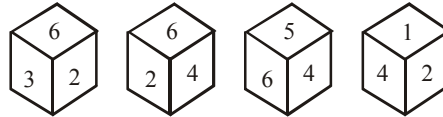
19. Cells : Tissues : Organs

(a) (B) (b) (A)
(c) (E) (d) (D)

20. Television : Computer : Typewriter

(a) (C) (b) (D)
(c) (A) (d) (E)

21. The number opposite to '3' in the given die is :



(a) 4 (b) 5
(c) 1 (d) 2

22. If P stands for '+'

P stands for '−'

P stands for '×'

P stands for '÷', then

$2P4Q6R8S1R3Q5P7$ is ;

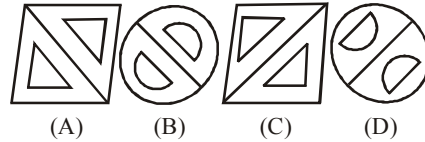
(a) 0 (b) − 136
(c) − 150 (d) 2

23. Find the odd man out in the series.

64, 71, 80, 91, 104, 119, 135, 155

(a) 71 (b) 80
(c) 119 (d) 135

24. Find the odd figure in the given sequence.



(a) (A) (b) (B)
(c) (C) (d) (D)

25. Complete the series :

0.5, 0.55, 0.65, 0.8, ?

(a) 0.85 (b) 0.9
(c) 0.95 (d) 1.0

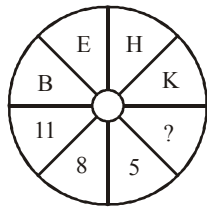
26. A man starts from his house and goes 5 km towards north and turns right and goes 5 km. Again he goes 5 km to his left and turns left and goes 15 km further. Now, in which direction is he from his house ?

(a) North (b) North-West
(c) East (d) North-East

27. If $A * E = C$; $H * L = J$; $P * T = R$ then, $J * (L * P) = ?$

(a) K (b) I
(c) L (d) N

28. Choose from the given options, the correct Letter-Number pair to replace the (?) and to continue the series.



(a) 3 (b) 7
(c) 2 (d) 6

29. If POUND is coded as MLRKA, how will ENGLISH be coded ?

(a) AKDJEPF (b) BJDIFOE
(c) BKDIFPE (d) BKDIDOE

30. SHINE, VEMJJ, XBQFO, ?

(a) ZXTAS (b) AYUBT
(c) BZVCU (d) WTUAV

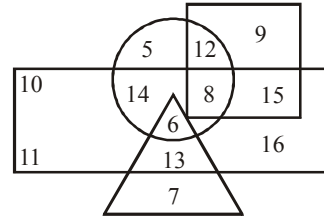
31. The mirror image of the word WEATHER.

(a) MEVLHET
(b) ЯEHJAEW
(c) MATHET
(d) ЯEHTAEW

32. Paper : Pen :: Blackboard : _____.

(a) Teacher
(b) Student
(c) Notebook
(d) Chalk

Directions (Q. 33-39) : In the following diagram Rectangle represents women, Circle represents urban, Triangle represents Post Graduates and Square represents librarians.



33. Who among the following is a Post Graduate who is not an urban resident ?

(a) 6 (b) 7
(c) 11 (d) 20

34. Who among the following is a Woman Librarian, who is neither post graduate nor belongs to urban area ?

(a) 9 (b) 15
(c) 6 (d) 10

35. Who among the following is a woman, urban and also a librarian but not a post graduate ?

(a) 15 (b) 14
(c) 8 (d) 12

36. Who among the following is neither a librarian nor a post graduate but is urban and not a woman ?

(a) 4 (b) 5
(c) 8 (d) 12

37. Who among the following is only a librarian but not a woman nor urban resident and not a post graduate ?

(a) 9 (b) 10
(c) 11 (d) 16

38. Who among the following is a man, urban resident and also a librarian ?

(a) 8 (b) 9
(c) 12 (d) 15

39. Who among the following is a post graduate woman who comes from urban area ?

(a) 6 (b) 14
(c) 13 (d) 7

40. 351 means "Students like maths"; 797 means "We are student" and 748 means "They are parents". The digit for "We" is :

(a) 4 (b) 8
(c) 9 (d) 5

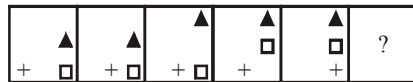
41. If 'BROTHER' is 86; 'FATHER' is 58 and 'SISTER' is 90 then 'MOTHER' is ____.

(a) 83 (b) 73
(c) 79 (d) 52

42. If fifth day of a month is four days earlier than Wednesday, what day will it be on Twenty eighth day of the month ?

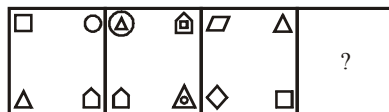
(a) Sunday (b) Monday
(c) Tuesday (d) Wednesday

43. The next figure in the following sequence of figures is



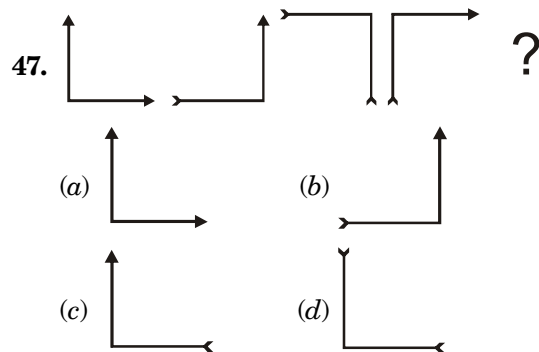
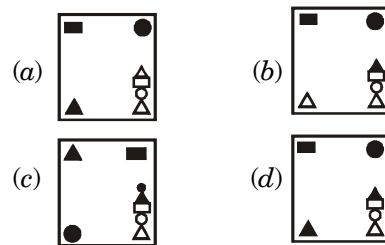
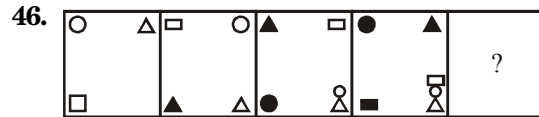
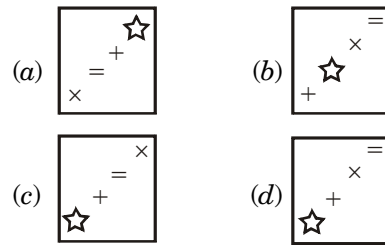
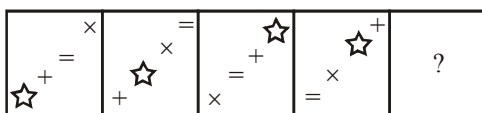
(a) (b)
(c) (d)

44. The next figure in the following sequence of figures is



(a) (b)
(c) (d)

45. The next figure in the following sequence of figures is :



48. Find out the word that cannot be formed by using the letters in the word "ERYTHROBLAST"

(a) BLAST (b) BLAME
(c) THEORY (d) ROAST

49. From the four alternatives only one differs from the remaining three. Identify it.

(a) Aries (b) Virus
(c) Aquarius (d) Pisces

50. Choose the correct answer for the term marked by the symbol (?)

P3, ?, J9, G12, D15

(a) K6 (b) M6
(c) M8 (d) L8

PART II : ENGLISH

Directions (Q. 51–55) : *Read the following passage and answer the questions given below :*

Fleas are perfectly designed by nature to feast on anything containing blood. The bodies of these tiny parasites are extremely hardy and well-suited for their job. A flea has a very hard exoskeleton, which means the body is covered by a tough, tile-like plate called a sclerite. Because of these plates, fleas are almost impossible to squish. The exoskeletons of fleas are also waterproof and shock resistant, and therefore fleas are highly resistant to the sprays and chemicals used to kill them.

Fleas are some of the best jumpers in the natural world. A flea can jump seven inches, or 150 times its own length, either vertically or horizontally. Fleas can jump 30,000 times in a row without stopping and they are able to accelerate through the air at an incredibly high rate, a rate which is over ten times what humans can withstand in an airplane. Fleas have very long rear legs with huge thigh muscles and multiple joints. When they get ready to jump, they fold their long legs up and crouch like a runner on a starting block. Several of their joints contain a protein called resilin, which helps catapult fleas into the air as they jump, similar to the way a rubber band provides momentum to a slingshot. Outward facing claws on the bottom of their legs grip anything they touch when they land. The adult female flea mates after her first blood meal and begins producing eggs in just 1 to 2 days. One flea can lay up to 50 eggs in one day and over 2000 in her lifetime. Flea eggs can be seen with the naked eye, but they are about the size of a grain of salt. Shortly after being laid the eggs begin to transform into cocoons. In the cocoon state, fleas are fully developed adults, and will hatch immediately if conditions are favourable.

51. The primary purpose of the passage is to :
 - (a) educate the reader about the physical characteristics of fleas.
 - (b) compare fleas to other members of the animal kingdom.
 - (c) relate the problems that can result from a flea infestation.
 - (d) explain that a flea exists everywhere and hard to get rid of.
52. According to the passage, fleas are resistant to sprays and chemicals because they :
 - (a) have waterproof sclerites
 - (b) are excellent jumpers
 - (c) reproduce very rapidly
 - (d) can stick to fur like Velcro
53. According to the passage, fleas are able to jump :
 - (A) with a high rate of acceleration.
 - (B) up and down and from side to side.
 - (C) because the blood they eat contains resilin.
 - (a) (A) only
 - (b) (A) and (B) only
 - (c) (B) and (C) only
 - (d) (A), (B) and (C)
54. Based on information in the passage, the reader can understand that :
 - (a) fleas will die without access to blood.
 - (b) fleas survive at a higher rate in outdoor habitats
 - (c) fleas will die after they produce 2000 eggs.
 - (d) newly hatched fleas are the size of a grain of salt.
55. It can be inferred that fleas will emerge from eggs as adults :
 - (a) when they outgrow the cocoon.
 - (b) after a period of three weeks.
 - (c) when they sense there is access to blood.
 - (d) if there is too much carbon dioxide in the cocoon.

Directions (Q. 56–60) : Read the following passage and answer the questions given below :

The greatest enemy of mankind, as people have discovered is not science, but war. Science merely reflects the social forces by which it is surrounded. It is found that when there is peace, science is constructive, when there is war, science is perverted to destructive ends. The weapons which science gives us do not necessarily create war, these make war increasingly more terrible. Until now it has brought us to the doorstep of doom. Our main problem, therefore, is not to curb science, but to stop war to substitute law for force and international government for anarchy in the relations of one nation with another. That is a job in which everybody must participate, including the scientists. But the bomb of Hiroshima suddenly woke us up to the fact that we have very little time. The hour is late and our work has scarcely begun. Now we are face to face with this urgent questions, "Can education and tolerance, understanding and creative intelligence run fast enough to keep us abreast with our own mounting capacity to destroy" ? That is the question which we shall have to answer one way or the other in this generation. Science must help us in the answer, but the main decision lies within ourselves.

- 56.** According to the author, the real enemy of mankind is not science but war, because :
- science during wars is so destructive.
 - science merely invents the weapons with which war is fought.
 - the weapons that science invents necessarily lead to war.
 - the weapons invented by science do not cause war, though these make it more destructive.

57. War can be stopped if :

- weapons invented by science are not used to launch a war.
- science is restricted to be utilized only during war time.
- science is not allowed to lead us to utter destruction.
- we replace force and lawlessness by law and international government.

58. Which of the following is opposite in meaning to the word 'anarchy' as used in the passage ?

- law and order
- economic prosperity
- political dominance
- communal harmony

59. The phrase 'our work has scarcely begun' implies that our work :

- has not yet begun
- has begun but not yet completed
- has only just begun
- has been half way through

60. According to the writer, the main objective is to :

- prevent scientists from participating in destructive activities.
- abolish war
- stop scientific activities everywhere
- stop science from reflecting social forces

Directions (Q. 61–65) : Fill in the blanks with the most appropriate option given below :

Some theorists believe that the conditions, of urban life harm the people who live in cities. Louis Wirth 61 in the 1930s that the huge number of people, population density and great social diversity of cities led to 62 impersonal relations, and stress. Many since then have agreed with him. People live 63 close to one another but are socially distant.

They mark few friendships outside their own racial, social or economic group. And they are constantly attacked on all sides by a variety of sights, sounds, and smells. They are **64** bumped by others on the street. They hear their neighbours' radios through thin apartment walls, and sirens **65** at all hours of the day and night.

- 61.** (a) said (b) opined
(c) argued (d) elaborated
- 62.** (a) alienation (b) orientation
(c) integration (d) confusion
- 63.** (a) ethically (b) happily
(c) physically (d) willingly
- 64.** (a) accidentally (b) occasionally
(c) intermittently (d) frequently
- 65.** (a) banging (b) wailing
(c) mourning (d) harping

Directions (Q. 66–67) : *The following five sentences come from a paragraph. The first and the last sentences are given. Choose the order in which the three sentences (PQR) should appear to complete the paragraph.*

- 66.** S1. The Indian woman wants
S2. _____
S3. _____
S4. _____
S5. And it is not too much to be demanded
P. in a male dominated society
Q. her rightful place
R. as an equal partner
Choose from the options given below :
(a) QPR (b) PRQ
(c) RQP (d) QRP
- 67.** S1. We had in our village
S2. _____
S3. _____
S4. _____
S5. near the river and throw stones into the water

- P. Whome I well remember who from
Q. Morning till night would sit on a stone
R. Some thirty years ago a stupid boy
Choose from the options given below :
(a) QPR (b) QRP
(c) RPQ (d) PRQ

Directions(Q.68–70) : *Select the most appropriate option to fill in the blanks from the given alternatives.*

- 68.** My father _____ as a teacher.
(a) working (b) is working
(c) works (d) is worked
- 69.** Leela _____ Raju for years about his smoking habits, but he just won't listen.
(a) warn
(b) warned
(c) have been warning
(d) has been warning
- 70.** Had you told me the short cuts earlier, _____ the contest.
(a) will have won (b) would have won
(c) would be won (d) will be winning

Directions (Q. 71–75) : *Select the meaning of the given phrases / idioms.*

- 71.** To bury the hatchet.
(a) To dispute over small things
(b) To destroy
(c) To make up a quarrel
(d) To repair a costly furniture
- 72.** To turn over a new leaf.
(a) To change one's behavior for the better
(b) To read something attentively
(c) To remain vigilant
(d) To become cautious from now
- 73.** Once in a blue moon.
(a) frequently
(b) on a New Moon day
(c) only once
(d) rarely

74. A snake in the grass.
 (a) a very poisonous snake
 (b) a secret agent
 (c) an unrecognisable enemy
 (d) not trustworthy

75. To be above board.
 (a) To have a good height
 (b) To be honest in any deal
 (c) To have no debts
 (d) To be secretive in any deal

Directions (Q. 76–80) : Choose the word which best suits to fill in the blank from the four options given below.

76. Mini was badly _____ by the news which she got in the letter.
 (a) electrified (b) petrified
 (c) deranged (d) shaken
77. The car driver was arrested for rage? driving and his license was _____.
 (a) impounded (b) confiscated
 (c) suspended (d) penalize
78. The chairman will come here at 5 p.m. to _____ a lecture.
 (a) offer (b) speak
 (c) talk (d) deliver
79. Cellular phone service has _____ a new phase of communication.
 (a) called (b) ushered
 (c) paved (d) started
80. AIDS is not a disease that can be _____ through the air or by insects.
 (a) circulated (b) transferred
 (c) transmitted (d) disseminated

Directions (Q. 81–85) : Choose the correct word to substitute the phrasal verb underlined.

81. She could not put up with all his nonsense.
 (a) tolerate (b) wear
 (c) accept (d) allow

82. They decided to do away with the old system.

(a) remove (b) repair
 (c) prepare (d) reject

83. Rosy put on her make-up very carefully.

(a) reduced (b) applied
 (c) wiped out (d) cleaned

84. The burglars got away through the window.

(a) entered (b) escaped
 (c) broke (d) jumped

85. I am not able to make out anything from your speech.

(a) conclude (b) understand
 (c) create (d) prepare

Directions (Q. 86–90) : Which one of the following sentences is correct ?

86. (a) He is more lazy than stupid
 (b) He is more lazier than stupid
 (c) He is lazier than stupid
 (d) He is laziest than stupid
87. (a) Let the window be opening
 (b) Let the window be opened
 (c) Let the window open
 (d) Let the window opened
88. (a) She can speak Japanese, will she ?
 (b) She can speak Japanese, won't she ?
 (c) She can speak Japanese, can she ?
 (d) She can speak Japanese, can't she ?
89. (a) I can be able to repair this machine
 (b) I can repair this machine
 (c) I am able to repairing this machine
 (d) I can able to repair this machine
90. (a) Ruth didn't turn up, nor did Anne.
 (b) Ruth didn't turn up, Anne did nor.
 (c) Ruth didn't turn up, did nor Anne.
 (d) Ruth didn't turn up, Anne nor did.

PART III :
SCHOLASTIC APTITUDE TEST

MATHEMATICS

- 91.** Let N be the set of natural numbers and P be the set of prime integers in N . If $A = \{n/n \in N, n \text{ is a multiple of some prime } p \in P\}$, then $N - A = \{n \in N/n \notin A\}$ is :
- (a) empty set
(b) of cardinality 2
(c) a finite set of cardinality greater than 2
(d) a singleton set
- 92.** The sum of the first k natural numbers is A , for a certain $k > 1$; the sum of their cubes is B , then $\log \sqrt{A}^B$ is
- (a) 4 (b) 3
(c) 2 (d) 1
- 93.** Given that $P(x)$ and $Q(x)$ are polynomials of degree 3 with real coefficients, which one of the following is **not** true ?
- (a) $\deg[P(x) \times Q(x)] = 6$
(b) $\deg[P(x) + Q(x)] = 3$
(c) $\deg[P(x) - Q(x)] \leq 3$
(d) $\deg[P(x)^2[Q(x)]^3] = 3$
- 94.** Suppose that a quadratic polynomial $x^2 + bx + 1$, $b \in \mathbb{R}$, has two zeros which are both real then which one of the following is necessarily true ?
- (a) b can have infinitely many values
(b) b has a unique value
(c) b has at most two distinct values
(d) b has at most four distinct values
- 95.** It is given that there is no solution to the system $x + 2y = 3$, $ax + by = 4$. Which one of the following is true ?
- (a) a has a unique value
(b) b has a unique value
(c) a can have more than one value
(d) a has exactly two different values
- 96.** The unit digit in the decimal expansion of 7^{25} is :
- (a) 1 (b) 3
(c) 5 (d) 7
- 97.** If the sum S of three consecutive even numbers is a perfect square between 200 and 400, then the square root of S is :
- (a) 15 (b) 16
(c) 18 (d) 19
- 98.** The number are arranged in the descending order : 108, 94, 88, 82, $x + 7$, $x - 7$, 60, 58, 42, 39. If the median is 73, the value of x is :
- (a) 72 (b) 73
(c) 76 (d) 75
- 99.** The mean of 16 numbers is 48. If each number is divided by 4 and diminished by 3, then the new mean is :
- (a) 12 (b) 48
(c) 52 (d) 9
- 100.** A natural number k is chosen from the set $\{1, 2, 3, \dots, 100\}$. The probability that it is prime, is :
- (a) $\frac{1}{4}$ (b) $\frac{1}{5}$
(c) $\frac{19}{100}$ (d) $\frac{23}{100}$
- 101.** If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ where $a, b, c, d \in \mathbb{R}$ such that $AB = BA$ for each 2×2 matrix B , then $b^2 + c^2$:
- (a) can have any positive value
(b) 0
(c) 1
(d) 2
- 102.** If each side of a rectangle is increased by 20% then the percentage increase in its area is :
- (a) 40% (b) 20%
(c) 44% (d) 30%

103. The perimeter and area of a sector are 18 cm and 20 sq. cm respectively. Then the length of the arc is :

- (a) 10 cm or 8 cm
(b) 10 cm or 5 cm
(c) 10 cm or 4 cm
(d) 20 cm or 2 cm

104. If $\sec \theta + \cos \theta = \sqrt{5}$, the value of $\sec^2 \theta + \cos^2 \theta$ is :

- (a) 5 (b) 7
(c) 25 (d) 3

105. The value of

$\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \dots + \sin^2 90^\circ$
is :

- (a) 8 (b) $9\frac{1}{2}$
(c) 9 (d) 10

106. ABC is a triangle with vertices A(1, 2), B(π , 2), C(1, π), then the orthocenter of the $\triangle ABC$ has coordinates :

- (a) $\left(\frac{2+\pi}{3}, \frac{4+\pi}{3}\right)$ (b) $\left(\frac{\pi+1}{2}, \frac{2+\pi}{2}\right)$
(c) (1, 2) (d) $\left(\frac{\pi}{3}, \frac{\pi}{3}\right)$

107. The circle S_1 has centre at (1, 2) and radius 3; the circle S_2 has centre at (9, 8) and radius 7. The circles S_1 and S_2 touch at the point whose coordinates are :

- (a) $\left(\frac{17}{5}, \frac{19}{5}\right)$ (b) $\left(\frac{33}{5}, \frac{31}{5}\right)$
(c) $\left(\frac{17}{10}, \frac{19}{10}\right)$ (d) $\left(\frac{33}{10}, \frac{31}{10}\right)$

108. It is given that there are 6 straight lines in a plane so that no three of them are concurrent and no two are parallel. Then the number of points of intersection among the given six straight lines is :

- (a) 6 (b) 12
(c) 15 (d) 3

109. AB is a chord of a circle S subtending an angle of 20° at the centre. Suppose AB has length 1008 units and CD is another chord having length 1512 units, then the angle subtended by CD at the centre is :

- (a) 40° (b) 30°
(c) 60° (d) 25°

110. If $x = 3 + \sqrt{8}$, then $x^4 + \frac{1}{x^4}$ is

- (a) 1056 (b) 1158
(c) 1156 (d) 1154

SCIENCE

111. Light year is the unit to measure :

- (a) the distance travelled by the light in a year
(b) the distance travelled by the atoms in a year
(c) the distance travelled by the earth in a year
(d) the distance travelled by the sound in a year

112. The _____ in running water turns a turbine to run a dynamo and produces electricity.

- (a) Kinetic energy
(b) Potential energy
(c) Heat energy
(d) Magnetic energy

113. A football has lesser inertia than a stone of the same size because :

- (a) football has more air inside than the stone
(b) football has less air inside than the stone
(c) football has less mass than the stone
(d) football has more mass than the stone

114. Sound travels faster in :

- (a) water (b) steel
(c) wood (d) air

115. The energy transformation in Mixie and Grinder is :

- (a) Electrical to heat energy
- (b) Electrical to mechanical energy
- (c) Electrical to sound energy
- (d) Electrical to light energy

116. If the mass of the body on the surface of the earth is 50 kg, its mass at the centre of the earth is :

- (a) zero
- (b) more than 50 kg
- (c) less than 50 kg
- (d) equal to 50 kg

117. The pressure of a given mass of a gas is inversely proportional to its volume when :

- (a) the temperature increases
- (b) the temperature decreases
- (c) the temperature remains constant
- (d) there is an absolute temperature

118. The force experienced by a boy in the merry-go-round is :

- (a) centripetal
- (b) centrifugal
- (c) gravitational
- (d) magnetic

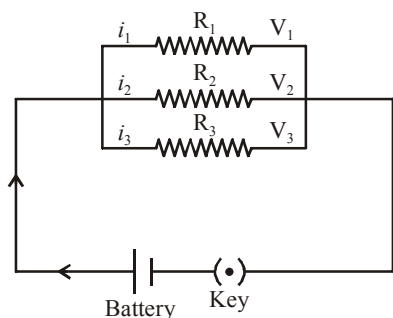
119. Atomic clock is based on the principle of periodic vibration in the :

- (a) Polonium atom
- (b) Uranium atom
- (c) Carbon atom
- (d) Caesium atom

120. In any electrical circuit, the direction of flow of current is :

- (a) same as that of the flow of electrons
- (b) opposite to the flow of electrons
- (c) parallel to the flow of electrons
- (d) stationary

121. Which is the correct answer for the circuit given below ?



- (a) $i_1 = i_2 = i_3$
- (b) $V_1 = V_2 = V_3$
- (c) $R_1 = R_2 = R_3$
- (d) $\frac{V_1}{R_1} = \frac{V_2}{R_2} = \frac{V_3}{R_3}$

122. The consumption of electrical energy in the house is measured in terms of :

- (a) Kilowatt hour
- (b) Watt hour
- (c) Joules
- (d) Kilo joules

123. Dry ice is an example of _____ process.

- (a) evaporation
- (b) crystallization
- (c) sublimation
- (d) purification

124. Solubility of KNO_3 :

- (a) increases with temperature
- (b) decreases with temperature
- (c) remains constant with temperature
- (d) is not related to the temperature fluctuations

125. _____ are alloys of Iron, Aluminium, Nickel and Cobalt.

- (a) Brass
- (b) Bronze
- (c) Solder
- (d) Alnicos

126. _____ exists as a dimer.

- (a) Hg_2^{2+}
- (b) Mg^{2+}
- (c) Cu^{2+}
- (d) Ca^{2+}

127. The phenomenon of producing a characteristic sound when a material is struck on the metallic surface is _____.

- (a) Ductility
- (b) Malleability
- (c) Sonarity
- (d) Conductivity

128. Copper reacts with dilute nitric acid and liberates _____.

- (a) Nitrogen dioxide
- (b) Nitric oxide
- (c) Nitrogen pentoxide
- (d) Nitrous oxide

129. The pH of 0.1 M NaOH is :

- (a) 13
- (b) 12
- (c) 11
- (d) 10

- 130.** Identify the type of reaction taking place in

$$\text{Fe} + \text{CuSO}_4 \rightarrow \text{Cu} + \text{FeSO}_4$$
 (a) Redox reaction
 (b) Displacement reaction
 (c) Neutralization reaction
 (d) Precipitation reaction
- 131.** The constituent present in baking powder is :
 (a) sodium benzoate
 (b) acetic acid
 (c) sodium lactate
 (d) tartaric acid
- 132.** Which metal is a constituent of hemoglobin ?
 (a) Zn (b) Ca
 (c) Fe (d) Co
- 133.** The total number of groups in Modern Periodic table is _____.
 (a) 7 (b) 17
 (c) 18 (d) 8
- 134.** Movement of water and mineral salts in plant is :
 (a) Osmosis (b) Absorption
 (c) Ascent of sap (d) Active absorption
- 135.** _____ is the pollutant released from air-conditioner.
 (a) Chlorofluoro carbons
 (b) Carbondioxide
 (c) Methane
 (d) Carbon-monoxide
- 136.** Brown haze is caused by _____.
 (a) Hydro carbons
 (b) Nitrogen oxides
 (c) Particulate matter
 (d) Smog
- 137.** The integuments become _____ after fertilization.
 (a) seed (b) pericarp
 (c) seed coat (d) fruit
- 138.** Anemophily occurs in _____.
 (a) Pinus
 (b) Jasmine
 (c) Lotus
 (d) Vallisneria
- 139.** Match the following :
 A. Vaccine – Wilmut
 B. Dolly – Sir. Ronald Ross
 C. Plasmodium – Edward Jenner
 (a) (C), (A), (B) (b) (B), (C), (A)
 (c) (B), (A), (C) (d) (A), (C), (B)
- 140.** Which one of the following is an Italian honey bee ?
 (a) Apis dorsata (b) Apis adamsoni
 (c) Apis mellifera (d) Apis florea
- 141.** Hyperthyroidism causes _____.
 (a) exophthalmic goitre
 (b) simple goitre
 (c) myxoedema
 (d) cretinism
- 142.** Pick the odd one out with respect to Mendel's observation.
 (a) Tall and dwarf stem
 (b) Smooth and rough stem
 (c) Yellow and green seeds
 (d) Violet and white flowers
- 143.** Pick out the pollutant.
 (a) Carbon - monoxide
 (b) Oxygen
 (c) Nitrogen
 (d) Hydrogen
- 144.** The name 'protoplasm' was coined by :
 (a) Robert Brown
 (b) Robert Hooke
 (c) Anton van Leeuwenhoek
 (d) Purkinje
- 145.** BCG is an effective vaccine to prevent :
 (a) Tetanus (b) Tuberculosis
 (c) Diphtheria (d) Pertussis

- 146.** The reign of _____ witnessed the golden age of Mesopotamia.
 (a) Nebuchad Nezzar
 (b) Summu Abu
 (c) Hammurabi
 (d) Saragan I
- 147.** 'Zend Avesta' is the holy book of the _____.
 (a) Greeks (b) Romans
 (c) Parsees (d) Egypt
- 148.** The title 'Lion-Heart' was given to _____.
 (a) Philip (b) Richard I
 (c) Fredrick (d) Nicholas
- 149.** _____ was the first person to coin the word "socialism"
 (a) John Kay (b) Henry Cort
 (c) Robert Owen (d) Karl Marx
- 150.** _____ is called the father of modern science.
 (a) Kepler (b) Friar Roger Bacon
 (c) Galileo (d) Newton
- 151.** The Bill of Rights was passed by the British Parliament in _____ AD.
 (a) 1789 (b) 1793
 (c) 1614 (d) 1689
- 152.** The _____ were the petty chieftains ruling over hilly region.
 (a) Velians (b) Panar
 (c) Viraliyar (d) Kalabhras
- 153.** The _____ and _____ formulated the Open Door Policy.
 (a) India and China
 (b) USA and England
 (c) Russia and France
 (d) Italy and Russia
- 154.** "New Deal" was formulated by :
 (a) Woodrow Wilson
 (b) Harry S. Truman
 (c) Franklin. D. Roosevelt
 (d) Herbert Hoover
- 155.** The number of judges in the International Court of Justice is _____.
 (a) 54 (b) 5
 (c) 15 (d) 192
- 156.** The present speaker of Lok Sabha is :
 (a) Tmt. Sumitra Mahajan
 (b) Thiru. P. Dhanapal
 (c) Tmt. Najma Heptullah
 (d) Tmt. Meerakumar
- 157.** Out of 545 members in Lok Sabha, the President generally elects two members belonging to _____ community.
 (a) Russian (b) Anglo-Indian
 (c) Italian (d) English
- 158.** "Money Bill" can be introduced only in the _____.
 (a) Lok Sabha
 (b) Rajya Sabha
 (c) Legislative Assembly
 (d) Grama Sabha
- 159.** The efficient functioning of the Legislative Assembly is in the hands of the _____.
 (a) Chief Minister (b) Governor
 (c) Speaker (d) Ministers
- 160.** Article _____ of the Constitution protects the right of the minorities to safeguard their distinct language, script and culture.
 (a) 23 (b) 30
 (c) 29 (d) 32
- 161.** Thiru.E.V. Ramasamy published _____, an English journal to propagate his ideas.
 (a) Revolt (b) Democracy
 (c) Wisdom (d) Freedom
- 162.** _____ is the first state in our country to recognise Transgender.
 (a) Kerala (b) Tamil Nadu
 (c) Maharashtra (d) Karnataka
- 163.** The South Asian Association for Regional Cooperation's first meeting was held at _____.
 (a) Thimbu (b) Colombo
 (c) New Delhi (d) Dacca

- 164.** Apart from India, _____ is also following multiparty system.
 (a) France (b) England
 (c) China (d) America
- 165.** The Chief Election Commissioner of India is appointed by the _____.
 (a) Prime Minister
 (b) Supreme Court Judge
 (c) President
 (d) Governor
- 166.** The Western Ghats enters the Tamil Nadu state through _____ district.
 (a) Coimbatore (b) Krishnagiri
 (c) Nilgiris (d) Erode
- 167.** The cyclone which affected the Cuddalore district in the year 2011 is _____.
 (a) Jal (b) Rita
 (c) Nima (d) Thane
- 168.** Mangrove vegetation in India is most extensively found in :
 (a) Malabar (b) Sundarbans
 (c) Kutch (d) Odisha
- 169.** The power station which started generating power recently in Tirunelveli district is :
 (a) Kelpakkam (b) Aralvaimozhi
 (c) Kudankulam (d) Neyveli
- 170.** _____ has the leading BPO sector in India.
 (a) Karnataka (b) Kerala
 (c) Maharashtra (d) West Bengal
- 171.** Demography means _____.
 (a) study about climate
 (b) study about minerals
 (c) study about population
 (d) study about landforms
- 172.** Udayamarthandapuram Bird Sanctuary is located in _____ district.
 (a) Thanjavur (b) Thiruvarur
 (c) Ariyalur (d) Nagapattinam
- 173.** At present, there are _____ states and _____ union territories in India.
 (a) 28, 8 (b) 29, 9
 (c) 30, 7 (d) 29, 7
- 174.** _____ is used for the manufacture of dry batteries.
 (a) Manganese dioxide
 (b) Sulphur dioxide
 (c) Hydrogen sulphide
 (d) Magnesium sulphide
- 175.** _____ is called the sugar bowl of the world.
 (a) India (b) Brazil
 (c) Russia (d) Cuba
- 176.** The most important determinant of demand is _____.
 (a) Climate
 (b) Expectation of future price rise
 (c) Price
 (d) Supply
- 177.** Air conditioner, Diamond jewels are examples of _____ goods.
 (a) Comfort (b) Luxury
 (c) Necessary (d) Very low priced
- 178.** If the price is greater than the equilibrium price, supply is _____ the demand.
 (a) more than (b) less than
 (c) equal to (d) greter or equal to
- 179.** Generally in India, _____ methods are used to arrive at the national income.
 (a) Income and expenditure
 (b) Product and expenditure
 (c) Product and income
 (d) Product, income and expenditure
- 180.** _____ comes under secondary sector.
 (a) Electricity (b) Agriculture
 (c) Transport (d) Insurance

ANSWERS**MENTAL ABILITY TEST**

1. (d) 2. (b) 3. (d) 4. (c) 5. (d) 6. (c) 7. (a) 8. (b) 9. (a) 10. (b)
11. (c) 12. (a) 13. (a) 14. (c) 15. (c) 16. (d) 17. (b) 18. (c) 19. (d) 20. (a)
21. (a) 22. (b) 23. (d) 24. (d) 25. (d) 26. (b) 27. (c) 28. (c) 29. (c) 30. (b)
31. (d) 32. (d) 33. (d) 34. (b) 35. (c) 36. (b) 37. (a) 38. (c) 39. (a) 40. (c)
41. (c) 42. (b) 43. (b) 44. (d) 45. (c) 46. (d) 47. (a) 48. (b) 49. (b) 50. (b)

ENGLISH

51. (a) 52. (a) 53. (b) 54. (a) 55. (a) 56. (d) 57. (d) 58. (a) 59. (c) 60. (b)
61. (a) 62. (a) 63. (c) 64. (c) 65. (b) 66. (d) 67. (c) 68. (c) 69. (d) 70. (b)
71. (c) 72. (a) 73. (d) 74. (c) 75. (b) 76. (d) 77. (b) 78. (d) 79. (d) 80. (c)
81. (a) 82. (a) 83. (b) 84. (b) 85. (b) 86. (a) 87. (b) 88. (d) 89. (b) 90. (a)

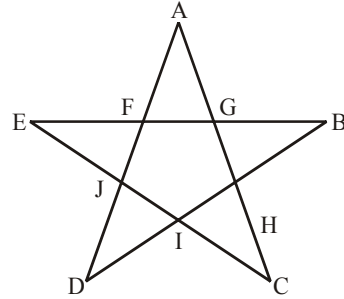
SCHOLASTIC APTITUDE TEST

91. (d) 92. (a) 93. (b) 94. (a) 95. (c) 96. (d) 97. (c) 98. (b) 99. (d) 100. (a)
101. (c) 102. (c) 103. (a) 104. (d) 105. (b) 106. (c) 107. (a) 108. (c) 109. (b) 110. (d)
111. (a) 112. (a) 113. (c) 114. (b) 115. (b) 116. (d) 117. (c) 118. (b) 119. (d) 120. (b)
121. (b) 122. (a) 123. (c) 124. (a) 125. (d) 126. (a) 127. (c) 128. (b) 129. (a) 130. (a,b)
131. (d) 132. (c) 133. (c) 134. (c) 135. (a) 136. (b) 137. (c) 138. (a) 139. (b) 140. (c)
141. (a) 142. (b) 143. (a) 144. (d) 145. (b) 146. (c) 147. (c) 148. (b) 149. (c) 150. (b)
151. (d) 152. (a) 153. (b) 154. (c) 155. (c) 156. (a) 157. (b) 158. (a) 159. (c) 160. (c)
161. (c) 162. (b) 163. (d) 164. (a) 165. (c) 166. (c) 167. (d) 168. (b) 169. (c) 170. (a)
171. (c) 172. (b) 173. (c) 174. (b) 175. (d) 176. (c) 177. (b) 178. (a) 179. (c) 180. (a)

EXPLANATIONS**MENTAL ABILITY TEST**

1. 0, 3, 9, 18, 30
 $\Rightarrow 30 + 15 = 45$
2. 6, 9, 18, 21, 30
 Alternate series difference is common,
 $\therefore 30 + 3 = 33$
3. $\rightarrow 16 \times 4 = 64 = 8^2$
 $\rightarrow 3 \times 27 = 81 = 9^2$
 $\rightarrow 18 \times 8 = 144 = 12^2$
4. (first row 1st value)
 $\times$ (second row 1st value - 1)
 $\Rightarrow (1) 5 \times (8 - 1) = 35$
 $\Rightarrow (2) 3 \times (10 - 1) = 27$
 $\Rightarrow (3) 3 \times (8 - 1) = 21$
5. Sum of outer digits $\times 3$ and i.e.,
 $\Rightarrow (4 + 6 + 3 + 5) \times 3 = 18 \times 3 = 54$
 $\Rightarrow (2 + 3 + 6 + 5) \times 4 = 16 \times 4 = 64$
 $\Rightarrow (3 + 5 + 7 + 9) \times 5 = 120$
6. Multiply opp digits and subtract,
 $\rightarrow (8 \times 9) - (2 \times 3) = 72 - 6 = 66$
 $\rightarrow (7 \times 8) - (3 \times 4) = 56 - 12 = 44$
 $\rightarrow (9 \times 11) - (6 \times 5) = 99 - 30 = 69$
7. $\rightarrow 1^2 + 1 = 2, 3^2 + 1 = 10, 5^2 + 1 = 26$
 $\rightarrow 2^2 + 1 = 5, 4^2 + 1 = 17, 6^2 + 1 = 37$
 $\rightarrow 5^2 + 1 = 26, 7^2 + 1 = 50, 9^2 + 1 = 82$
8. Addition of opp number and subtract result one from another,
 $\rightarrow (125 + 18) - (51 + 21) = 71$
 $\rightarrow (56 + x) - (45 + 39) = 111$
 $\Rightarrow x = 139$
9. Multiply opp number and add result one to another,
 $\rightarrow (12 \times 6) + (4 \times 8) = 72 + 32 = 104$
 $\rightarrow (4 \times 7) + (3 \times 6) = 28 + 18 = 46$
 $\rightarrow (8 \times 4) + (16 \times 8) = 32 + 128 = 160$

10.



No. of Triangles AFG, BGH, CHI, DIJ, EJA, FDB, GEC, HAD, IEB, JAC

$\therefore$ Total = 10

11. Number of square : 1×1 squares = 9

2×2 squares = 4

1 Big squares = 1

$\therefore$ Total = 14

12. $2 \times 5 = 2^3 (2^3 + 5^2) 5^2 = 83325$

$4 \times 6 = 4^3 (4^3 + 6^2) 6^2 = 6410036$

$3 \times 7 = 3^3 (3^3 + 7^2) 7^2 = 277649$

$5 \times 9 = 5^3 (5^3 + 9^2) 9^2 = 12520681$

13. Sum of two numbers of sides and square:

$\Rightarrow (2 + 3)^2 = 25$

$\Rightarrow (15 + 6)^2 = 441$

$\Rightarrow (10 + 7)^2 = 289$

$\Rightarrow (13 + 12)^2 = 625$

14. (a) B F J N (b) E I M G

$\downarrow \downarrow \downarrow \downarrow \quad \downarrow \downarrow \downarrow \downarrow$

Y U Q M V R N J

(c) G L Q V (d) K O S W

$\downarrow \downarrow \downarrow \downarrow \quad \downarrow \downarrow \downarrow \downarrow$

T O J E P L H D

15. In number its series difference

$\Rightarrow 23, 21, 18, 14, 9, 3$

In letter its difference is increasing

D, F, I, M, R, (X)

1, 2, 3, 4

$\therefore \frac{3}{x}$

21. Given 6, 2, 4 are adjacent and again 6, 2, 3 are adjacent

∴ Directly we can say that 4 is opp to 3

22. 2 P 4 Q 6 R 8 S 1 R 3 Q 5 P 7

$$\rightarrow 2 + 4 - 6 \times 8 \div 1 \times 3 - 5 + 7$$

→ BODMAS RULES

$$\Rightarrow 2 + 4 - (6 \times 8 \times 3) - 5 + 7 \\ = 6 - 144 + 2 = -136$$

23. 64, 71, 80, 91, 104, 119, 135, 155

$$\rightarrow 119 + 77 = 136$$

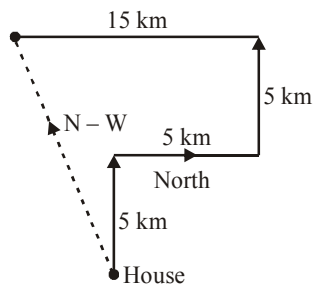
ODD ONE = 135

- 25.

$$\begin{array}{c} \text{+0.1} \\ 0.5, 0.55, 0.65, 0.8 \\ \text{+0.05} \quad \text{+0.15} \end{array}$$

$$\Rightarrow 0.8 + 0.20 = 1.0$$

26. North – West



27. $A \times E = C, H \times L = J, P \times T = R$

$$\Rightarrow J \times (L \times P) = J \times (N) = L$$

Middle values for multiplication

28. Allocating number of given letters

i.e., $B \rightarrow 2$

29. P O U N D $\Rightarrow$ E N G L I S H

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

M L R K A B K D I F P E

COMMON DIFFERENCE IS 2

30. S H I N E, V E M J J, X B Q F O?

→ going in sequence variation option : (2)

32. Pen is used to write on paper like chalk is used to write on black board.

33. $\rightarrow 7 + 13 = 20$

40. 351 → students like maths

197 → we are students

748 → they are parents

7 → are, 1 → students

∴ we → 9

41. BROTHER $\rightarrow 2 + 18 + 15 + 20 + 8 + 5 + 18 = 86$

$$\text{FATHER} \rightarrow 6 + 1 + 20 + 8 + 5 + 18 = 58$$

$$\text{SISTER} \rightarrow 19 + 9 + 19 + 20 + 5 + 18 = 90$$

Like

$$\text{MOTHER} = 13 + 15 + 20 + 8 + 5 + 18 = 79$$

42. 5th is four days earlier of Wednesday

$$\rightarrow 5^{\text{th}} = \text{Saturday}$$

$$\rightarrow 28^{\text{th}} \text{ day means} = 28 - 5 = 23$$

$$\rightarrow \frac{23}{7} = 2 \rightarrow \text{remainder}$$

$$\rightarrow 28^{\text{th}} \text{ day is Monday}$$

43. Moving the object in a sequence clock wise direction option (b).

44. Objects moving anticlockwise is getting outer and objects moving clockwise getting inner.

45. Step 1 : exchanging positions of adjacent figures.

Step 2 : exchanging positions of alternate figures.

Repeat step (1) and (2) continuously.

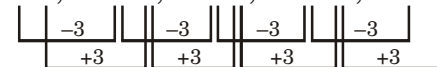
46. Objects going clock – wise and adding clours.

48. BLAME

Because, 'M' is not there in the given word 'ERYTHROBLAST'

49. Virus is different because Aries, Aquarius, and pisces are zodiacs

50. P 3, M 6, J 9, G 12, D 15



SCHOLASTIC APTITUDE TEST

91. $N = \{1, 2, 3, \dots\}$

$$P = \{2, 3, 5, 7, \dots\}$$

$$A = \{2, 3, 4, 5, 6, 7, \dots\}$$

$$N - A = \{1\}$$

92. A = sum of k Natural number

$$= \frac{k(k+1)}{2}$$

B = sum of cubes of k rotation

$$= \left(\frac{k(k+1)}{2} \right)^2$$

$$\log_{\sqrt{A}}^B = \log \left(\frac{(k(k+1))}{2} \right)^2$$

$$\left(\frac{k(k+1)}{2} \right)^{\frac{1}{2}} = \frac{2}{1} \log \left(\frac{k(k+1)}{2} \right) = 4$$

93. $\deg[P(x) \times Q(x)] = 6$ possible

$\deg[P(x) + Q(x)] = 3$ possible

$\deg[P(x) - Q(x)] = 3$ possible

$4 \deg[P(x)]^2 \cdot Q((x)^2) = 12$ but 15 is given
4th option is not possible

94. $x^2 + bx + 1 : b \in \mathbb{R}$

roots are reals

$$\therefore b^2 - 4ac \geq 0$$

$$b^2 - 4 \geq 0$$

$$(b-2)(b+2) \geq 0$$

$$(b+2) \leq 0$$

$$\text{or } (b-2) \geq 0$$

$$\leq -2$$

$$b \geq 2$$

b has infinitely many values

95. $x + 2y = 3$

$$ax + by = 4$$

$$\frac{1}{a} = \frac{2}{b} \neq \frac{3}{4}$$

$$a \neq \frac{4}{3}$$

A can have more than one value

96. $7^{25} = (7^4)^6 \cdot 7$

$$= (1).7 = 7$$

$\therefore$ unit digit is 7.

97. $15^2 = 225$ $16^2 = 256$ $17^2 = 289$

$$18^2 = 324$$

$$19^2 = 361$$

$$2x - 1$$

$$2x - 1 + 2x + 2x + 1 = 6(x)$$

$$2x$$

$$2x + 1$$

324 possible

$$\sqrt{324} = 18$$

$$98. \frac{x+7+x-7}{2} = 73$$

$$\frac{2x}{2} = 73$$

$$x = 73$$

$$99. \frac{48}{4} - 3 = 12 - 3$$

$$= 9$$

100. Number of prime numbers = 25

$$P(A) = \frac{25}{100} = \frac{1}{4}$$

101.

$$Bq = Cr$$

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} p & q \\ r & s \end{pmatrix} = \begin{pmatrix} p & q \\ r & s \end{pmatrix} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

$$bs = -Cr$$

$$2bq = 0$$

$$b = 0$$

$$c = 0$$

$$b^2 + c^2 = 0$$

102. Area of reactangle = xy

Area of increased radius

$$= \frac{36}{25} \times y$$

$$\text{Increase \%} = \frac{\left(\frac{36}{25} - 1 \right) xy}{xy} \times 100$$

$$= \frac{11}{75} \times 100 = 44\%$$

103.

$$I + 2r = 18$$

$$\frac{Ir}{2} = 20$$

$$Ir = 40$$

$$I = \frac{40}{r}$$

$$18 = \frac{40}{r} + 2r$$

$$r^2 - 9r + 20 = 0$$

$$(r-4)(r-5) = 0$$

$$r = 4 \text{ or } 5$$

$$\ell = 8 \text{ (or) } 10 \text{ cm}$$

104. $\sec \theta + \cos \theta = \sqrt{5}$

S.O.B.S

$$\sec^2 \theta + \cos^2 \theta + 2 = 5$$

$$\sec^2 \theta + \cos^2 \theta = 3$$

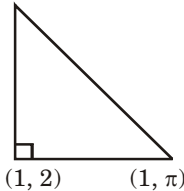
105. $\sin^2 5^\circ + \sin^2 10^\circ + \dots + \sin^2 90^\circ$

$$= \sin^2 5^\circ + \cos^2 5^\circ + \dots + \sin^2 40^\circ + \cos^2 90^\circ + \sin^2 45^\circ + \sin^2 90^\circ$$

$$= 8 + \frac{1}{2} + 1$$

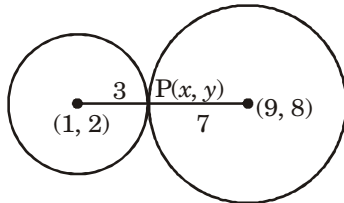
$$= 9 + \frac{1}{2} = 9\frac{1}{2}$$

106. $(\pi, 2)$



Orthocenter $(1, 2)$

107.

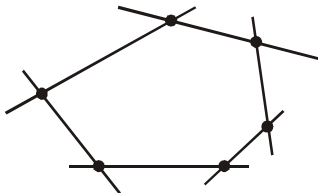


$$P(x, y) = \left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right)$$

$$= \left(\frac{27+7}{10}, \frac{24+14}{10} \right)$$

$$= \left(\frac{17}{5}, \frac{19}{5} \right)$$

108.



6 intersecting points

110. $x = 3 + \sqrt{8}$

$$\frac{1}{x} = 3 - \sqrt{8}$$

$$x + \frac{1}{x} = 6$$

$$x^2 + \frac{1}{x^2} = 34$$

$$x^4 + \frac{1}{x^4} = 1154$$

111. Speed of light $\times$ one year = light year

112. Speed of water gives it kinetic energy.

113. Inertia is the property of mass.

Mass of stone > mass of toothbal.

114. Steel (speed of sound depends on medium)

$$(S_{\text{solid}} > S_{\text{liquid}} > S_{\text{gas}})$$

115. Electrical energy runs the motor and motor gives mechanical energy by rotation.

116. Same (mass is always same)

117. $P \propto \frac{1}{V}$

$$P = \frac{k}{V} \quad [\because PV = nRT]$$

$$Pv = k \quad T = \text{constant}$$

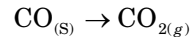
118. $F = \frac{mv^2}{r}$ ($v \rightarrow$ speed $r \rightarrow$ radius)

120. We always take direction of current opposite to the flow of electron.

121. In parallel connection, potential is same

122. Power $\times$ time $\rightarrow$ KWh

123. Solid carbon - di - oxide



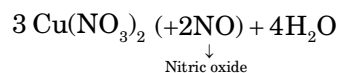
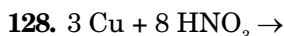
124. $\text{KNO}_3 + \text{Water} \rightarrow \text{KNO}_{3(aq)}$ endothermic

Temp $\uparrow$, solubility $\uparrow$ (1)

125. AlNiCOs (Al, Ni, Co, Fe)

126. Hg_2^{2+} (1)

127. Sonority (3) it is the property of metal to produce sound.



129. $\text{pOH} = \log \left(\frac{(-)}{\text{OH}} \right)$
 $= -\log(10^{-1}) = 1$
 $\text{pH} + \text{pOH} = 14$

$$\boxed{\text{pH} = 13}$$

131. $\text{NaHCO}_3 \rightarrow$ basic, to neutralize, they add, tartanic acid

134. Ascent of Sap : Ascent of sap in the xylem tissue of plants is the upward movement of water from the root to the crown.

135. Chlorofluoro Carbons : Many CFC's are used as refrigerants, propellants and solvents, which are organic compounds containing carbon, chlorine and fluorine.

136. Nitrogen Oxides : It absorbs light and leads to yellow brown haze.

137. Seed coat : The ovule becomes the seed and the surrounding integuments become the seed coat after fertilization.

138. Pinus : Almost all gymnosperms are anemophilous.

139. B, C, A

140. Ap is mellifera

141. Exophthalmic goiter : Because of excess secretion of thyroxine hormone.

142. Smooth and rough stem : Mendel didn't experiment with this trait.

143. Carbon – monoxide : It is an air pollutant

144. Purkinje

145. Tuberculosis

146. Hammurabi

147. Parsees

148. Richerd I

149. Robert owen

150. Friar roger Bacon

151. 1689

152. Veliars

153. USA and England

154. Franklin D. Roosevelt

156. Tmt sumitra Mahajan

157. Anglo – Indian

158. Lok Sabha

159. Speaker

160. 29

161. Wisdom

162. Tamil Nadu

163. Dacca

164. france

165. President

166. Nilgiris

167. Thane

168. Sundarbans

169. Kudan Kulam

170. Karnataka

171. Study about population

172. Thiruvvarun

173. 29, 7

174. Sulphur dioxide

175. Cube

176. Price

177. Luxury

178. More than

179. Product and income

180. Electricity

NTSE - 2015

MENTAL ABILITY TEST

Directions : From question 1 to 7 each question has four Terms. Three terms are alike in some way. One term is different from three others. Find out the correct term which is different from three others and write its alternative number on your answer sheet against the proper question number-

1. (1) 2008 (2) 2012
(3) 2016 (4) 2018
2. (1) S-190 (2) L-144
(3) P-256 (4) T-400
3. (1) Magazine (2) Book
(3) Copy (4) News-Paper
4. (1) 11, 14, 17 (2) 19, 16, 13
(3) 2, 5, 7 (4) 25, 29, 32
5. (1) DAC (2) SJG
(3) MKB (4) YTE
6. (1)  (2) 
(3)  (4) 
7. (1)  (2) 
(3)  (4) 

Directions : Question 8 to 12 there are food terms/ figure in each question. The terms right to the symbol : have same relationship as the two terms of the left symbol :: Out of the food terms. Figure one is missing, which is shown bold (?). Four alternative are given for each question. Find out the correct alternative and write its number against the corresponding question on your answer sheet.

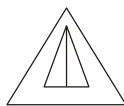
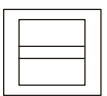
8. News paper: News: : Book: ?
(1) Writer (2) Chapter
(3) Knowledge (4) Page

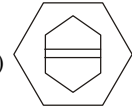
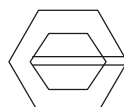
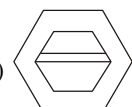
9. BHC : FLG :: JPK : ?

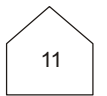
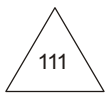
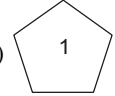
- (1) MSP (2) NTO
(3) EKF (4) SYT

10. $\frac{D}{W} : 92 :: \frac{H}{S} : ?$

- (1) 27 (2) 11
(3) 121 (4) 152

11.  :  ::  : ?

- (1)  (2) 
(3)  (4) 

12.  :  ::  : ?
(1)  (2) 
(3)  (4) 

Directions : Question from 13 to 18 are based on number/ letter/ figure series. In each series missing term is mentioned by question mark (?). Find out the missing term in given alternatives and write its alternative number against the correct question number on your answer sheet.

13. 213, 768, 132, 687, ?, 876, 213,?
(1) 312, 786 (2) 321, 768
(3) 321, 867 (4) 123, 678

14. BA, ZY, DC, XW, FE, VU, TS, JI, ?

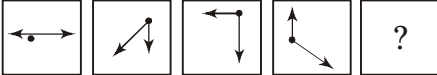
- (1) GH, QR (2) QR, GH
(3) HG, RQ (4) GH, RQ

15. 1, 4, ?, ?, 125, 36, ?

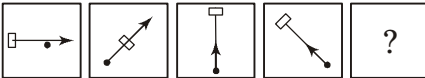
- (1) 27, 16, 49 (2) 9, 16, 49
(3) 27, 64, 49 (4) 27, 16, 343

16. $\frac{H}{16}, \frac{K}{13}, ?, \frac{Q}{19}, \frac{T}{40}, ?, \frac{Z}{52}$

- (1) $\frac{N}{25}, \frac{V}{28}$ (2) $\frac{N}{28}, \frac{W}{25}$
(3) $\frac{W}{26}, \frac{M}{20}$ (4) $\frac{N}{24}, \frac{W}{32}$

17. 

- (1)  (2) 
(3)  (4) 

18. 

- (1)  (2) 
(3)  (4) 

Directions : Question 19 to 21 the letters in column I are coded in the form of numbers. Which are written in column II, but the order of numbers is different. Read carefully code of letters. Find out correct answer in given alternative and write its alternative number against the corresponding question number on your answer sheet.

Column-I	Column-II
STE	376
KSN	324
DRQ	815
EKR	562
DNR	415

19. What will be code of RKT

- (1) 257 (2) 527
(3) 235 (4) 764

20. What will be code of SEND ?

- (1) 6413 (2) 5614
(3) 3641 (4) 4631

21. What will be code of QRK ?

- (1) 583 (2) 625
(3) 278 (4) 852

22. If in certain code language SATURDAY written as UTASYADR. How is HOSPITAL written in that code?

- (1) PSOHLATI (2) HPSOILAT
(3) SPOHATLI (4) POSHLTAI

23. If in a certain code language TABLE written as SBAMD. How is COVER written in that code?

- (1) DPWFQ (2) BQUDS
(3) BQUFD (4) BPUFQ

24. If in certain code language ROPE is written as 6821 and CHAIR as 73456. How will be CRAPE written in that code?

- (1) 77246 (2) 76421
(3) 73456 (4) 73214

Directions : From Question 25 to 30 the equations have become wrong because of the wrong order of signs. Choose the correct order of signs from the four options given below so as to make the equations right. Write the alternative number of the correct option on the answer sheet against the corresponding question number.

25. $11 + 2 = 1 - 10$

- (1) $- + =$ (2) $= + -$
(3) $- = +$ (4) $+ - =$

26. $15 + 3 = 5 \times 50$

- (1) $= + \times$ (2) $\times + =$
(3) $\times = +$ (4) $+ \times =$

27. $93 + 7 = 13 + 113$

- (1) $= + +$ (2) $+ = +$
(3) $+ + =$ (4) $- = +$

28. $27 \times 5 = 11 - 2$

- (1) $- \times =$ (2) $= \times -$
(3) $\times - =$ (4) $- = \times$

29. $72 + 8 \div 12 = 21$

- (1) $\div + =$ (2) $= + \div$
 (3) $= \div +$ (4) $\div = +$

30. $12 - 4 + 12 \div 3 = 9$

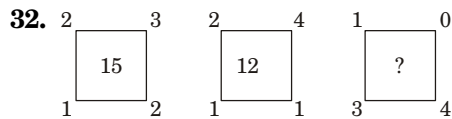
- (1) $+ \div = -$ (2) $\div = + -$
 (3) $= \div - +$ (4) $\div \times + =$

Directions : Question 31 to 36 numbers are placed in figure on the basis of some rules. One place is vacant which is indicated as (?). find out the correct alternative for the vacant place and write its number against the proper question number on your answer sheet.

31.

31	26	15
27	?	9

- (1) 13 (2) 24
 (3) 18 (4) 12

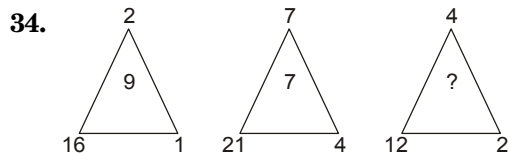


- (1) 7 (2) 13
 (3) 1 (4) 8

33.

13	25	34
12	30	?

- (1) 32 (2) 36
 (3) 27 (4) 39

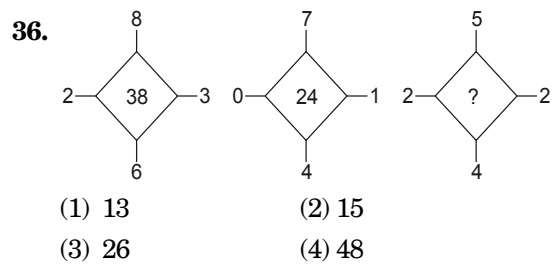


- (1) 3 (2) 4
 (3) 5 (4) 6

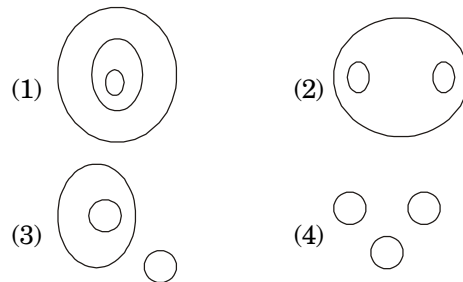
35.

1	1	32
1	2	?
1	8	2

- (1) 2
 (2) 4
 (3) 16
 (4) 12



Directions : Each of the following question 37 to 42 has a group of the words which are related to each other in some way. This relationship can be represented by one of the four figure alternative given in the beginning. Find out the correct figure alternative and write its number against the corresponding questions on your answer sheet.



37. Rose Lion Animal

- (1) 4 (2) 2
 (3) 1 (4) 3

38. Police Teacher School

- (1) 2 (2) 3
 (3) 4 (4) 1

39. Dog Fish Bird

- (1) 4 (2) 1
 (3) 2 (4) 3

40. Doctor Nurse Hospital

- (1) 3 (2) 4
 (3) 2 (4) 1

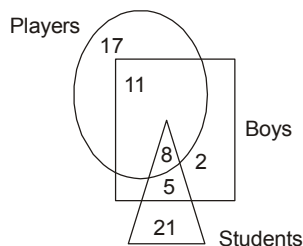
41. Library Almirah Book

- (1) 4 (2) 3
 (3) 2 (4) 1

42. Family Brother Sister

- (1) 2 (2) 3
 (3) 1 (4) 4

Directions : In Question 43 to 46 are based on the diagram given below. In the diagram Triangle represents students, circle represents player and square represents boys. Read carefully the digits written within the diagram to choose the correct answer from given alternative and write its numbers against the proper question number on your answer sheet.



43. How many boys are students
 (1) 13 (2) 34
 (3) 19 (4) 15
44. How many students are there
 (1) 13 (2) 34
 (3) 26 (4) 35
45. How many boys are students but not player?
 (1) 8 (2) 21
 (3) 2 (4) 5
46. How many boys are player?
 (1) 8 (2) 36
 (3) 15 (4) 19

Directions : Question 47 to 50 are based on informations given below. Under each question options are given for answer. Read the information carefully and write serial number of correct option against corresponding question on your answer sheet.

Information

- Ram plays football, Hockey and Volley ball
- Shyam plays Cricket, Hockey and foot ball
- Anil plays Hockey, Volley ball and Batminton
- Deepak plays Volley-ball, Cricket and Foot ball
- Harish plays Foot-ball only.

47. Which game is played by the most of the boys-?

- (1) Cricket (2) Hockey
 (3) Foot- ball (4) Volley-ball

48. How many boys play Hockey-?

- (1) Two (2) Three
 (3) Five (4) One

49. How many boys play Cricket-?

- (1) Two (2) Four
 (3) One (4) Three

50. Which boys do not play Volley-ball-?

- (1) Ram- Harish
 (2) Shyam- Deepak
 (3) Anil- Shyam
 (4) Shyam- Harish

ENGLISH LANGUAGE

Directions (Q. 51–56) : Read the following passage and answer the question that follow.

Do you know how blueberries grow? They grow on bushes. Each blueberry is small and round. Many blueberries can grow on one bush. At first the blueberries are green. The green berries are not ready to eat yet. They need a lot of sun and rain to help then become fat and sweet. When the berries turn blue, they are ripe and ready to be picked.

Some farmers grow blueberries in big fields. The people who live nearby can earn money by helping to pick the blueberries. Each one takes a pail out to the field and fills it with blueberries. They work fast so that they can fill many pails. They want to earn as much money as they can. When they are done picking their fingers are blue from the juice of the berries!

After the blueberries are picked, they are put into boxes and sent to stores. People buy the blueberries and take them home to eat. Some people like to wash the berries and eat them one by one. Other people like to cook with blueberries. They make blueberries muffins and pancakes. No matter how you eat them, blueberries taste great!

- 51.** The word 'earn' is
 (1) Verb (2) Adjective
 (3) Adverb (4) Noun
- 52.** What is the colour of blueberries before they are ready to be picked?
 (1) blue (2) red
 (3) green (4) brown
- 53.** Where do the blueberry pickers work:
 (1) in a barn (2) in a field
 (3) in a forest (4) near a stream
- 54.** What happens to blueberries after they are picked:
 (1) they are put into boxes
 (2) they need sun and rain
 (3) farmers plant them
 (4) they become sweet and ripe
- 55.** What is the opposite of the word 'Sweet':
 (1) juicy (2) sour
 (3) dry (4) sugary
- 56.** What could be title for this story:
 (1) "all about blueberries"
 (2) "how to cook with blueberries"
 (3) "eating blueberries"
 (4) "all about strawberries"

Directions (Q. 57–61) : Based on the notes given complete the biography to present a report

Chanakya

- Political shrewdness and diplomacy.
- helped in establishing the Mauryan empire.
- Wrote a book called Arthashastra .
- From poor Brahmin family .
- Born and educated in Taxila .

Chanakya ...57.... into a poor Brahmin family. He was born in Taxila and 58... there. Politically 59... and a great 60...., he 61.... the book Arthashastra.

- 57.** (1) was born (2) educated
 (3) shrewd (4) diplomat

- 58.** (1) born (2) was educated
 (3) shrewd (4) diplomat
- 59.** (1) was born (2) educated
 (3) shrewd (4) diplomat
- 60.** (1) was born (2) authored/wrote
 (3) shrewd (4) diplomat
- 61.** (1) was born (2) authored/ wrote
 (3) shrewd (4) diplomat

Directions (Q. 62–71) : Fill in the blanks with correct words from the option given below.

I don't know why, but...62... I travel by public transport, the buses are always crowded and 63... I have to stand up on the way to work. It may be better 64... I were to leave home earlier. As it is, many passengers are left behind, ...65.... they force those standing to move further down the aisle, I 66..... have wait for upto twenty minutes for another bus 67.... the one that arrives is full. 68.... I have been late to work a few times. My manager is 69..... sympathetic, I don't think it will be long 70....., before he begins to lose his patience. Perhaps I should purchase ...71.... a motorbike or a small car.

- 62.** (1) whenever (2) however
 (3) therefore (4) either
- 63.** (1) but (2) if
 (3) however (4) therefore
- 64.** (1) but (2) if
 (3) else (4) because
- 65.** (1) because (2) unless
 (3) but (4) however
- 66.** (1) whenever (2) seldom
 (3) sometimes (4) either
- 67.** (1) else (2) because
 (3) when (4) therefore
- 68.** (1) either (2) if
 (3) when (4) consequently

69. (1) usually (2) but
(3) because (4) either
70. (1) however (2) whenever
(3) while (4) when
71. (1) unless (2) although
(3) either (4) usually

Directions (Q. 72–74) : Fill in the blanks with suitable Nouns to complete the sentence.

The girl could not understand 72....
inspite of her teachers 73.... It was not
because of 74.... but she seemed to lack
confidence

72. (1) multiply (2) multiplication
(3) to multiply (4) multiplied
73. (1) explain (2) explained
(3) explanation (4) explanatory
74. (1) lazy (2) being lazy
(3) laziness (4) weak

Directions (Q. 75–85) : Read the passages and fill in the blanks with suitable preposition:

One night I was very upset. I decided to go
.....75..... a walk. I walked 76..... the lake
for a long time. When I looked 77..... my
watch I realized I had been walking for two
hours. As I was 78.... my way back home
without realizing I started walking
.....79..... Sameer's house. When I reached
sameer's room, I switched 80.... the light.
I saw Sameer sitting 81.... his bed
82.... Seeing me he raised his head. He looked
very sick. I stood 83..... his bed and he
grabbed me 84..... both arms. I could
see tears..... 85.... his eyes:

75. (1) off (2) for
(3) at (4) on
76. (1) At (2) From
(3) Along (4) In
77. (1) In (2) By
(3) At (4) On

78. (1) On (2) At
(3) Along (4) From
79. (1) At (2) Towards
(3) On (4) Along
80. (1) In (2) Off
(3) On (4) By
81. (1) In (2) On
(3) By (4) At
82. (1) At (2) From
(3) Of (4) On
83. (1) Beside (2) At
(3) Between (4) Off
84. (1) In (2) From
(3) By (4) With
85. (1) At (2) On
(3) In (4) From

Direction : Choose the correct spelt word

86. (1) Dificient (2) Deficient
(3) Defecient (4) Defisient

Directions (Q. 87-89): Select the meaning of given phrasal verbs

87. Break in
(1) disappear (2) destroy
(3) enter by force (4) cutting into peices
88. Keep on
(1) admit (2) attend
(3) over flow (4) continue
89. Do away with
(1) retain (2) abolish
(3) distribute (4) consider

Direction : Choose the correct option

90. One who knows many language is called
(1) misogynist (2) polyglot
(3) Epicure (4) All of these

Directions (Q. 91–94) : Select the most appropriate option to fill in the blanks from the given alternative. When I was speaking to Ravi over the phone suddenly we were

91. (1) hung up (2) run out
(3) broken down (4) cut off

92. The farmer had.....land and many servants.

- (1) very little (2) some
(3) a lot of (4) many

93. When he got married he a life insurance policy

- (1) took up (2) took out
(3) took in (4) took over

94. By the time I reach America, it morning

- (1) is (2) would be
(3) must be (4) was

Directions (Q. 95-98) : Select the word which means the opposite of the given word.

95. Despair

- (1) belief (2) trust
(3) hope (4) faith

96. Arrogant

- (1) simple (2) timid
(3) civilized (4) modest

97. Shimmering

- (1) Gloomy (2) Glimmering
(3) Refreshing (4) Repining

98. Dauntless

- (1) Daring (2) Forgiving
(3) Harsh (4) Timid

Directions (Q. 99-100) : Select the meaning of given phrases/idioms.

99. Red letter day

- (1) Colourful day
(2) fatal day
(3) Happy less day
(4) happy less day

100. Turn a deaf ear.

- (1) disregard
(2) defy
(3) disobey
(4) dismiss

SCHOLASTIC APTITUDE TEST

101. The sky appears blue due to:

- (1) reflection of light
(2) refraction of light
(3) total internal reflection of light
(4) scattering of light

102. $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$, this reaction is an example of a:

- (1) combination reaction
(2) double displacement reaction
(3) decomposition reaction
(4) displacement reaction

103. The chemical formula of baking soda is:

- (1) NaHCO_3 (2) Na_2CO_3
(3) CaOCl_2 (4) CaSO_4

104. Which one of the following types of medicines is used for treating indigestion:

- (1) antibiotic (2) analgesic
(3) antacid (4) antiseptic

105. The kidney in human being are a part of the system for:

- (1) nutrition (2) respiration
(3) excretion (4) transportation

106. The xylem in plants are responsible for:

- (1) transport of water
(2) transport of food
(3) transport of amino acid
(4) transport of oxygen

107. The least distance of distinct vision for a young adult with normal vision is about:

- (1) 25 meter (2) 2.5 cm
(3) 25 cm (4) 2.5 meter

108. The plant hormone is:

- (1) insulin (2) thyroxine
(3) oestrogen (4) cytokinin

109. The gap between two neurons is called a:

- (1) dendrite (2) synapse
(3) axon (4) impulse

- 110.** The device used for measuring electric current is:
(1) generator (2) galvanometer
(3) ammeter (4) motor
- 111.** The image produced by a concave lens is always:
(1) real (2) virtual
(3) inverted (4) enlarged
- 112.** The unit of electrical energy is:
(1) watt
(2) kilowatt
(3) kilowatt per hour
(4) kilowatt hour
- 113.** A solution turns red litmus into blue, its pH is likely to be:
(1) 1 (2) 4
(3) 5 (4) 10
- 114.** The anther contains:
(1) sepals (2) ovules
(3) carpel (4) pollen grains
- 115.** The main factor of depletion of ozone layer is:
(1) chlorofluorocarbons
(2) oxygen
(3) sulphur
(4) nitrogen
- 116.** Which part of the human brain is most developed:
(1) cerebrum (2) cerebellum
(3) hypothalamus (4) medulla oblongata
- 117.** The full form of T. S. H is:
(1) thyroxin stimulating hormone
(2) thymine stimulating hormone
(3) thyroxin stimulating hormone
(4) thyroid stimulating hormone
- 118.** The drugs obtain from plant is:
(1) caolin
(2) insulin
(3) magnesium sulphate
(4) morphine
- 119.** Artificial soap is:
(1) sodium stearate
(2) lauryl sulphuric acid
(3) lauryl alcohol
(4) sodium lauryl sulphate
- 120.** The example of thermosetting plastic is:
(1) polythene (2) polyvinyl chloride
(3) bakelite (4) polystyrene
- 121.** The suitable catalyst in hydrogenation of oil is:
(1) Fe (2) Pt
(3) Ni (4) Mo
- 122.** Sphygmomanometer measure:
(1) blood pressure (2) pulse-rate
(3) heart beat (4) sugar level
- 123.** A lens have power +5D. This lens will be:
(1) a convex lens of focal length 0.20 m
(2) a concave lens of focal length 0.20 m
(3) a convex lens of focal length 0.20 m
(4) a concave lens of focal length 0.05 m
- 124.** The magnetic field inside a long straight solenoid carry current:
(1) is zero
(2) decreases as we move towards its end
(3) increases as we move towards its end
(4) is the same at all points
- 125.** Which of the following is incorrect:
(1) $1 \text{ ampere} \times 1 \text{ second} = 1 \text{ coulomb}$
(2) $1 \text{ coulomb} \times 1 \text{ joule} = 1 \text{ volt}$
(3) $1 \text{ volt} \times 1 \text{ coulomb} = 1 \text{ joule}$
(4) $1 \text{ volt} \times 1 \text{ ampere} = 1 \text{ joule per second}$
- 126.** Gene are present:
(1) in cell (2) in nucleus
(3) in mitochondria (4) on chromosomes
- 127.** Which of the following is made in anaerobic respiration:
(1) ethyl alcohol (2) ethylene
(3) glucose (4) glycerol
- 128.** Explosive material is:
(1) picric acid (2) tetracycline
(3) cellulose nitrate (4) Bakelite

- 129.** A simple pendulum perform 18 oscillation per second the mechanical wave produced by it will be:
- (1) sound wave
 - (2) ultrasonic wave
 - (3) subsonic wave
 - (4) electromagnetic wave
- 130.** The power of electric power station is 200 mega watt, the electrical energy produced by it daily, will be:
- (1) 200 mega watt hour
 - (2) 4800 mega watt hour
 - (3) 4800 mega watt
 - (4) 48 joule
- 131.** MPO_4 is the formula of phosphate of an element. The molecular formula of its nitrate will be:
- (1) MNO_3
 - (2) $\text{M}(\text{NO}_3)_3$
 - (3) $\text{M}_2(\text{NO}_3)$
 - (4) $\text{M}(\text{NO}_3)_2$
- 132.** It is written 100 watt – 250 volt on any bulb its resistance will be:
- (1) 25000 ohm
 - (2) 625 ohm
 - (3) 25 ohm
 - (4) 2.5 ohm
- 133.** Food cans are coated with tin and not with zinc because:
- (1) zinc is costlier than tin
 - (2) zinc has a higher melting point than tin
 - (3) zinc is more reactive than tin
 - (4) zinc is less reactive than tin
- 134.** The refractive index of glass is maximum for:
- (1) red colour
 - (2) yellow colour
 - (3) violet colour
 - (4) green colour
- 135.** The human eye can focus objects at different distances by adjusting the focal length of the eye-lens. This is due to:
- (1) presbyopia
 - (2) near-sightedness
 - (3) accommodation
 - (4) far-sightedness
- 136.** Which one of the following is not an acidic salt:
- (1) NaHSO_4
 - (2) NaH_2PO_4
 - (3) Na_3PO_4
 - (4) Na_2HPO_2
- 137.** The water solution of SO_2 is:
- (1) sulphurous acid
 - (2) sulphuric acid
 - (3) pyrosulphuric acid
 - (4) None of these
- 138.** Which one of the following is not a semiconductor:
- (1) pure silicon
 - (2) pure germanium
 - (3) germanium with arsenic
 - (4) silver
- 139.** By which reaction metals are obtained from metal oxide:
- (1) liquefaction
 - (2) reduction
 - (3) calcination
 - (4) roasting
- 140.** One nano meter is equal to:
- (1) 10^9 meter
 - (2) 10^6 meter
 - (3) 10^{-9} meter
 - (4) 10^{-6} meter
- 141.** By whom 'Saka Era' was start:
- (1) Kanishka
 - (2) Ashoka
 - (3) Harshvardhan
 - (4) Chandra Gupta Second
- 142.** 'Avesta' belongs to which religion:
- (1) Muslim
 - (2) Hindu
 - (3) Parsis
 - (4) Christian
- 143.** Which city was founded by Sikandar:
- (1) Allahabad
 - (2) Sikandrabad
 - (3) Jaunpur
 - (4) Agra
- 144.** 'Din-E-Illahi' was related to:
- (1) Akbar
 - (2) Jahangir
 - (3) Shahjahan
 - (4) Shershah
- 145.** Who divided the Bengal:
- (1) Lord Curzon
 - (2) Lord Minto
 - (3) Lord Erwin
 - (4) Lord Mountbattan
- 146.** Who among the following was associated with news paper 'Kesari':
- (1) Mahatma Gandhi
 - (2) Bal Gangadhar Tilak
 - (3) Subhas Chandra Bose
 - (4) A. O. Hume

- 147.** Who wrote 'Chandrakanta':
(1) Srinivas Dass
(2) Deviki Nandan Khatri
(3) Raja Ram Mohan Ray
(4) Mahatma Gandhi
- 148.** Who is called the 'Grand Old Man' of India:
(1) Surendra Nath Banerjee
(2) Firozshah Metha
(3) Dadabhai Navroji
(4) Motilal Nehru
- 149.** The first women President of the Indian National Congress was:
(1) Sucheta Kriplani
(2) Rajkumari Amrit Kaur
(3) Sarojini Naidu
(4) Annie Besant
- 150.** Sankhya Darshan is related with:
(1) Kapil (2) Gautam
(3) Jaimini (4) Patanjali
- 151.** The Chipko Movement is associated with:
(1) Women rights
(2) Child rights
(3) Political rights
(4) Forest conservation
- 152.** The father of 'Green Revolution' in India is:
(1) Nagarjun
(2) M. S. Swaminathan
(3) A. P. J. Abdul Kalam
(4) Ramanujam
- 153.** Jharia, Raniganj & Bokaro are famous for:
(1) Petroleum (2) Bauxite
(3) Coal (4) Diamond
- 154.** When was the 'Project Tiger' launched:
(1) 1973 (2) 1976
(3) 1978 (4) 1980
- 155.** Nepanagar is situated at:
(1) Uttar Pradesh (2) Madhya Pradesh
(3) Bihar (4) Rajasthan
- 156.** Extreme heat is found on
(1) Tropic of Cancer
(2) Equator
(3) Tropic of Capricorn
(4) Antarctic line
- 157.** The world's highest peak is found in
(1) Asia (2) South America
(3) North America (4) Europe
- 158.** It is called the Earth's twin sister
(1) Mars (2) Saturn
(3) Pluto (4) Venus
- 159.** Gift of Nile river is called
(1) China (2) Ethophiya
(3) Egypt (4) Sudan
- 160.** Air pressure is commonly measured by an instrument called
(1) Speedometer (2) Windvane
(3) Barometer (4) Anemometer
- 161.** Etna volcano is situated at
(1) Chile (2) Sicily Island
(3) Japan (4) Philippines
- 162.** The deep narrow valley found in mountaneous region is know as
(1) Gorge (2) Meander
(3) Cliff (4) None of these
- 163.** Who was the first chairman of planning commission
(1) Mahatma Gandhi
(2) Pandit Jawaharlal Nehru
(3) Dr. Rajendra Prasad
(4) Lal Bahadur Shastri
- 164.** The lowest level of trilevel Panchayati raj is
(1) Nyay Panchayat
(2) Block Panchayat
(3) Village Panchayat
(4) Zila Panchayat
- 165.** United Nations organization was founded in
(1) 24 September 1943
(2) 28 September 1944
(3) 1 November 1944
(4) 24 October 1945

- 166.** How many seats are there in Rajaya Sabha
 (1) 250 (2) 245
 (3) 233 (4) 145
- 167.** Which of the following is not the fundamental right
 (1) Right against exploitation
 (2) Right to property
 (3) Right of freedom of religion
 (4) Right of equality
- 168.** Which is the 29th state of India
 (1) Telangana (2) Purvanchal
 (3) Uttaranchal (4) Jharkhan
- 169.** The First Indian Scientist who got Noble Prize was
 (1) Prafulla Chand Roy
 (2) Meghanath Saha
 (3) Birbal Sahani
 (4) C.V. Raman
- 170.** Who among the following has been Vice President of India
 (1) Justice H.J. Kania
 (2) Justice Y.V. Chandrachud
 (3) Justice M. Hidayatulla
 (4) Justice M.N. Venkatcheliah
- 171.** The retirement age of Supreme Court judges is
 (1) 60 Years (2) 62 Years
 (3) 65 years (4) 68 years
- 172.** The Pradhanmantri Jan-Dhan Yojna is related to
 (1) Road Construction
 (2) Education
 (3) Banking
 (4) Drinking water
- 173.** When did the community development programme start in India
 (1) 1951 (2) 1952
 (3) 1958 (4) 1961
- 174.** The chairman of Neeti Aayog is
 (1) Prime Minister (2) President
 (3) Vice President (4) Finance Minister
- 175.** The duration of the 12th five year plan in India is
 (1) 2012-2017 (2) 2014-2019
 (3) 2013-2018 (4) 2015-2020
- 176.** Who built the 'Khajuraho' temple
 (1) Holkars (2) Parmar
 (3) Pallav (4) Chandela
- 177.** Which of the following is not a source of income of central Government
 (1) Custom Duty
 (2) Income Tax
 (3) Central Excise Duty
 (4) Land Revenue
- 178.** Which among the following is a developing country
 (1) France (2) Japan
 (3) Argentina (4) Britain
- 179.** A crop grown in Zaid is
 (1) Water melon (2) Wheat
 (3) Maize (4) Jute
- 180.** White revolution is related with
 (1) Agricultural (2) Dairy
 (3) Fisheries (4) Poultry
- 181.** The value of $\sin^2 \theta + \frac{1}{(1 + \tan^2 \theta)}$ is
 (1) $\sin^2 \theta$ (2) $\cos^2 \theta$
 (3) $\sec^2 \theta$ (4) 1
- 182.** If $\sec \theta + \tan \theta = P$ then the value of $\frac{P^2 - 1}{P^2 + 1}$ is
 (1) cosec θ (2) sin θ
 (3) $\frac{\tan \theta}{\sec \theta}$ (4) 1
- 183.** If $\tan \theta = \frac{a}{b}$ then the value of $\frac{b \sin \theta - a \cos \theta}{b \sin \theta + a \cos \theta}$ is
 (1) 1 (2) $\frac{a^2 - b^2}{a^2 + b^2}$
 (3) $\frac{b^2 - a^2}{b^2 + a^2}$ (4) 0

184. If $\sin \theta = \frac{4}{5}$, then value of $\cos 2\theta$ is

- (1) $\frac{8}{5}$ (2) $\frac{3}{5}$
(3) $\frac{7}{35}$ (4) $-\frac{7}{25}$

185. Each exterior angle of a regular Polygon of m sides is

- (1) $\left(\frac{360}{m}\right)\pi$ degree (2) $\left(\frac{360}{m}\right)$ degree
(3) $\left(\frac{180}{m}\right)\pi^2$ degree (4) $\left(\frac{180}{m}\right)$ degree

186. If two equal circles of radius r passes through centre of the other, then the length of their common chord is

- (1) $\frac{r}{\sqrt{3}}$ (2) $r\sqrt{3}$
(3) $r\sqrt{3}$ (4) $r\sqrt{2}$

187. The H.C.F. of expression $(x + 1)(x - 1)^2$ and $(x + 1)^2(x - 1)$ is

- (1) $(x + 1)(x - 1)$ (2) $(x + 1)^2$
(3) $(x - 1)^2$ (4) $(x + 1)^2(x - 1)^2$

188. If a , b and c are any positive real number then the value of $\sqrt{a^{-1}b} \cdot \sqrt{b^{-1}c} \cdot \sqrt{c^{-1}a}$

- (1) $\frac{1}{2}$ (2) 0
(3) 1 (4) -1

189. If roots of equation $2x^2 - 8x + c = 0$ are equal. Then the value of c will be

- (1) 2 (2) 4
(3) 6 (4) 8

190. If mean of 5, 10, 15, P, 20, 35, 40 is 21. Then the value of P will be

- (1) 18 (2) 22
(3) 25 (4) 30

191. The median of first 10 prime numbers will be

- (1) 5 (2) 11
(3) 12 (4) 13

192. The equation of a line which passes through points P (4,0) and Q(0, -3) will be

- (1) $\frac{x}{4} + \frac{y}{3} = 1$ (2) $\frac{x}{3} - \frac{y}{4} = 7$
(3) $\frac{x}{4} - \frac{y}{3} = 1$ (4) $\frac{x}{3} + \frac{y}{4} = 7$

193. If a number is divided by 6, the remainder is 3 then what will be the remainder when the square of the same numbers is divided by 6 again

- (1) 0 (2) 1
(3) 2 (4) 3

194. The radius of a sphere is r and radius of base of a cylinder is r and height is $2r$. The ratio of their volumes will be

- (1) $2 : 3$ (2) $3 : 4$
(3) $4 : 3$ (4) $3 : 2$

195. In two spheres, the radius of first is half than second. Then what will be volume of second in comparison of first

- (1) 2 times (2) 4 times
(3) 8 times (4) $\frac{22}{7}$ times

196. The length of line segment is 3 which is perpendicular on line $4x + 3y = C = 0$ from the origin. Then value of c will be

- (1) 0 (2) 7
(3) 10 (4) 15

197. if $x = (3 + \sqrt{8})$, then $\left(x^2 + \frac{1}{x^2}\right)$ will be

- (1) 38 (2) 36
(3) 34 (4) 30

198. If $\left(\frac{a}{b}\right)^{x-1} = \left(\frac{b}{a}\right)^{x-3}$ then the value of x will be

- (1) -1 (2) 1
(3) 2 (4) 3

199. If $x - y = 5$, $xy = 24$ then the value of $x^2 + y^2$ will be

- (1) 23 (2) 73
(3) 65 (4) 74

200. If mode of any series is 9 and median is 7 then mean of that series will be

- (1) -6 (2) 6
(3) $-5/3$ (4) $5/3$

ANSWERS

MENTAL ABILITY TEST

1. (4)	2. (1)	3. (3)	4. (2)	5. (2)	6. (4)	7. (3)	8. (3)	9. (2)	10. (4)
11. (4)	12. (1)	13. (2)	14. (3)	15. (4)	16. (2)	17. (2)	18. (1)	19. (2)	20. (3)
21. (4)	22. (1)	23. (4)	24. (2)	25. (1)	26. (2)	27. (3)	28. (4)	29. (1)	30. (4)
31. (3)	32. (1)	33. (1)	34. (*)	35. (*)	36. (3)	37. (4)	38. (2)	39. (1)	40. (3)
41. (4)	42. (1)	43. (1)	44. (2)	45. (4)	46. (4)	47. (3)	48. (2)	49. (1)	50. (4)

ENGLISH LANGUAGE

51. (1)	52. (1)	53. (2)	54. (1)	55. (2)	56. (1)	57. (1)	58. (2)	59. (3)	60. (4)
61. (2)	62. (1)	63. (4)	64. (2)	65. (2)	66. (3)	67. (2)	68. (4)	69. (1)	70. (3)
71. (3)	72. (2)	73. (3)	74. (3)	75. (2)	76. (3)	77. (3)	78. (1)	79. (2)	80. (3)
81. (2)	82. (4)	83. (4)	84. (4)	85. (3)	86. (2)	87. (3)	88. (4)	89. (2)	90. (2)
91. (4)	92. (3)	93. (1)	94. (2)	95. (3)	96. (4)	97. (1)	98. (4)	99. (3)	100. (1)

SCHOLASTIC APTITUDE TEST

101. (4)	102. (4)	103. (1)	104. (3)	105. (3)	106. (1)	107. (3)	108. (4)	109. (2)	110. (3)
111. (2)	112. (4)	113. (4)	114. (4)	115. (1)	116. (1)	117. (4)	118. (4)	119. (4)	120. (3)
121. (3)	122. (1)	123. (3)	124. (4)	125. (2)	126. (4)	127. (1)	128. (1,3)	129. (1)	130. (2)
131. (2)	132. (2)	133. (3)	134. (3)	135. (3)	136. (3)	137. (1)	138. (4)	139. (2)	140. (3)
141. (1)	142. (3)	143. (4)	144. (1)	145. (1)	146. (2)	147. (2)	148. (3)	149. (4)	150. (1)
151. (4)	152. (2)	153. (3)	154. (1)	155. (2)	156. (2)	157. (1)	158. (4)	159. (3)	160. (3)
161. (2)	162. (1)	163. (2)	164. (3)	165. (4)	166. (2)	167. (2)	168. (1)	169. (4)	170. (3)
171. (3)	172. (3)	173. (2)	174. (1)	175. (1)	176. (4)	177. (4)	178. (3)	179. (1)	180. (2)
181. (4)	182. (2,3)	183. (4)	184. (4)	185. (2)	186. (2)	187. (1)	188. (3)	189. (4)	190. (2)
191. (3)	192. (3)	193. (4)	194. (1)	195. (3)	196. (4)	197. (3)	198. (3)	199. (2)	200. (2)

EXPLANATIONS

MENTAL ABILITY TEST

- From the given question all numbers are multiple of 4 except 2018.
- From the given question S – 19 (the position of alphabet starts from left)
 $19^2 = 361$
 So S-190 is not correct.
- All are readings except copy.
- Given number series is in increasing order except option (2).
- According to given question order of middle term is the difference of extremes except (2).

- From given question, all options contain two identical fig. except (4).

- From the given question all figure have corners, except (3).

- From news paper we get news, similarly from book we get knowledge.

- B H C : F L G :: J P K : N T O

- From the given question

D – 4 (position of alphabet starts)

W – 23 (position of alphabet starts from A)

$$\therefore 4 \times 23 = 92$$

Similarly

$$H - 8$$

$$S - 19$$

$$\therefore 8 \times 19 = \boxed{152}$$

11. According to given question fig. lines are increased by 1.
12. From the given question fig. sides in fig. is increased by 1 and lines is decreased by 1.
13. According the given question digits are rotating in cyclic order.
14. From the given question B & Y; A & Z in english alphabet have same distance from beginning and end respectively.

$$15. 1^3, 2^2, \boxed{3^3}, \boxed{4^2}, 5^3, 6^2, \boxed{7^3}$$

So the numbers are 27, 16, 343

$$16. \frac{H}{2 \times 8}, \frac{K}{11 + 2}, \frac{N}{2 \times 14}, \frac{Q}{17 + 2}, \frac{T}{2 \times 20},$$

$$\frac{W}{23 + 2}, \frac{Z}{2 \times 26}$$

(Here the position of alphabet starts from left and then multiply and add consecutively of the given position of alphabet.)

17. From given question fig.
Small arrow rotating 90° clockwise direction in each step and big arrow rotating 45° anticlockwise direction in each step.
18. From the given question fig.
Arrow is rotating 45° anticlockwise direction and is rotating 135° clockwise direction and 45° anticlockwise direction alternatively.

From 19 to 21. From the given question the code for the letters is given below:

$$S \rightarrow 3$$

$$K \rightarrow 2$$

$$R \rightarrow 5$$

$$T \rightarrow 7$$

$$Q \rightarrow 8$$

$$D \rightarrow 1$$

$$E \rightarrow 6$$

$$N \rightarrow 4$$

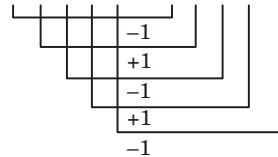
19. So the code for RKT is 527.

20. So the code for SEND is 3641

21. So the code for QRK is 852

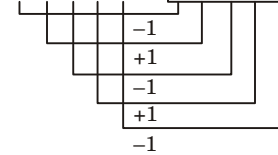
22. According to given question the first four and last four letters are written in reverse order.

23. TABLE : SBAMD



Similarly

COVER : BPUFQ



24. The code for the following language is given below.

$$R \rightarrow 6$$

$$O \rightarrow 8$$

$$P \rightarrow 2$$

$$E \rightarrow 1$$

$$C \rightarrow 7$$

$$H \rightarrow 3$$

$$A \rightarrow 4$$

$$I \rightarrow 5$$

$$\therefore \begin{array}{ccccc} C & R & A & P & E \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 7 & 6 & 4 & 2 & 1 \end{array}$$

25. From option (1), we get

$$11 - 2 + 1 = 10$$

26. From option (2), we get

$$15 \times 3 + 5 = 50$$

27. From option (3), we get

$$93 + 7 + 13 = 113$$

28. From option (4), we get

$$27 - 5 = 11 \times 2$$

29. From option (1), we get

$$72 \div 8 + 12 = 9 + 12 = 21$$

30. From option (4), we get

$$12 \div 4 \times 2 + 3 = 9$$

31. From the given fig.

$$(31 - (3 + 1)) = 31 - 4 = 27$$

$$(15 - (1 + 5)) = 15 - 6 = 9$$

$$(26 - (2 + 6)) = 26 - 8 = \boxed{18}$$

32. From the given question

$$(3 + 2) \times (2 + 1) = 5 \times 3 = 15$$

$$(4 + 2) \times (1 + 1) = 6 \times 2 = 12$$

$$(1 + 0) \times (3 + 4) = 1 \times 7 = \boxed{7}$$

33. According to given question

$$(1 + 1) \times 3 \times 2 = 2 \times 3 \times 2 = 12$$

$$(2 + 1) \times 5 \times 2 = 3 \times 5 \times 2 = 30$$

$$(3 + 1) \times 4 \times 2 = 4 \times 4 \times 2 = 32$$

34. From question fig. 1

$$\frac{16}{2} + 1 = 8 + 1 = 9$$

From question fig. 2

$$\frac{21}{7} + 4 = 3 + 4 = 7$$

From question fig. 3

$$\frac{12}{4} + 2 = 3 + 2 = \boxed{5}$$

35. From question fig. 1

$$(1)^3 \div 1 = 1$$

From question fig. 2

$$(2)^3 \div 8 = 1$$

From question fig. 3

$$(x)^3 \div 2 = 32$$

$$\frac{(x)^3}{2} = 32$$

$$(x)^3 = 64$$

$$(x)^3 = (4)^3$$

$$\therefore x = \boxed{4}$$

36. From question fig. 1

$$(8 + 3 + 6 + 2) \times 2 = 19 \times 2 = 38$$

From question fig. 2

$$(7 + 1 + 4 + 0) \times 2 = 12 \times 2 = 24$$

From question fig. 3

$$(5 + 2 + 4 + 2) \times 2 = 13 \times 2 = 26$$

37. From the given question Lion is Animal, so question figure (3) represents the correct figure

38. According to given question Teacher is a part of School, so question fig. (3) represents the correct fig.

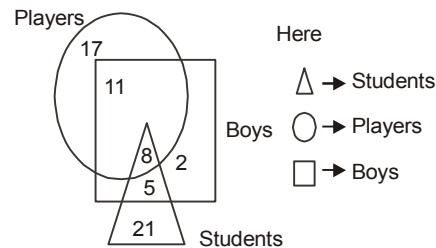
39. From the given question All are different so question fig. (4) represents the correct figure.

40. From the given question Doctor and Nurse, both are parts of Hospital, but both jobs are different.

41. From the given question Books are kept in Almirah and Almirah is in Library.

42. From the given question both Brother and Sister are the parts of family.

Question 43 to 46 :



43. From the given question there are 13 boys and students (sum of the numebrs which come under square and triangle)

44. There are 34 students.

45. There are 5 boys which are students but not player.

46. There are 19 boys which are also player.

Question 47 to 50 :

	Ram	Shyam	Anil	Deepak	Haris
Football	✓	✓	—	✓	✓
Hockey	✓	✓	✓	—	—
Volleyball	✓	—	✓	✓	—
Cricket	—	✓	—	✓	—
Badminton	—	—	✓	—	—

ENGLISH LANGUAGE

51. The contextual use of the term 'earn' makes it clear that it is a verb.
52. The first paragraph of the passage states that "when the berries turn blue, they are ripe and ready to be picked". This makes option (1) correct.
53. The second paragraph of the passage states that "farmers grow blueberries in big fields". This makes option (2) correct.
54. The last paragraph of the passage states that "after the blueberries are picked, they are put into boxes and sent to stores". This makes option (1) correct.
55. The opposite of 'sweet' is 'sour'. Sugary is synonymous with 'sweet'.
56. Option (1) is the most appropriate answer the passage revolves all around blueberries. Options (2) and (3) are incorrect because they are too specific. They are stated only towards the end of the passage. Option (4) is factually incorrect.
57. Out of all the options only 'was born' can fit into the first blank. None of the other options contain a helping verb, which is mandatory to give a meaning to the sentence.
58. Out of all the options only 'was educated' can fit into the first blank. None of the other options contain a helping verb, which is mandatory to give a meaning to the sentence.
59. 'Shrewd' is the most appropriate word for blank 3, as the sentence will be logically correct only if an adjective fills in the blank.
60. 'Diplomat' is the most appropriate word for blank 4.
61. The last part of the biography talks about a book 'Arthashastra'. Hence, both 'authored and wrote' are correct.
62. According to the given sentence, 'whenever' is the correct answer. Other options cease to exist as they will make the sentence incorrect.
63. (4) According to the given sentence, 'therefore' is the correct answer as this part of the sentence reasons what happens due to the crowded bus.
64. This sentence presents a condition, and hence 'if' is the correct option.
65. 'Unless' is the correct answer. The sentence says that passengers would have stayed behind, unless they pushed people to move forward. 'Because' will make the sentence logically incorrect. Other options are highly inappropriate for the blank.
66. Only 'sometimes' is the correct answer. Other options are highly inappropriate for the blank.
67. 'Because' is the correct answer. It explains why the speaker has to sometimes wait for 20 minutes.
68. 'Consequently' is the correct answer as the sentence states the result of waiting for 20 minutes for a bus.
69. 'Usually' is the correct answer. Other options are highly inappropriate for the blank.
70. 'While' is the correct answer. Other options are highly inappropriate for the blank.
71. 'Either' is the correct answer. 'Either-or' is a pair of conjunctions that is always used together.
72. 'Multiplication' is the correct answer as the other options are verbs and not nouns.
73. 'Explanation' is the correct answer as the other options are verbs and adjectives.

74. 'Laziness' is the correct answer as the other options are adjectives.
75. 'For' is the correct answer. Other options are highly inappropriate for the blank.
76. 'Along' is the most appropriate option. It will make a connection between this sentence and the next sentence of the paragraph.
77. 'Looking at' is a phrase which means to direct eyes towards something (here, watch).
78. 'On' is the correct answer. Other options are highly inappropriate for the blank.
79. 'Towards' is the correct answer. It is used to say that the speaker started moving in the direction of Sameer's house.
80. 'Off' and 'on' both can appear in this blank. But considering the following sentence, 'off' will be ruled out. 'On' is hence the correct answer.
81. 'On' is the correct answer. Other options are highly inappropriate for the blank.
82. 'On' is the correct answer. Other options are highly inappropriate for the blank.
83. 'Beside' is the correct answer. The use of 'grabbed' in the same sentence is important. Sameer grabbed the narrator, who was standing beside the bed. Other options are incorrect.
84. 'Grabbed with both arms' is the only correct phrase. Other options are highly inappropriate for the blank.
85. 'On' is the correct answer. Other options are highly inappropriate for the blank. 'From' could have appeared if the blank was preceded with 'coming'.
86. 'Deficient' is the correct answer.
87. 'Break in' means to burst into a place and violate some one's privacy. Hence, option (3) is the correct answer.
88. 'Keep on' means to continue doing something. Hence, option (4) is the correct answer.
89. 'Do away with' means to eliminate something. Hence, option (2) is the correct answer.
90. A Polyglot is a person who knows and is able to use several languages.
91. 'Cut off' is the correct option. 'Hung up' is used when one person worries too much about a person or a thing.
92. 'A lot of' is the correct answer. Other options will make the sentence grammatically incorrect.
93. 'Took up' is to accept or adopt something. 'Took out' is to remove something from somewhere. 'Took in' is to include something. Hence, 'took up' is the only correct answer.
94. As the sentence talks about a future course of event, 'is' and 'was' are incorrect. 'Must be' is incorrect since it is not necessary. The speaker is merely assuming. Hence, 'would be' is the correct answer.
95. 'Despair' is hopelessness. Hence, option (3), 'hope', is the correct answer.
96. 'Arrogant' means proud and haughty. Hence, option (4), 'modest', is the correct answer.
97. 'Shimmering' is shining and glimmering. Hence, option (1), 'gloomy', is the correct answer.
98. 'Dauntless' means bold and daring. Hence, option (4), 'timid', is the correct answer.
99. 'A red letter day' is a day that is pleasantly noteworthy or memorable. Hence, option (3), 'a happy day', is the correct answer.
100. 'Turn a deaf ear' is to ignore what someone says. Hence, 'disregard' is the correct answer.

SCHOLASTIC APTITUDE TEST

101. Blue colour is scattered by atmosphere.



This reaction is an example of displacement reaction.

103. NaHCO_3 , sodium bicarbonate (sodium hydrogen carbonate) is commonly called as baking soda.

104. Antacids like $\text{Mg}(\text{OH})_2$ Milk of magnesia are used for treating indigestion; as it neutralises the acidic effect.

105. The filtration of blood takes place in kidney. Each kidney has nephrons which consist of glomerulus that help in ultrafiltration of blood.

106. Transport of water in plants is through Xylem. Xylem consists of tracheids and vessels which are the main conducting elements.

107. 25 cm.

108. The plant hormones include Auxin, Cytokinin, Gibberellins, Absciscic acid, ethylene. Cytokinin helps in cell division and is present in greater concentration in areas of rapid cell division like fruits, seeds etc.

109. The gap between two neurons is called synapse. Through synapse electrical impulse passes from nerve endings of one neuron to dendrites of other neuron

110. Ammeter

111. Virtual

112. Kilowatt hours

113. A solution of pH 10 would be basic and will turn red litmus into blue.

114. Anther is the male part of a flower and contains male gametes in pollen grains. Each pollen grain has two male gamete.

115. CFCs are stable compounds and react with ozone (O_3) and thus deplete the ozone layer.

116. Since birth, cerebrum is the most developed part of the human brain. It is seat for intelligence & is the largest part of the brain.

117. TSH = Thyroid Stimulation Hormone. It stimulates thyroid gland to release thyroxine.

118. It is an analgesic and narcotic drug obtained from opium (poppy plant)

119. Sodium lauryl sulphate. Soaps are sodium salts of fatty acids whereas as detergents are sulphate salts of fatty acids.

120. Thermosetting plastics are those which cannot be remoulded. Eg. *Bakelite*

121. H_2 adsorbed on Ni, Pt or Pd is used for the hydrogenation of vegetable oil to vegetable ghee.

122. Sphygmomanometer measures blood pressure. Normal blood pressure is 120/80 mmHg

123. + means convex

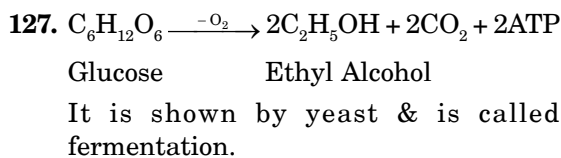
$$P = 5$$

$$\Rightarrow f = \frac{1}{5} \text{ m} = 0.2 \text{ m}$$

124. It is a uniform field

$$125. 1 \text{ volt} = \frac{1 \text{ joule}}{1 \text{ coulomb}}$$

126. Genes are segment of DNA present on chromosomes. Genes is a section of DNA that provides information for one protein.



128. Both picric acid and cellulose nitrate are used as explosives.

129. Sound which is infrasonic.

$$\begin{aligned} 130. \quad \epsilon &= P \times t \\ &= 200 \text{ megawatt} \times 24 \text{ h} \\ &= 4800 \text{ megawatt hour} \end{aligned}$$

131. The valency of the metal is 3. The cation formed is M^{+3} , thus the formula of its nitrate will be $M(NO_3)_3$.
132.
$$R = \frac{V^2}{P}$$
133. As zinc is more reactive than tin thus food cans are coated with tin and not with zinc. Also it gets a better look
134. $n = \frac{C}{V}$ and V for violet is minimum.
135. Change in focal length of eyelens.
136. Na_3PO_4 is a simple or normal salt. As it does not release H^+ ions in solution.
137. SO_2 on dissolving in water forms sulphurous acid

$$H_2O + SO_2 \rightarrow H_2SO_3$$
138. Silver is the best conductor of electricity.
139. Metal oxides on reduction with a suitable reducing agent are converted into metals.
140. $1 \text{ m} = 10^9 \text{ nm}$
141. The beginning of the Shaka era corresponds to the ascension of Kanishka I in 78 CE.
142. Avesta is the sacred book of the Parsis, that is to say, of the few remaining followers of that religion which feigned over Persia at the time when the second successor of Mohammed overthrew the Sassanian dynasty.
143. In 1503, Sikander Lodi commissioned the building of the present-day city of Agra. Agra was founded by him
144. Mughal emperor Akbar started a faith called Din-i-Illahi which encompassed ideas from various religions. On every Thursday, scholars from different religions came to debate on religious issues raised by the emperor. This was done at the Ibadat Khana in Fateh Pur Sikri at Agra.
145. In 1905, Lord Curzon decided to partition Bengal to control the growing opposition to British rule.
146. Kesari is a Marathi newspaper which was founded in 1881 by Lokmanya Bal Gangadhar Tilak, a prominent leader of the Indian Independence movement.
147. Chandrakanta is a popular epic fantasy Hindi novel by Devaki Nandan Khatri. Published in 1888, it was the first modern Hindi novel.
148. Dadabhai Naoroji is also known as the Grand Old Man of India, Naoroji is also credited with the founding of the Indian National Congress, along with A.O. Hume and Dinshaw Edulji Wacha. His book Poverty and Un-British Rule in India brought attention to the draining of India's wealth into Britain.
149. Annie Besant was the first woman president of the Indian National Congress in 1917 session of Calcutta.
150. Samkhya or Sankhya is one of the six astika schools of Hindu philosophy. Sage Kapila is traditionally credited as a founder of the Samkhya School.
151. Chipko Movement or Chipko Andolan was primarily a forest conservation movement in India that began in 1973 under the leadership of Sunderlal Bahuguna.
152. M.S. Swaminathan is known as "Indian Father of Green Revolution" for his leadership and success in introducing and further developing high-yielding varieties of wheat in India.
153. The most important Gondwana coal fields of India are located in Damodar Valley. They lie in Jharkhand-Bengal coal belt and the important coal fields in this region are Raniganj, Jharia, Bokaro, Giridih, Karanpura.

- 154.** Project Tiger was launched in 1973. The first tiger census in 1972 showed the number to be 1827 throughout the country. In 1973, nine reserves were set up Assam, Bihar, Orissa, Uttar Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Rajasthan and the Sunderbans.
- 155.** Nepanagar is an industrial township in Burhanpur district in the Indian state of Madhya Pradesh. Nepanagar is famous for its newsprint paper mill, Nepa Mills Limited.
- 156.** Equator experiences hot weather throughout the year. It is because the sun remains almost directly overhead every day. Extreme heat is found on equator.
- 157.** Mount Everest is called the world's highest mountain because it has the "highest elevation above sea level". It is located in Asia.
- 158.** Venus is a terrestrial planet and is sometimes called Earth's "sister planet" because of their similar size, mass, proximity to the Sun, and bulk composition.
- 159.** The Nile River was the only reason that civilization arose in ancient Egypt at all. In the fourth century B.C., the Greek historian Herodotus reported in his *Histories* that "Egypt is the gift of the Nile." He meant that Egypt received virtually no rain and so all of its water — for drinking, washing, irrigation of crops and operation of water-wheels — came solely from this one river.
- 160.** Barometer is a scientific instrument used in meteorology to measure atmospheric pressure.
- 161.** Mount Etna is an active stratovolcano on the east coast of Sicily, Italy, in the Metropolitan City of Catania, between the cities of Messina and Catania.
- 162.** Gorge is a deep, narrow valley with very steep sides, usually where a river passes through mountains or an area of hard rock.
- 163.** Planning Commission was established on 15 March 1950, with Prime Minister Jawaharlal Nehru as the first Chairman of it.
- 164.** Gram panchayat or village panchayat is the grassroots-level of panchayati raj formalised local self-governance system in India at the village or small-town level, and has a sarpanch as its elected head.
- 165.** The United Nations is an international organization founded on 24th October 1945. It is currently made up of 193 Member States.
- 166.** Article 80 of the Constitution lays down the maximum strength of Rajya Sabha as 250, out of which 12 members are nominated by the President and 238 are representatives of the States and of the two Union Territories.
- 167.** Forty-Fourth Amendment of 1978 deleted the right to property from the list of fundamental rights. A new provision, Article 300-A, was added to the constitution, which provided that "no person shall be deprived of his property save by authority of law".
- 168.** Telangana is the 29 state of India, located in southern India. It formed on 2 June 2014 as the youngest state in India, from the northwestern part of the Joint State of Andhra Pradesh.
- 169.** Chandrasekhara Venkata Raman was the first Asian and first non-white to receive any Nobel Prize in the sciences.
- 170.** Justice Mohammad Hidayatullah was the 11th Chief Justice of India and the sixth Vice President of India, serving from 31

- August 1979 to 30 August 1984. He had also served as the Acting President of India from 20 July 1969 to 24 August 1969 and from 6 October 1982 to 31 October 1982.
- 171.** Supreme Court judges retire at the age of 65.
- 172.** Pradhan Mantri Jan-Dhan Yojana (P.M.J.D.Y), Prime Minister's People Money Scheme is India's National Mission for Financial Inclusion to ensure access to financial services, namely Banking Savings & Deposit Accounts, Remittance, Credit, Insurance, and Pension in an affordable manner.
- 173.** Community development programme was launched on a pilot basis in 1952 to provide for a substantial increase in the country's agricultural programme, and for improvements in systems of communication, in rural health and hygiene, and in rural education and also to initiate and direct a process of integrated culture change aimed at transforming the social and economic life of villagers.
- 174.** NITI Aayog is also known as National Institution for Transforming India, policy think tank of Government of India. It was established in 2015, by the NDA government, to replace the Planning Commission which followed the top-down model. Prime Minister is the Ex-officio chairman.
- 175.** 12th Five Year Plan of the Government of India implemented between 2012–17 with the main goal of "faster, sustainable and more inclusive".
- 176.** Khajuraho Group of Monuments is a group of Hindu and Jain temples in Madhya Pradesh, India. Most Khajuraho temples were built between 950 and 1050 by the Chandela dynasty.
- 177.** Land revenue, including the assessment and collection of revenue, the maintenance of land records, survey for revenue purposes and records of rights and alienation of revenues is the subject of state list.
- 178.** With a Gross Domestic Product (GDP) of more than US\$600 billion, Argentina is one of the largest economies in Latin America. Argentina is currently undergoing an economic transformation that promotes sustainable economic development with social inclusion and integration into the global economy.
- 179.** In between the rabi and the kharif seasons, there is a short season during the summer months known as the Zaid season. Some of the crops produced during 'zaid' are water melon, muskmelon, cucumber, vegetables and fodder crops.
- 180.** White Revolution is the concerted efforts on a cooperative level to increase milk supply through which Indian Dairy Industry has grown to the extent that milk output has not only topped the world, but also represents sustained growth in the availability of milk and milk products. The dairy sector is now the largest contributor in the agricultural sector to the nation's GDP.
- 181.** Value of $\sin^2 \theta + \frac{1}{(1 + \tan^2 \theta)}$
- $$= \sin^2 \theta + \frac{1}{\sec^2 \theta}$$
- $$\quad \text{(using } 1 + \tan^2 \theta = \sec^2 \theta \text{)}$$
- $$= \sin^2 \theta + \cos^2 \theta \left\{ \text{put } \frac{1}{\sec^2 \theta} = \cos^2 \theta \right\}$$
- $$= 1$$
- Hence option (4) is correct.

182. As $\sec \theta + \tan \theta = P$, then value of

$$\begin{aligned} \therefore \frac{P^2 - 1}{P^2 + 1} &\text{ will be } \frac{(\sec \theta + \tan \theta)^2 - 1}{(\sec \theta + \tan \theta)^2 + 1} \\ &= \frac{2 \tan \theta (\sec \theta + \tan \theta)}{2 \sec \theta (\sec \theta + \tan \theta)} \\ &= \frac{\tan \theta}{\sec \theta} = \sin \theta \end{aligned}$$

Hence option 2 and 3 both are correct.

183. As $\tan \theta = \frac{a}{b}$ so to evaluate value of

$$\frac{b \sin \theta - a \cos \theta}{b \sin \theta + a \cos \theta} \text{ we will divide}$$

Numerator and denominator both by

$$\cos \theta \text{ we will get } \frac{b \tan \theta - a}{b \tan \theta + a}$$

Now put $\frac{a}{b}$ in place of $\tan \theta$ we get

$$\frac{b \times \frac{a}{b} - a}{b \times \frac{a}{b} + a} = \frac{0}{2a} = 0$$

Hence option (4) is correct.

184. As $\sin \theta = \frac{4}{5}$

$$\Rightarrow \sin^2 \theta = \frac{16}{25} \quad (1)$$

We know that $\cos 2\theta = 1 - 2 \sin^2 \theta$ (2)

so using (1) in (2) we get

$$\cos 2\theta = 1 - 2 \times \frac{16}{25} = \frac{-7}{25}$$

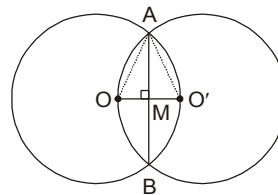
Hence option (4) is correct.

185. We know that the sum of all the exterior angles of any polygon is given by 360° so far regular polygon of (m) number of sides

$$\text{exterior angle will be } = \left(\frac{360}{m} \right)^\circ$$

$\Rightarrow$ Option (2) is correct

186.



In right angled $\triangle AMO$

$$OM^2 + AM^2 = r^2 \quad \dots(1)$$

In right angled $\triangle AMO'$

$$(MO')^2 + AM^2 = r^2 \quad \dots(2)$$

($\because OA = O'A$ given)

From (1) and (2)

$$OM = O'M = \frac{r}{2}$$

$$\therefore \frac{r^2}{4} + AM^2 = r^2 \text{ from (1)}$$

$$\Rightarrow AM^2 = \frac{3}{4} r^2$$

$$\Rightarrow AM = \frac{\sqrt{3}}{2} r$$

$$\Rightarrow AB = \sqrt{3} r$$

Alternate solution

Since $\triangle OAO'$ is an equilateral triangle

$$\therefore AM = \frac{r\sqrt{3}}{2}$$

$$\therefore AB = 2AM = r\sqrt{3}$$

Hence option (4) is correct

187. HCF of $(x+1)(x-1)^2$ and $(x+1)^2(x-1)$ will be

Given as : Let $p(x) = (x+1)(x-1)(x-1)$

and $q(x) = (x+1)(x+1)(x-1)$

Hence HCF = $(x+1)(x-1)$

Hence option (1) is correct.

188. On rearranging $\sqrt{a^{-1}b}\sqrt{b^{-1}c}\sqrt{c^{-1}a}$ we get

$$\sqrt{\frac{b}{a}} \times \sqrt{\frac{c}{b}} \times \sqrt{\frac{a}{c}} = \sqrt{\frac{b}{a} \times \frac{c}{b} \times \frac{a}{c}} = \sqrt{1} = 1$$

Hence option (3) is correct.

189. We know that for equal roots 'D' i.e.

$$\begin{aligned} b^2 - 4ac &= 0 \\ \Rightarrow (-8)^2 - 4 \times 2 \times c &= 0 \\ \Rightarrow c &= 8 \end{aligned}$$

Hence option (4) is correct.

190. A.G.C $\frac{5 + 10 + 15 + P + 20 + 35 + 40}{7}$

$$\begin{aligned} &= 21 \\ \Rightarrow 215 + P &= 147 \\ \Rightarrow P &= 22 \end{aligned}$$

Hence option (2) is correct.

191. First 10 prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

$$\begin{aligned} \text{Medium} &= \frac{\left(\frac{10}{2}\right)^{\text{th}} + \left(\frac{10}{2} + 1\right)^{\text{th}}}{2} \\ &= \frac{5^{\text{th}} + 6^{\text{th}}}{2} \\ &= \frac{11 + 13}{2} = 12 \end{aligned}$$

Hence option (3) is correct.

192. Using intercept form

$$\begin{aligned} \frac{x}{a} + \frac{y}{b} &= 1 \\ \text{Here, } a &= 4, b = -3 \end{aligned}$$

$$\therefore \text{Equation of line will be } \frac{x}{4} - \frac{y}{3} = 1$$

Hence option (3) is correct.

193. Let P be the number

$$\begin{aligned} P &= 6q + 3 \\ P^2 &= (6q + 3)^2 \\ &= 36q^2 + 36q + 9 \\ &= 36q^2 + 36q + 6 + 3 \\ &= 6(6q^2 + 6q + 1) + 3 \end{aligned}$$

$$\therefore \text{Remainder} = 3$$

Hence option (4) is correct.

194. Ratio of volumes = $\frac{\frac{4}{3}\pi r^3}{\pi r^2 h}$

$$= \frac{\frac{4}{3}\pi r^3}{\pi r^2 \times 2r} \quad (\text{As } h = 2r)$$

$$\begin{aligned} \Rightarrow \text{Ratio} &= \frac{\frac{4}{3}\pi r^3}{2 \times \pi r^3} \\ &= \frac{4}{3 \times 2} \\ &= \frac{2}{3} \\ &= 2 : 3 \end{aligned}$$

Hence option (1) is correct.

195. Let radius of first sphere = r units
so radius of second sphere = 2r units
Now ratio of volume of second sphere to

$$\text{first sphere} = \frac{\frac{4}{3}\pi(2r)^3}{\frac{4}{3}\pi(r)^3} = \frac{8}{1}$$

$$\Rightarrow 8 \text{ times}$$

Hence option (3) is correct

196. Length of perpendicular from point $P(x_1, y_1)$ to line $ax + by + c$ is given by

$$d = \frac{ax_1 + by_1 + c}{\sqrt{a^2 + b^2}}$$

$$d = 3, \text{ Point } (0, 0)$$

$$\text{line } 4x + 3y + c = 0$$

$$\Rightarrow 3 = \frac{4 \times 0 + 3 \times 0 + c}{\sqrt{3^2 + 4^2}}$$

$$\Rightarrow 3 = \frac{c}{\sqrt{25}} \Rightarrow \boxed{c = 15}$$

Hence option (4) is correct

197. $x = 3 + \sqrt{8}$

$$\frac{1}{x} = 3 - \sqrt{8}$$

$$x + \frac{1}{x} = 3 + \sqrt{8} + 3 - \sqrt{8} = 6$$

$$x^2 + \frac{1}{x^2} + 2 = 36$$

$$x^2 + \frac{1}{x^2} = 34$$

Hence option (3) is correct

198. $\left(\frac{a}{b}\right)^{x-1} = \left(\frac{b}{a}\right)^{x-3}$

$$\Rightarrow \left(\frac{a}{b}\right)^{x-1} = \left(\frac{a}{b}\right)^{3-x}$$

On comparing the exponent, as base is same

$$x - 1 = 3 - x$$

$$\Rightarrow 2x = 4$$

$$\Rightarrow x = 2$$

Hence option (3) is correct

199. As $x - y = 5$ and $xy = 24$

on squaring both sides of $x - y = 5$

$$\text{we get } x^2 + y^2 - 2xy = 25$$

$$\Rightarrow x^2 + y^2 - 2 \times 24 = 25 \quad \{\text{put } xy = 24\}$$

$$\text{we get } x^2 + y^2 = 25 + 48$$

$$\Rightarrow x^2 + y^2 = 73$$

Hence option (4) is correct

200. Using Imperical formula

$$\text{mode} = 3 \text{ median} - 2 \text{ mean}$$

$$\text{We get mean} = \frac{3 \times 7 - 9}{2} = 6$$

Hence option (2) is correct

■ ■

NTSE - 2016

MENTAL ABILITY TEST

1. If $x + y + z = 0$, then value of

$$\frac{(x+y)(y+z)(z+x)}{xyz} + 11 \text{ is}$$

- (1) $x + 11$ (2) $y + 11$
(3) $z + 11$ (4) 10
2. If $\sin A + \cos A = \sqrt{2} \sin(90^\circ - A)$ then value of $(\sqrt{2} + 1) \tan A$ will be
- (1) 1 (2) 0
(3) $\sqrt{2}$ (4) 2
3. If the point (K, 2) is equidistant from the point (5, -2) and (1, -2) then value of $K^2 + 7$ will be
- (1) 10 (2) 9
(3) 12 (4) 16
4. If each side of a cube is increased by 40%, then how much percent its total surface area will be increased.
- (1) 76 (2) 80
(3) 96 (4) 85
5. If sum of squares of zeros of a quadratic polynomial $g(y) = y^2 - 6y + p$ is 10. What will be the value of p .
- (1) 13 (2) 12
(3) 11 (4) 10
6. A train cross a pole in 12 seconds. If the speed of the train is 54 km/hr then length of train will be
- (1) 648 meter
(2) 150 meter
(3) 180 meter
(4) 100 meter

7. If the sum of the digits of a two digit number is 9 and the difference between the number and that formed by reversing the digits is 45 then number is

- (1) 81 (2) 72
(3) 45 (4) 54

8. How many numbers between 10 and 90 are divisible by 8 completely

- (1) 12 (2) 10
(3) 11 (4) 8

9. Is $3 = x + \frac{1}{1 + \frac{1}{5 + \frac{1}{3}}}$ Value of x will be

- (1) 14/19 (2) 17/19
(3) 15/19 (4) 41/19

10. Simplify $\frac{x+1}{x-1} + \frac{x-1}{x+1} - \frac{(2x^2-2)}{x^2+1}$

- (1) $\frac{4x^2}{x^4+1}$ (2) $\frac{8x^2}{x^4-1}$
(3) 1 (4) $\frac{4x^2+2}{x^4-1}$

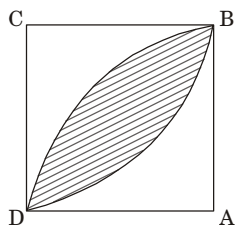
11. Vinod has some cows and some hens in his shed. The total number of legs is 92 and total number of heads is 29. Then the number of hens in his shed is

- (1) 14 (2) 12
(3) 17 (4) 21

12. Parth can row 16 km downstream and 8 km upstream in 6 hours. He can row 6 km upstream and 24 km downstream in 6 hours. Find the speed of Parth in still water

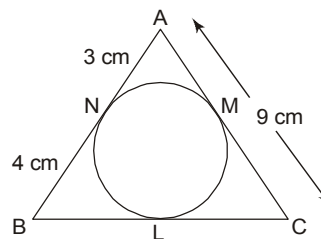
- (1) 5 km/hr (2) 3 km/hr
(3) 6 km/hr (4) 8 km/hr

13. Value of $\left(\log \frac{75}{16} - 2 \log \frac{5}{9} + \log \frac{32}{243}\right)$ is
- (1) $\log 3$ (2) $2 \log 2$
 (3) $\log 5$ (4) $\log 2$
14. Find the angle between the two hands of a clock at 15 minutes past 4 O' clock (Minute hand and hour hand)
- (1) 35.5° (2) 30°
 (3) 37.5° (4) 32.5°
15. If $3\sqrt{5} + \sqrt{125} = 17.88$ then what will be the value of $\sqrt{80} + 6\sqrt{5}$
- (1) 22.35 (2) 21.66
 (3) 20.12 (4) 20.46
16. The traffic signals at four road crossing change every 30 second, 1 minute, 45 seconds and 75 seconds respectively. If they change simultaneously at 9 AM, at what time will they change simultaneously again.
- (1) 9:12 AM (2) 9:15 AM
 (3) 9:20 AM (4) 9:30 AM
17. If $A:B = 2:3$, $B:C = 2:4$, and $C:D = 2:5$ then $A:D$ is equal to
- (1) 2:15 (2) 2:5
 (3) 1:5 (4) 3:5
18. In the adjoining figure, ABCD is a square of 7cm side length. $\overline{BD}$ is an arc of a circle of radius AB, what is the area of the shaded region?



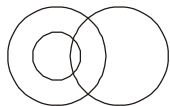
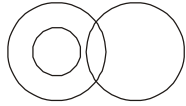
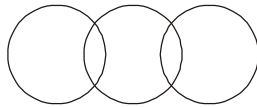
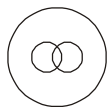
- (1) 28 cm^2
 (2) 35 cm^2
 (3) 21 cm^2
 (4) 14 cm^2

19. Width of a room is half of its height and height of room is $\frac{3}{2}$ times of its length. If cost of flooring carpet on floor at the rate of Rs $4/\text{m}^2$ is Rs 432, then what will be height of room?
- (1) 18 m (2) 20 m
 (3) 12 m (4) 15 m
20. Which number in the following will completely divide $3^{15} + 3^{16} + 3^{17}$
- (1) 11 (2) 14
 (3) 13 (4) 17
21. What will be the difference between simple interest and compound interest on sum of Rs 6000 in 2 years at the rate of interest of 5% p.a.
- (1) Rs 15 (2) Rs 20
 (3) Rs 30 (4) Rs 10
22. Value of $(3.5)^3 - (2.5)^3$ is
- (1) 25.27 (2) 29.25
 (3) 27.25 (4) 25.29
23. If $\sqrt{13 - x\sqrt{10}} = \sqrt{8} + \sqrt{5}$, then what is the value of x ?
- (1) -2 (2) -5
 (3) -6 (4) -4
24. In the adjoining figure, $\triangle ABC$, is circumscribing a circle. Then the length of BC is

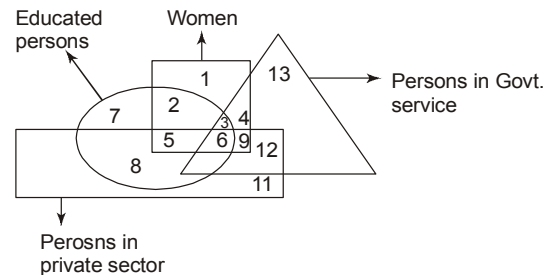


- (1) 10 cm (2) 7 cm
 (3) 9 cm (4) 8 cm
25. The selling price of 5 articles is the same as the cost price of 3 article. The gain or loss percent is
- (1) 25% gain (2) 30% gain
 (3) 40% loss (4) 33.33% loss

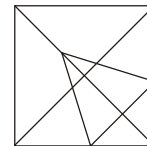
26. If the first half of the English alphabet is reversed and so is the 2nd half, then which letter is 7th to the right of the 12th letter from the left side?
- (1) S (2) U
(3) R (4) T
27. If in a certain code language 'THREAT' is written as 'RHTTAE' then how will 'PEARLY' be written in that code?
- (1) YLRAEP (2) YLRPAE
(3) AEPYLR (4) AEPRYL
28. What comes in place of question mark '?'
4, 6, 16, 62, 308, ?
- (1) 990 (2) 1721
(3) 698 (4) 1846
29. In a group of five persons Kamal is the tallest while Leela is the shortest. Rashi is shorter than Kamal but taller than Vinita and Priti. Priti is second shortest person in the group. Who is the third tallest?
- (1) Vinita (2) Rashi
(3) Priti (4) Leela
30. Which is the following diagram best depicts the relationship between Males, Husbands and Doctors?

- (1) 
- (2) 
- (3) 
- (4) 

Directions (Q. 31–33) : In the venn diagram given below, the square represents women, the triangle represents persons who are in Govt Service, the circle represents educated persons and the rectangle represents persons working in private sector. Each section of the diagram is numbered. Study the diagram and answer the following questions.



31. Which number represents educated women, who are in Govt. job?
- (1) 2 (2) 3
(3) 4 (4) 6
32. Which number represents the uneducated women, who have Govt. Jobs as well as jobs in private sector?
- (1) 6 (2) 4
(3) 12 (4) 9
33. Which number represent educated men having private jobs as well as govt. jobs?
- (1) 7 (2) 8
(3) 6 (4) 10
34. Which is the smallest number?
- (1) $-7 \div 7 \times 7 + 7$ (2) $(7 + 7 \times 7) \div 7 - 7$
(3) $7 - 7 \times 7 \div 7 + 7$ (4) $7 - (7 \div 7 \times 7 + 7)$
35. In the given figure, how many triangles are there?



- (1) 26 (2) 16
(3) 18 (4) 19

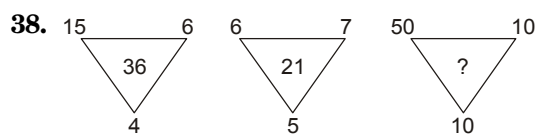
36. Choose the correct mirror image of the given figure from the alternatives.

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- (1) 5297NAC8JD (2) 5297NAC8JD
(3) 5297NAC8JD (4) 5297NAC8LD

37. $\frac{T}{J} : 2 :: \frac{X}{H} : ?$

- (1) 3/7 (2) 2
(3) 3 (4) 4



- (1) 140 (2) 220
(3) 500 (4) 320

Directions (Q. 39-41) : Read the following information carefully and answer the questions given below:

M, P, J, B, R, T and F are sitting around a circle facing the centre. B is the third to the left of J who is second to the left of M. P is third to the left of B and second to the right of R. T is not an immediate neighbour of M.

39. Who is fourth to the right of M?
(1) B (2) T
(3) J (4) M
40. Who is second to the left of T?
(1) F (2) M
(3) P (4) J
41. What is F's position with respect to R?
(A) Third to the left
(B) Fourth to the right
(C) Third to the right
(1) Only A
(2) Only B
(3) Only C
(4) Both A and B

42. A man is facing north west. If he turns 90° in the clockwise direction and then 135° in the anticlockwise direction.

Which direction is he facing now?

- (1) East (2) West
(3) North (4) South

43. If in a certain language 'how can you go' is written as 'je de ke pe', 'you come here' is written as 'ne ke se' and 'come and go' as 're pe se', then how will 'here' be written in the language?

- (1) je (2) pe
(3) me (4) ke

44.

4	5	6
2	3	7
1	8	3
21	98	?

- (1) 85 (2) 94
(3) 49 (4) 104

45. A's mother is sister of 'B' and daughter of 'C'. 'D' is the daughter of B and sister of E. How is 'C' related to E?

- (1) Sister
(2) Mother
(3) Father
(4) Grand mother or Grand father

46. In a certain code

P stands for +

Q stands for -

R stands for $\times$

S stands for $\div$

Then number corresponding to

6R8S1R3Q5P7Q4P2 is

- (1) 144 (2) 148
(3) 146 (4) 116

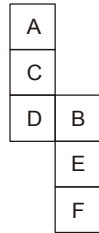
47. If the first and third digits of each number are inter changed and one is added to the second digit of each number, then which of the following pairs of numbers, will have highest total of their numerical value?

- (1) 946 and 728 (2) 728 and 574
(3) 669 and 946 (4) 669 and 629

48. Looking into a mirror, the clock shows 9:30 as the time. The actual time is

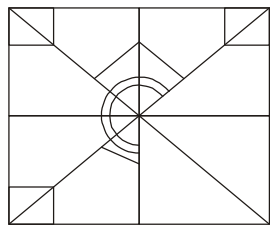
- (1) 2:30
- (2) 3:30
- (3) 4:30
- (4) 6:30

49. The sheet of paper shown in the figure is folded to form a box. Choose the correct alternative, which will truly represent the position of alphabets A to F shown in the following figure?



- (1)
- (2)
- (3)
- (4)

50. Select the figure from amongst the four alternatives which when placed in the blank space, would complete the pattern?



- (1)
- (2)
- (3)
- (4)

ENGLISH LANGUAGE

Direction : Choose the word that is opposite in meaning to the given words in question Nos. 51 – 56

51. Collision

- (1) Compassion
- (2) Agreement
- (3) Perfection
- (4) Conflict

52. Grudge

- (1) hatred
- (2) modest
- (3) eternal
- (4) affection

53. Insolvent

- (1) irrational
- (2) alluring
- (3) affluent
- (4) defaulter

54. Scanty

- (1) Lavish
- (2) skillful
- (3) dirty
- (4) Insufficient

55. Destitute

- (1) Impoverished
- (2) Lacking
- (3) rich
- (4) needy

56. Vanity

- (1) pride
- (2) modesty
- (3) arrogance
- (4) variety

Direction : In question nos. 57 – 62, out of four alternatives, choose the one which best expresses the meaning of the given word.

57. Emphatic

- (1) hesitant
- (2) extinct
- (3) gigantic
- (4) definite

58. Compatible

- (1) liable
- (2) viable
- (3) eligible
- (4) consistent

59. Pandemonium

- (1) a kind of harmonium
- (2) repercussion
- (3) chaos
- (4) symposium

60. Judicious

- (1) prudent
- (2) ardent
- (3) furious
- (4) curious

61. Inquisitive

- (1) beautiful (2) curious
(3) impulsive (4) modest

62. Spurious

- (1) serious (2) original
(3) anxious (4) fake

Directions : In question nos. 63 – 68, choose the alternative which expresses the meaning of the given idioms/phrases.

63. Once in a blue moon

- (1) every month
(2) always
(3) rarely
(4) after mid night

64. Keep body and soul together

- (1) to be free from disease
(2) to maintain life
(3) to have fun in life
(4) to live in a joint family

65. Sweat of the brow

- (1) sweating from heat to foot
(2) sweat runs down the brow
(3) hard labour
(4) sweat on the forehead

66. A snake in the grass

- (1) green coloured snake
(2) snake hiding in grass
(3) snake lying eggs in grass
(4) a secret foe

67. Come under the hammer

- (1) to be sold by an auctioneer
(2) to join
(3) to beat with hammer
(4) to break

68. Slip of the tongue

- (1) to talk nonsense
(2) to stammer
(3) an error of speech
(4) to abuse

Directions : In question nos. 69 – 74, sentences are given with blank to be filled with appropriate word out of four alternatives given:

69. I am sorry I cannot comply _____ your wishes

- (1) with (2) by
(3) at (4) for

70. I am vexed _____ his silence

- (1) about (2) for
(3) by (4) at

71. He fell a victim _____ his own avarice.

- (1) by (2) to
(3) of (4) with

72. We should abide _____ the laws of our country.

- (1) with (2) in
(3) by (4) to

73. You will have to answer _____ your misdeed.

- (1) for (2) with
(3) of (4) to

74. Parents should not be blind _____ the fault of their children.

- (1) for (2) in
(3) to (4) with

Directions : Choose the correct alternatives of the verbs given in brackets from question nos. 75 – 80.

75. The baby _____ (cry) since morning.

- (1) has crying (2) is crying
(3) cried (4) has been crying

76. When I reached home, my sister _____ (cook) the food.

- (1) has been cooking
(2) was cooking
(3) is cooking
(4) had cooked

77. The farmers _____ (plough) their fields before the rainy season sets in

- (1) have ploughed
(2) had ploughed
(3) will have ploughed
(4) ploughed

78. I _____ (not refuse) him anything till yesterday.
 (1) had not refused
 (2) did not refuse
 (3) have not refused
 (4) not refused
79. They _____ (wait) for the train for two hours when I reached the station.
 (1) were waiting
 (2) had been waiting
 (3) have been waiting
 (4) are waiting
80. She _____ (not write) to me since she went abroad.
 (1) did not write
 (2) had not written
 (3) will not have written
 (4) has not written

Directions : In question nos. 81 – 85, read the passage and choose the correct answer from the given options.

Sariska National Park is a wildlife sanctuary, located at a distance of 107 km from Jaipur. The park possesses historical monuments and temples, which reflect the legacy of the maharajas of Alwar. The park is bigger than Ranthambore but has a similar topography. Though this sanctuary does not have many tigers yet many wild animals dwell on the grounds of this park. Apart from other carnivores and herbivores, you can also trace Rhesus monkeys, which can usually be seen playing tricks upon one another around the Tad Vriksh (palm tree). The park also shelters many different species of birds including Bush Quails, Sand Grouses, Tree Pies, Golden Backed Woodpeckers etc. Animal lovers would definitely love this place as it will offer them some of the best scenes to remember. The best place to spot wildlife is at the waterholes where animals come to satisfy their thirst. You can trace hundreds of birds at the Kalighati waterhole and Nilgai can be spotted at lupka waterhole.

81. In the Sariska National Park, there are _____.
 (1) only herbivores
 (2) only carnivores
 (3) both carnivores and herbivores
 (4) no carnivores or herbivores
82. The Sariska National Park is not far from
 (1) Jodhpur (2) Raipur
 (3) Mewar (4) Jaipur
83. The park possesses
 (1) ramparts and monuments
 (2) monuments and temples
 (3) temples and ramparts
 (4) monuments and forts
84. Animals come to satisfy their thirst at a
 (1) borehole (2) deepwell
 (3) waterhole (4) borewell
85. The Sand Grouse is a species of
 (1) birds (2) plants
 (3) animals (4) trees
86. One who looks at the dark side of life?
 (1) optimist (2) pacifist
 (3) pessimist (4) sadist
87. One who has a long experience of any occupation?
 (1) Stoic (2) Novice
 (3) Veteran (4) Mesologist
88. To become strong again after illness
 (1) recuperate (2) toxify
 (3) recrimination (4) exhaust
89. Official in-charge of a museum/art gallery
 (1) artist (2) excavator
 (3) caretaker (4) curator
90. Rise in prices
 (1) inflammation (2) inflation
 (3) infiltration (4) inflection

Directions : In question nos. 91 – 95, choose the alternative with correct spellings.

91. (1) Catastrophe (2) Catastroph
 (3) Catastrophy (4) Catestrophy

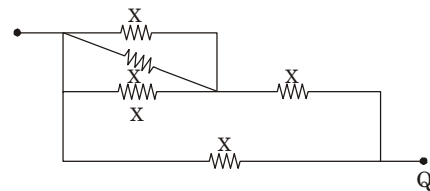
92. (1) Redical (2) Radical
(3) Radicle (4) Redicle
93. (1) Gyneacology (2) Gyniecology
(3) Gynaecology (4) Ginicology
94. (1) Spontaneous (2) Spantaneous
(3) Spuntaneous (4) Sponteneous
95. (1) Benevolence (2) Benivolence
(3) Benevolance (4) Benevolence

Directions : In question nos. 96 – 100, find the correct passive construction.

96. The enemy has captured the city.
(1) The enemy has captured the city
(2) The city has been captured by the enemy
(3) The city captured by the enemy
(4) The city was been captured by the enemy
97. I kept him waiting
(1) He kept me waiting
(2) I was kept waiting by him
(3) He was kept waiting by me
(4) he has been kept waiting by me
98. Who composed this piece of composition
(1) By whom was this piece of composition composed?
(2) Who is being composed this piece of composition?
(3) By whom has this piece of composition been composed ?
(4) By whom this piece of composition was written?
99. Bring me a pen
(1) Please bring me a pen
(2) Let a pen brought to me
(3) Let a pen be brought to me
(4) Let a pen to bring to me
100. Have you repaired the road?
(1) Have the road repaired by you?
(2) Has the road been repaired by you?
(3) Has the road repaired by you?
(4) Was the road repaired by you?

SCHOLASTIC APTITUDE TEST

101. The distance travelled by a body falling freely from rest in 2nd, 3rd and 5th second of its motion are in the ratio
(1) 7 : 5 : 3 (2) 3 : 5 : 7
(3) 5 : 3 : 7 (4) 5 : 7 : 3
102. Two extremes ends of a moving train (engine and guard coach) pass a pole with speeds U and V respectively with a constant acceleration. The speed with which the middle point of the train will pass the same pole is
(1) $\frac{U + V}{2}$ (2) $\frac{V^2 + U^2}{2}$
(3) $\frac{UV}{2}$ (4) $\sqrt{\frac{U^2 + V^2}{2}}$
103. An athlete completes one round of circular track of radius r in 30s with uniform speed. The ratio of distance to the displacement traveled by the athlete at the end of 45s is
(1) $2r$ (2) $\frac{2}{3}r$
(3) $\frac{2}{3}\pi$ (4) 2π
104. Five resistances of same value 'x' are joined in an electric circuit as shown in figure. The equivalent resistance between ends P and Q is 3Ω . The value of x



- (1) $\frac{1}{5}\Omega$ (2) $\frac{5}{4}\Omega$
(3) $\frac{21}{4}\Omega$ (4) $\frac{7}{4}\Omega$

105. A bomb of mass 9 kg initially at rest explodes into two pieces of masses 3 kg and 6 kg. If the kinetic energy of 3 kg mass is 216J, then the velocity of 6kg mass will be

- (1) 4 m/s (2) 3 m/s
(3) 2 m/s (4) 6 m/s

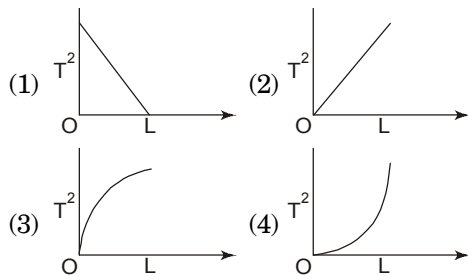
106. A glass rod is rubbed with silk, is found positively charged. This is because

- (1) Electrons are transferred from glass rod to silk.
(2) Electrons are transferred from silk to glass rod.
(3) Protons are transferred from glass rod to silk
(4) Protons are transferred from silk to glass rod

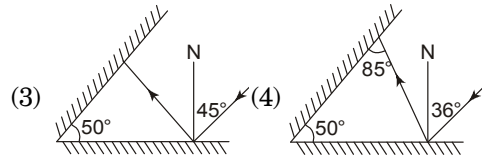
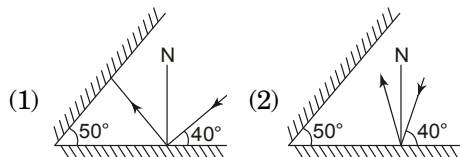
107. A ship rises up as it enters the sea from a river because

- (1) Sea water is harder than river water
(2) Density of sea water is lesser than river water
(3) Large quantity of sea water pushes ship up
(4) Density of sea water is greater than river water

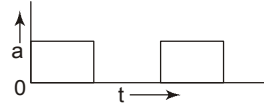
108. Which are of the following represents the correct graph between L and T^2 in simple pendulum?



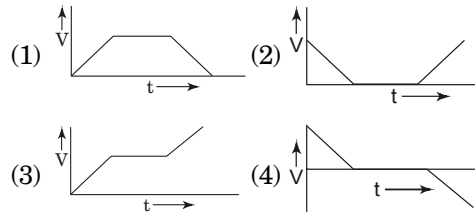
109. Which are of the following correctly depicts reflection. When two mirrors are inclined at an angle of 50° ?



110. Acceleration time graph of a body is shown below:



Which of the following velocity time graph of the same body



111. A man of 80 kg mass stands on a weighing machine in a lift which is moving upwards with a uniform speed of 5m/s. The reading of the weighing machine will be. (Take $g = 10 \text{ m/s}^2$)

- (1) Zero (2) 400N
(3) 800N (4) 1200N

112. An electric bulb marked 40W – 220V is connected with an electric supply of 110 v. Its electric power is

- (1) 100W (2) 40W
(3) 20W (4) 10W

113. An overhead power transmission line carries a current from east to east directs as the magnetic field at a point 1.5 cm north of the line is in

- (1) North direction
(2) South direction
(3) Vertically upward
(4) Vertically downward

114. Total internal reflection is not possible when ray of light travels from

- (1) glass to water (2) glass to air
(3) water to air (4) water to glass

- 115.** How many grams of oxygen gas is essentially required for complete combustion of 3 moles of butane gas?
- (1) 624 g (2) 312 g
(3) 128 g (4) 64 g
- 116.** IUPAC name of $\text{H} - \overset{\text{O}}{\parallel} \text{C} - \overset{\text{O}}{\parallel} \text{C} - \text{H}$
- (1) Oxoethanal (2) Glyoxal
(3) Ethanedial (4) Ethanedione
- 117.** What is the mass of pure ethanoic acid required to neutralize 280 mL of 0.5 molar pure limewater completely?
- (1) 60.4 g (2) 30.2 g
(3) 16.8 g (4) 8.4 g
- 118.** A metal sulphate has the formula MSO_4 . The phosphate of the same metal will have the formula
- (1) $\text{M}_3(\text{PO}_4)_3$ (2) M_2PO_4
(3) $\text{M}(\text{PO}_4)_2$ (4) $\text{M}_3(\text{PO}_4)_2$
- 119.** The mass of sodium chloride formed when 5.3 g of sodium carbonate is dissolve in 250ml of $\frac{1}{2}$ molar HCl solution will be
- (1) 5.85 g (2) 7.32 g
(3) 11.7 g (4) 58.5 g
- 120.** A gas mixture contains 50% helium and 50% methane by volume at S.T.P. What is the percentage by mass of the methane in the mixture?
- (1) 20% (2) 40%
(3) 60% (4) 80%
- 121.** The German silver, an alloy, has the composition
- (1) $\text{Cu} + \text{Sn} + \text{Zn}$ (2) $\text{Cu} + \text{Zn} + \text{Ni}$
(3) $\text{Cu} + \text{Ag} + \text{Zn}$ (4) $\text{Ag} + \text{Hg} + \text{Sn}$
- 122.** Out of the following, which is the incorrect statement?
- (1) Adsorption is always an exothermic process
(2) The soap solution is not a colloidal solution below its CMC.
(3) 'Argyrol' used in eye-lotion is a colloidal solution
(4) Gold number is the number of moles of gold formed in anode mud during copper refining.
- 123.** A mixture of non-reacting gasses contains hydrogen and oxygen gases in the mass ratio of 1 : 4 respectively. What will be the molar ratio of the above two gases in the mixture?
- (1) 16 : 1 (2) 1 : 4
(3) 4 : 1 (4) 1 : 6
- 124.** An element 'X' has the same number of electrons in the first and the fourth shell as well as in the second and the third shell. What is the formula and nature of its oxide?
- (1) XO, Neutral
(2) XO_2 , Acidic
(3) XO_2 , Amphoteric
(4) XO, Basic
- 125.** Which of the following is not used as a food preservative?
- (1) Alitame (2) BHA
(3) BHT (4) Na_2SO_3
- 126.** Match the column-I with column-II.
- | Column-I | Column-II |
|--|------------------------|
| (a) 0.5 mole SO_2 gas | (P) 10 moles of proton |
| (b) 1 mole H_2O | (Q) 11.2 L at S.T.P |
| (c) 96g of O_2 gas | (R) 2 moles |
| (d) 88g of CO_2 gas | (S) 6 moles of atoms |
| (1) (a) – (R), (b) – (P), (c) – (Q), (d) – (S) | |
| (2) (d) – (P), (c) – (Q), (b) – (R), (a) – (S) | |
| (3) (a) – (P), (b) – (Q), (c) – (S), (d) – (R) | |
| (4) (a) – (Q), (b) – (P), (c) – (S), (d) – (R) | |
- 127.** Choose the incorrect statement:
- (1) Iodine-value is a parameter to denote the degree of unsaturation of fatty acids.
(2) Cholesterol is not present in plant fats
(3) Rancidity is a reduction process of oily food materials.
(4) Tocopherol is an antioxidant.

- 128.** Iodine present in iodised salt in our diet is essential for
 (1) Synthesis of insulin
 (2) Synthesis of thyroxine
 (3) Synthesis of adrenalin
 (4) Synthesis of growth hormone
- 129.** Which of the following is not controlled by medulla in hind brain?
 (1) Blood pressure (2) Salivation
 (3) Body Posture (4) Vomitting
- 130.** The breakdown of glucose to pyruvate takes place in
 (1) Mitochondria (2) Nucleus
 (3) Lungs (4) cytoplasm
- 131.** The oxygen rich blood from lungs comes to the heart in
 (1) Left atrium (2) Right atrium
 (3) Right ventricle (4) Left ventricle
- 132.** Growth of pollen tube in the style towards the ovule in plants is an example of
 (1) Geotropism (2) Hydrotropism
 (3) Phototropism (4) Chemotropism
- 133.** The common passage of urine and sperm in human male is
 (1) Seminal vesicle (2) Ureter
 (3) Vas deferens (4) Urethra
- 134.** Out of the following, which enzyme is active in acidic medium
 (1) Pepsin (2) Trypsin
 (3) Lipase (4) Amylase
- 135.** Bowman capsule is found in
 (1) Small intestine
 (2) Kidneys
 (3) Heart
 (4) Brain
- 136.** "Khadins" are used in Rajasthan to
 (1) Check soil erosion
 (2) Recharge ground water
 (3) Promote soil erosion
 (4) Trap wild animals
- 137.** Which of these is 'not' a reflex action?
 (1) Salivation on smell of food
 (2) Secretion of sweat
 (3) Blinking of eye in strong light
 (4) Withdrawal of hand on touching hot object.
- 138.** A food chain comprising of a snake, grass, frog and insect, the secondary consumer is
 (1) Insect (2) Snake
 (3) Frog (4) Grass
- 139.** Identify the inherited trait from the following:
 (1) Colour of seed of garden pea
 (2) Developed musculature of a wrestler
 (3) Singing ability of a person.
 (4) Darkening of skin due to exposure to sunlight
- 140.** Which of the following disease cannot be sexually transmitted.
 (1) Cholera (2) HIV / AIDS
 (3) Syphilis (4) Gonorrhoea
- 141.** The simplified form of the expression given below is

$$\frac{y^2 - x^4}{x(x + y)} - \frac{y^3}{x}$$

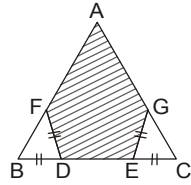
$$\frac{y^2 - xy + x^2}{y^2 - xy + x^2}$$

 (1) 1 (2) 0
 (3) -1 (4) 2
- 142.** If $a = \frac{4xy}{x + y}$, the value of $\frac{a + 2x}{a - 2x} + \frac{a + 2y}{a - 2y}$ in most simplified form is
 (1) 0 (2) 1
 (3) -1 (4) 2
- 143.** If $\frac{x^2 - bx}{ax - c} = \frac{m - 1}{m + 1}$, has roots which are numerically equal but of opposite signs, the value of m must be
 (1) $(a - b) / (a + b)$ (2) $(a + b) / (a - b)$
 (3) c (4) $\frac{1}{c}$

144. In the set of equations $z^x = y^{2x}$, $2^z = 2.4^x$; $x + y + z = 16$, the integral roots in the order $x, y, z = 16$,

- (1) 3, 4, 9 (2) 9, -5, 12
(3) 12, -5, 9 (4) 4, 3, 9

145. $\triangle ABC$ is an equilateral triangle, we have $BD = EG = DF = DE = EC$, then the ratio of the area of the shaded portion to area of $\triangle ABC$ is



- (1) $\frac{4}{11}$ (2) $\frac{7}{9}$
(3) $\frac{5}{12}$ (4) $\frac{6}{7}$

146. If $A + B = 90^\circ$ then

$$\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}$$

is equal to

- (1) $\cot^2 A$ (2) $\cot^2 B$
(3) $-\tan^2 A$ (4) $-\cot^2 A$

147. The value of the following expression is

$$\left[\frac{1}{(2^2 - 1)} \right] + \left[\frac{1}{(4^2 - 1)} \right] + \left[\frac{1}{(6^2 - 1)} \right] + \dots + \left[\frac{1}{(20^2 - 1)} \right]$$

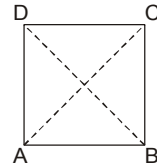
- (1) $\frac{10}{21}$ (2) $\frac{13}{27}$
(3) $\frac{15}{27}$ (4) $\frac{8}{33}$

148. If $2^{\sin x + \cos y} = 1$, $16^{\sin^2 x + \cos^2 y} = 4$, then values of $\sin x$ and $\cos y$ respectively are

- (1) $-\frac{1}{2}, \frac{1}{2}$ (2) $\frac{1}{2}, -\frac{1}{3}$
(3) 1, -1 (4) $\frac{1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}$

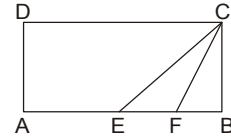
149. ABCD is a square of area of 4 square units which is divided into 4 non overlapping triangles as shown in figure, then sum of perimeters of the triangles so formed is

- (1) $8(2 + \sqrt{2})$
(2) $8(1 + \sqrt{2})$
(3) $4(1 + \sqrt{2})$
(4) $4(2 + \sqrt{2})$



150. In the diagram ABCD is a rectangle with $AE = EF = FB$, the ratio of the areas of triangle CEF and that of rectangle ABCD is

- (1) 1 : 6
(2) 1 : 8
(3) 1 : 9
(4) 1 : 10



151. If we divide a two digit number by the sum of its digits we get 4 as quotient and 3 as remainder. Now if we divide that two digit number by the product of its digits, we get 3 as quotient and 5 as remainder the two digit number is

- (1) Even (2) Odd prime
(3) Odd composite (4) Odd

152. The average weight(in kg) of all the students in a class equals the number of students in the class. The increase in the average weight when a teacher to 21 kg is included equals the decrease in average weight when a student of 19 kg is included. The strength of the class is

- (1) 15 (2) 10
(3) 20 (4) 17

153. Four positive integers sum to 125. If the first of these numbers is increased by 4, the second is decreased by 4. the third is multiplied by 4 and the fourth is divided by 4 we find four equal numbers then four original integers are

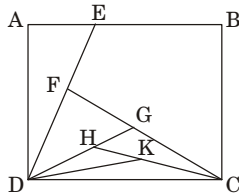
- (1) 16, 24, 5, 80 (2) 8, 22, 38, 57
(3) 7, 19, 46, 53 (4) 12, 28, 40, 45

154. The total number of squares on a chessboard is

- (1) 206 (2) 205
(3) 204 (4) 202

155. In the figure, the area of square ABCD is 4 cm^2 and E is midpoint of AB; F, G, H and K are the mid points of DE, CF, DG and CH respectively. The area of ΔKDC is:

- (1) $\frac{1}{4} \text{ cm}^2$
(2) $\frac{1}{8} \text{ cm}^2$
(3) $\frac{1}{16} \text{ cm}^2$
(4) $\frac{1}{32} \text{ cm}^2$



156. If $x\%$ of y is equal to 1% of z , $y\%$ of z is equal to 1% of x and $z\%$ of x is equal to 1% of y , then the value of $xy + yz + zx$ is

- (1) 1 (2) 2
(3) 3 (4) 4

157. The volume and whole surface area of a cylindrical solid of radius ' r ' units are v and s respectively. If the height of cylinder

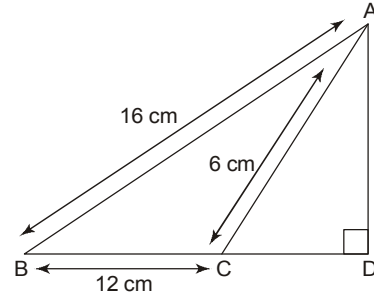
is 1 unit then $\frac{v}{s}$ is equal to

- (1) $\frac{1}{2} \left(1 - \frac{1}{r+1} \right)$ (2) $\frac{1}{2} \left(1 + \frac{1}{r+1} \right)$
(3) $\frac{1}{2} \left(1 - \frac{1}{r} \right)$ (4) $\frac{1}{2} \left(1 + \frac{1}{r} \right)$

158. If the height of right circular cylinder is increased by 10% while the radius of base is decreased by 10% then curved surface area of cylinder

- (1) Remains same
(2) Decreases by 1%
(3) Increases by 1%
(4) Increases by 0.1%

159. In the figure $\angle D = 90^\circ$ $AB = 16 \text{ cm}$, $BC = 12 \text{ cm}$ and $CA = 6 \text{ cm}$, then CD is:



- (1) $\frac{13}{6} \text{ cm}$ (2) $\frac{17}{6} \text{ cm}$
(3) $\frac{19}{6} \text{ cm}$ (4) $\frac{18}{5} \text{ cm}$

160. If x, y, z are real numbers such that $\sqrt{x-1} + \sqrt{y-2} + \sqrt{z-3} = 0$ then the values of x, y, z are respectively

- (1) 1, 2, 3 (2) 0, 0, 0
(3) 2, 3, 1 (4) 2, 4, 1

161. Napoleonic code is known as

- (1) Civil code of 1802
(2) Civil code of 1803
(3) Civil code of 1804
(4) Civil code of 1805

162. When was Victor Emmanuel II proclaimed king of united Italy?

- (1) 1860 (2) 1861
(3) 1863 (4) 1871

163. Satyagrah of Gandhiji against oppressive planation system was started from which place?

- (1) Dandi (2) Surat
(3) Ahmedabad (4) Champaran

164. Who set up the first Indian Jute mill in Calcutta in 1917?

- (1) Seth Hukum Chand
(2) G.D. Birla
(3) Dwaraka Nath Tagore
(4) J.N. Tata

- 165.** Where was khilafat committee formed in March 1919?
(1) Lucknow (2) Bombay
(3) Lahore (4) Ajmer
- 166.** Who wrote about the injustice of the caste system in his book 'Gulamgiri'?
(1) B.R. Ambedkar
(2) Periyar
(3) Amrit Lal Thakkar
(4) Jyotiba Phule
- 167.** The Act was made by Britishers to censor the India press was
(1) Rowlatt Act (2) Regulating Act
(3) Vernacular Act (4) Pitt Act
- 168.** Who was the king of France during French Revolution?
(1) Louis XIV (2) Louis XV
(3) Louis XVI (4) Louis XVII
- 169.** Which of the following book is not written by Premchand?
(1) Rangbhoomi (2) Indulekha
(3) Sevasadan (4) Godan
- 170.** Who was propaganda minister of Hitler?
(1) Goebbels (2) Raasputin
(3) Stalin (4) Helmuth
- 171.** Which of the following country is not included in Indo-China?
(1) Laos (2) Vietnam
(3) Cambodia (4) Japan
- 172.** How much percent of iron ore is found in magnetite?
(1) 70% (2) 65%
(3) 60% (4) 75%
- 173.** Which coal has highest quantity?
(1) Peat (2) Lignite
(3) Bituminous (4) Anthracite
- 174.** During which period was the greatest damage inflicted upon Indian forest?
(1) Colonial period (2) Mughal period
(3) Maratha period (4) Gupt period
- 175.** A chemical compound called 'texol' extracted from the Himalyan yew is used to cure which disease?
(1) Tuberculosis (2) Cancer
(3) Asthma (4) Fever
- 176.** In which year was the 'Project Tiger' launched?
(1) 1974 (2) 1970
(3) 1972 (4) 1973
- 177.** Which crop is kharif crop in North and Rabi in south India?
(1) Rice (2) Sugar cane
(3) Sesame (4) Cotton
- 178.** In which industry limestone is used as a raw material?
(1) Cotton textiles
(2) Iron and steel
(3) Cement industry
(4) Jute industry
- 179.** Which one of the following is the type of plate boundary of the Indian plate along the Himalayan Mountain?
(1) Ocean-continent convergence
(2) Divergent-boundary
(3) Transform boundary
(4) Continent-continent boundary
- 180.** Which of the following island groups lies to South East India?
(1) Andaman and Nicobar Islands
(2) Lakshadweep
(3) Maldives
(4) Sri Lanka
- 181.** Which of the following is the main form of degradation in the irrigated areas?
(1) Gully erosion
(2) Wind erosion
(3) Siltation of land
(4) Salinisation of soils
- 182.** River Narmada originates from which of the following hills
(1) Amarkantak (2) Satpura
(3) Vindhyachal (4) Mahabaleshwar

- 183.** Which one of the following is not a good argument in favour of democracy?
- (1) People feel free and equal in democracy
 - (2) Democracy resolves conflict in a better way than other
 - (3) Democratic government is more accountable to the people
 - (4) Democratic countries are more prosperous than others
- 184.** Who prepared the constitution of India in 1928?
- (1) B.R. Ambedkar
 - (2) Rajendra Prasad
 - (3) Jawahar Lal Nehru
 - (4) Moti Lal Nehru
- 185.** Who appoints the chief election commissioner of India?
- (1) The Prime Minister
 - (2) People of India
 - (3) President of India
 - (4) Chief justice of India
- 186.** Main recommendations of Mandal commission was
- (1) reservation of Schedule caste
 - (2) reservation of schedule tribe
 - (3) reservation for socially and educationally backward
 - (4) reservation for minorities
- 187.** In America Legislature is called
- (1) Upper house (2) Congress
 - (3) Lower house (4) Cabinet
- 188.** Which one of the following state was born out of cultural, ethnicity and geography?
- (1) Kerala (2) Nagaland
 - (3) Mizoram (4) Assam
- 189.** In modern democracy power sharing arrangements can take in following way
- (1) Among different organs of government
 - (2) Among government at different level
 - (3) Among different social groups
 - (4) All of them
- 190.** Which one of the following subject is of union list?
- (1) Police (2) Trade
 - (3) Foreign Affairs (4) Commerce
- 191.** 'Religion can never be separated from politics' said by
- (1) Sardar Patel
 - (2) Jawahar Lal Nehru
 - (3) Mahatma Gandhi
 - (4) Indira Gandhi
- 192.** Who interprets the constitution of India?
- (1) Lok Sabha
 - (2) Rajya Sabha
 - (3) Both(Lok Sabha & Rajya Sabha)
 - (4) The Supreme Court of India
- 193.** Which one of the following is not a function of political party?
- (1) To fill the political offices
 - (2) Contest the election
 - (3) To pass the Budget
 - (4) Do not shape the Public Opinion
- 194.** What is the time period of government budge in India?
- (1) From 1st January to 31st December
 - (2) From 1st March to 30th April
 - (3) From 1st April to 31st March
 - (4) From 1st April to 31 December
- 195.** After which five year plan there were three annual plans.
- (1) First five year plan
 - (2) Third five year plan
 - (3) Fourth five year plan
 - (4) Fifth five year plan
- 196.** How many days of guaranteed work is provided by National Rural Employment Guarantee Act.
- (1) 200 days
 - (2) 100 days
 - (3) 300 days
 - (4) 500 days

- 197.** Which one of the following agency issues one rupee currency note in India?
 (1) Reserve Bank of India
 (2) Ministry of Finance
 (3) Commerce Ministry
 (4) Commercial Banks
- 198.** Selling of part of public sector enterprises is called
 (1) Globalization
 (2) Privatization
 (3) Disinvestment
 (4) Liberalization
- 199.** Blue revolution is associated with which activity
 (1) Indigo cultivation
 (2) Fisheries
 (3) Poultry farming
 (4) Availability of drinking water
- 200.** Which one of these is not a feature of money?
 (1) Medium of exchange
 (2) Source of Income
 (3) Store of value
 (4) Unit of account

ANSWERS

MENTAL ABILITY TEST

1. (4)	2. (1)	3. (4)	4. (3)	5. (1)	6. (3)	7. (2)	8. (2)	9. (4)	10. (2)
11. (2)	12. (1)	13. (4)	14. (3)	15. (1)	16. (2)	17. (1)	18. (1)	19. (1)	20. (3)
21. (1)	22. (3)	23. (4)	24. (1)	25. (3)	26. (2)	27. (3)	28. (4)	29. (1)	30. (1)
31. (2)	32. (4)	33. (4)	34. (4)	35. (*)	36. (3)	37. (3)	38. (3)	39. (*)	40. (1)
41. (4)	42. (2)	43. (*)	44. (2)	45. (4)	46. (1)	47. (4)	48. (1)	49. (2)	50. (3)

ENGLISH LANGUAGE

51. (2)	52. (4)	53. (3)	54. (1)	55. (3)	56. (2)	57. (1)	58. (4)	59. (3)	60. (1)
61. (2)	62. (4)	63. (3)	64. (2)	65. (3)	66. (4)	67. (1)	68. (3)	69. (1)	70. (4)
71. (2)	72. (3)	73. (1)	74. (3)	75. (4)	76. (4)	77. (3)	78. (1)	79. (2)	80. (4)
81. (3)	82. (4)	83. (2)	84. (3)	85. (1)	86. (3)	87. (3)	88. (1)	89. (4)	90. (2)
91. (1)	92. (2)	93. (3)	94. (1)	95. (4)	96. (2)	97. (3)	98. (1)	99. (3)	100. (2)

SCHOLASTIC APTITUDE TEST

101. (2)	102. (4)	103. (3)	104. (3)	105. (4)	106. (1)	107. (4)	108. (2)	109. (1)	110. (3)
111. (3)	112. (4)	113. (4)	114. (4)	115. (1)	116. (3)	117. (3)	118. (4)	119. (1)	120. (4)
121. (2)	122. (4)	123. (2)	124. (4)	125. (1)	126. (4)	127. (3)	128. (2)	129. (3)	130. (4)
131. (1)	132. (4)	133. (4)	134. (1)	135. (2)	136. (2)	137. (2)	138. (3)	139. (1)	140. (1)
141. (3)	142. (4)	143. (1)	144. (1)	145. (2)	146. (2)	147. (1)	148. (1)	149. (2)	150. (1)
151. (2)	152. (3)	153. (1)	154. (3)	155. (2)	156. (3)	157. (1)	158. (2)	159. (3)	160. (1)
161. (3)	162. (2)	163. (4)	164. (1)	165. (2)	166. (4)	167. (3)	168. (3)	169. (2)	170. (1)
171. (4)	172. (1)	173. (4)	174. (1)	175. (2)	176. (4)	177. (3)	178. (3)	179. (4)	180. (1)
181. (4)	182. (1)	183. (4)	184. (4)	185. (3)	186. (3)	187. (2)	188. (2)	189. (4)	190. (3)
191. (3)	192. (4)	193. (4)	194. (3)	195. (2)	196. (2)	197. (2)	198. (3)	199. (2)	200. (2)

EXPLANATIONS

MENTAL ABILITY TEST

1. Given $x + y + z = 0$... (i)

$$\frac{(x+y)(y+z)(z+x)}{xyz} + 11$$

$$= \frac{-z \times -x \times -y}{xyz} + 11 = -1 + 11 = 10$$

(From equation (i) $x = -(y+z)$, $y = -(x+z)$
 $z = -(x+y)$)

2. Given $\sin A + \cos A = \sqrt{2} \cos A$

$$\sin A = \sqrt{2} \cos A - \cos A$$

$$\sin A = (\sqrt{2} - 1) \cos A$$

$$\tan A = \sqrt{2} - 1$$

$$(\sqrt{2} + 1) \tan A = (\sqrt{2} + 1)(\sqrt{2} - 1)$$

$$(\sqrt{2} + 1) \tan A = 1$$

3. Using distance formula

$$\sqrt{(k-5)^2 + (2+2)^2} = \sqrt{(k-1)^2 + (2+2)^2}$$

$$(k-5)^2 + (4)^2 = (k-1)^2 + (4)^2$$

$$\Rightarrow (k-5)^2 - (k-1)^2 = 0$$

$$\Rightarrow (k-5)^2 = (k-1)^2$$

$$\Rightarrow k-5 = |k-1|$$

$$\Rightarrow k-5 = -k+1$$

$$2k = 6$$

$$\therefore k = \pm 3$$

$$\Rightarrow k^2 + 7 = (\pm 3)^2 + 7 = 16$$

4. Using formula

$$A = \left(a + b + \frac{a \times b}{100} \right) \%$$

$$= \left(40 + 40 + \frac{40 \times 40}{100} \right) \%$$

$$= (80 + 16) \%$$

$$= 96 \% \text{ (increase)}$$

5. Given quadratic polynomial

$$y^2 - 6y + p = 0$$

Here $\alpha + \beta = \frac{b}{a} = 6$

$$\alpha \cdot \beta = \frac{c}{a} = p$$

According to question

$$\alpha^2 + \beta^2 = 10$$

$$(\alpha + \beta)^2 - 2\alpha \cdot \beta = 10$$

$$(6)^2 - 2p = 10$$

$$26 = 2p$$

$$\therefore p = 13$$

6. Here speed of the train

$$= 54 \text{ km/hr}$$

$$= \left(54 \times \frac{5}{18} \right) \text{ m/s}$$

$$= 15 \text{ m/s}$$

$\therefore$ Length of train

$$= \text{speed of the train} \times \text{total time}$$

$$= (15 \times 12) \text{ m} = 180 \text{ m}$$

$\therefore$ The length of a train is 180 m

7. From given question

$$x + y = 9 \quad \dots (i)$$

$$(10x + y) - (10y + x) = 45$$

$$9(x - y) = 45$$

$$x - y = 5 \quad \dots (ii)$$

Solving equations (i) and (ii), we get

$$\therefore x = 7, y = 2$$

So the number

$$= 10x + y$$

$$= 10 \times 7 + 2$$

$$= 72$$

$\therefore$ 72 is the number

8. Number between 10 and 90, which are divisible by 8.

$$\text{First term } (a) = 16$$

$$\text{Last term } (t_n) = 88$$

$$\therefore t_n = a + (n-1)d$$

$$88 = 16 + (n-1)8$$

$$72 = (n-1)8$$

$$\therefore n = 1 + 9$$

$$= 10$$

9. Given $3 = x + \frac{1}{1 + \frac{1}{5 + \frac{1}{3}}}$

$$3 = x + \frac{1}{1 + \frac{1}{\frac{16}{3}}}$$

$$\Rightarrow 3 = x + \frac{1}{1 + \frac{3}{16}}$$

$$\Rightarrow 3 = x + \frac{16}{19}$$

$$\Rightarrow x = 3 - \frac{16}{19}$$

$$\therefore x = \frac{41}{19}$$

10. Given expression is

$$\begin{aligned} & \frac{x+1}{x-1} + \frac{x-1}{x+1} - \frac{(2x^2-2)}{x^2+1} \\ &= \frac{(x+1)^2(x^2+1) + (x-1)^2(x^2+1) - 2(x^2-1)^2}{(x^2+1)(x^2-1)} \\ &= \frac{(x^2+1)((x+1)^2 + (x-1)^2) - 2(x^2-1)^2}{(x^2+1)(x^2-1)} \\ &= \frac{(x^2+1)((x^2+1+2x+x^2+1-2x) - 2(x^2-1)^2)}{(x^2+1)(x^2-1)} \\ &= \frac{(x^2+1)(2x^2+2) - 2(x^2-1)^2}{(x^2+1)(x^2-1)} \\ &= \frac{2((x^2+1)^2 - (x^2-1)^2)}{(x^2+1)(x^2-1)} \\ &= 2[x^4+1+2x^2-x^4-1+2x^2] \\ &= \frac{2[2x^2][2]}{x^4-1} \\ &= \frac{8x^2}{x^4-1} \end{aligned}$$

11. Let the total number of hens be 'x'.

$\therefore$ Total number of cows is $(29-x)$.

According to question

$$2x + 4(29-x) = 92$$

$$2x + 116 - 4x = 92$$

$$\therefore 2x = 24$$

$$\therefore x = 24$$

Hence the number of hens is 24

12. From given question

$$\begin{aligned} & \frac{16}{a} + \frac{8}{b} = 6 \\ \Rightarrow 8x + 4y &= 3 \end{aligned} \quad \dots(i)$$

$$\begin{aligned} & \frac{6}{a} + \frac{24}{b} = 6 \\ \Rightarrow 4x + y &= 1 \end{aligned} \quad \dots(ii)$$

$$\left[\frac{1}{a} = x, \frac{1}{b} = y \right]$$

Solving equations (i) and (ii), we get

$$x = \frac{1}{8}$$

$$y = \frac{1}{2}$$

Now $e + f = 8$ { e represents Parth's speed}

$e - f = 2$ { f represents speed of stream}

$$\Rightarrow e = 5 \text{ km/hr}$$

$$\begin{aligned} 13. \log \frac{75}{16} - 2 \log \frac{5}{9} + \log \frac{32}{243} \\ &= \log \frac{75}{16} - \log \frac{25}{81} + \log \frac{32}{243} \\ &= \log \frac{75}{16} + \log \frac{81}{25} + \log \frac{32}{243} \\ &= \log \left(\frac{75}{16} \times \frac{81}{25} \times \frac{32}{243} \right) \\ &= \log 2 \end{aligned}$$

14. At 4:15, angle between hands

$$= (4 \times 30^\circ) - (5.5 \times 15^\circ)$$

$$= 120^\circ - 82.5^\circ$$

$$= 37.5^\circ$$

So the angle between two hands of a clock is 37.5° .

15. Given $3\sqrt{5} + \sqrt{125} = 17.88$

$$3\sqrt{5} + 5\sqrt{5} = 17.88$$

$$8\sqrt{5} = 17.88$$

$$\sqrt{5} = \frac{17.88}{8}$$

$$\sqrt{5} = 2.235$$

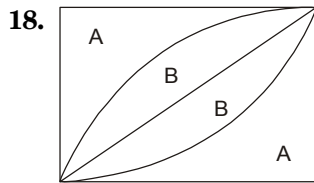
Now $\sqrt{80} + 6\sqrt{5} = 10\sqrt{5} = 22.35$

16. LCM of 30 sec, 1 min, 45 sec and 75 sec
= 15 min

∴ At 9:15 AM, they will simultaneously change again.

17. The required ratio of A : D is

$$\frac{A}{D} = \frac{A}{B} \times \frac{B}{C} \times \frac{C}{D} = \frac{2}{3} \times \frac{2}{4} \times \frac{2}{5} = \frac{2}{15}$$



$$2B + C = \frac{1}{4} \times \frac{22}{7} \times 7^2 = \frac{77}{2}$$

$$B + C = \frac{1}{2} \times 7^2 = \frac{49}{2}$$

$$\therefore B = \frac{28}{2} = 14$$

$$\Rightarrow \text{Shaded area} = 28 \text{ cm}^2$$

19. $l = x$ (say)

$$h = \frac{3}{2}x$$

$$w = \frac{1}{2} \cdot \frac{3}{2}x$$

$$= \frac{3}{4}x = \text{Area of floor} = \frac{3}{4}x^2$$

$$4 \times \frac{3}{4}x^2 = 432$$

$$x^2 = 144$$

$$x = 12$$

$$\therefore \text{height} = \frac{3}{2}x = 18$$

20. Given

$$\begin{aligned} 3^{15} + 3^{16} + 3^{17} &= 3^{12} (3^3 + 3^4 + 3^5) \\ &= 3^{12} (27 + 81 + 243) \\ &= 3^{12} (351) \\ &= 3^{12} \times 351 \end{aligned}$$

$\Rightarrow$ Divisible by 13.

21. Using formula

$$D = \frac{Pr^2}{(100)^2}$$

$$= \frac{6000 \times (5)^2}{100 \times 100}$$

$$= \frac{6000 \times 25}{100 \times 100} = \text{Rs. } 15$$

22. $(3.5)^3 - (2.5)^3$

$$= (3.5 - 2.5) ((3.5)^2 + (2.5)^2 + 3.5 \times 2.5)$$

$$= 1 \times (12.25 + 6.25 + 8.75)$$

$$= 27.25$$

23. Given $\sqrt{13 - x\sqrt{10}} = \sqrt{8} + \sqrt{5}$

squaring on both sides, we get

$$\Rightarrow 13 - x\sqrt{10} = 8 + 5 + 2\sqrt{8}\sqrt{5}$$

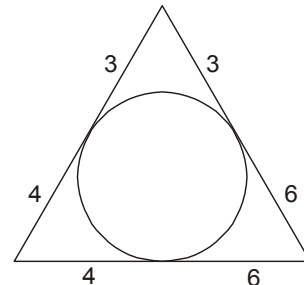
$$13 - x\sqrt{10} = 13 + 2\sqrt{40}$$

$$13 + x\sqrt{10} = 13 + 4\sqrt{10}$$

$$\Rightarrow -x\sqrt{10} = 4\sqrt{10}$$

$$\therefore x = -4$$

24.



$\Rightarrow BC = 10$ cm (Tangents from a point to the circle are of equal length)

25. From given question

$$\text{SP of 5} = \text{CP of 3}$$

$$5 \text{ SP} = 3 \text{ CP}$$

$$\frac{\text{CP}}{\text{SP}} = \frac{5}{3}$$

$$\therefore \% \text{ Loss} = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100\%$$

$$= \frac{5 - 3}{5} \times 100\%$$

$$= \frac{2}{5} \times 100\%$$

$$= 40\% \text{ (Loss)}$$

26. The required sequence of the alphabet is:

MLKJIHGFEDCBZYXWV U

TSRQPON

So the letter is 7th to the right of 12th letter from the left side is U.

27. THREAT → RHTTAE

⇒ PEARLY → AEPYLR

Logic : First half is reversed, then second half of reversed.

28.

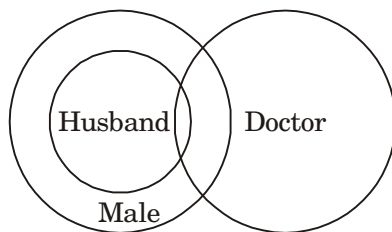
4	6	16	62	308	1846
×2 -2	×3 -2	×4 -2	×5 -2	×6 -2	

29. The arrangement is:

Kamal, Rashi, Vinita, Preeti, Leela

∴ 3rd in order of height is Vinita.

30.



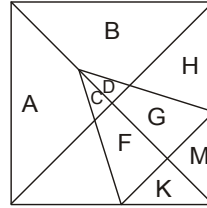
34. 1. $-7 \div 7 \times 7 + 7 = -1 \times 7 + 7 = -7 + 7 = 0$

$$2. (7 + 7 \times 7) \div 7 - 7 = (7 + 49) \div 7 - 7 \\ = 56 \div 7 - 7 = 8 - 7 = 1$$

$$3. 7 - 7 \times 7 \div 7 + 7 = 7 - 7 \times 1 + 7 \\ = 7 - 7 + 7 = 7$$

$$4. 7 - (7 \div 7 \times 7 + 7) = (7 - (1 \times 7 + 7)) \\ = 7 - 14 = -7$$

35.



The triangles are represented by C, D, E, H, K, M, AC, CD, BD, CF, DG, KM, EGK, CFK, DGM, MGH, ABCD, CDFG, ACFKE, EFKGHM and DGMBH.

So, 21 triangles.

Total number of triangles = 21

37.

$$\frac{T}{J} = \frac{20}{10}$$

(position of alphabet start from left)

$$\text{Similarly } \frac{X}{H} = \frac{24}{8} = \boxed{3}$$

38.

$$\frac{15 \times 6 \times 4}{10} = \frac{360}{10} = 36$$

$$\frac{6 \times 7 \times 5}{10} = \frac{210}{10} = 21$$

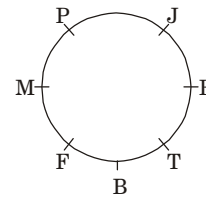
Similarly

$$\frac{50 \times 10 \times 10}{10} = \frac{5000}{10} \\ = \boxed{500}$$

Questions. 39–41 :

From given question

The arrangement is:

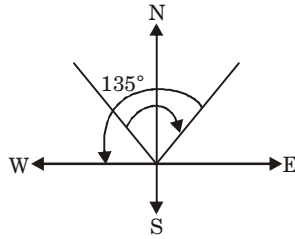


39. No option is correct, R is fourth to the right of M.

40. F is second to the left of T.

41. F is third to the left of R and fourth to the right of R.

42.



So, a man is facing west direction (from fig.)

43. From the given question code for the language is given below.

you → ke, come → se
⇒ here → ne

44. For Column-1

$$4^2 + 2^2 + 1^2 = 21$$

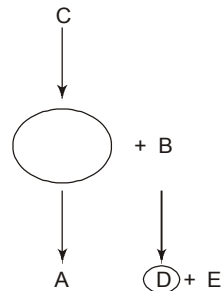
For Column-2

$$5^2 + 3^2 + 8^2 = 98$$

For Column-3

$$(6)^2 + (7)^2 + (3)^2 = 36 + 49 + 9 = \boxed{94}$$

45.



∴ C is grandfather or grandmother.

46. From the given code

$$= 6 \times 8 \div 1 \times 3 - 5 + 7 - 4 + 2$$

$$= 6 \times 8 \times 3 - 5 + 7 \times 2 = 144$$

47. From option (1)

1. 659 and 837

From option (2)

2. 837 and 485

From option (3)

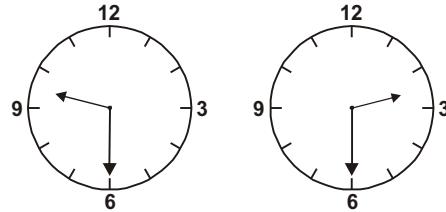
3. 976 and 659

From option (4)

4. 976 and 936

∴ Highest numerical value is 976 and 936

48.



(Actual Time)

(Mirror Time)

= 2 : 30.

49. A↔D, C↔E, B↔F

∴ (2) will be formed.

50. Answer fig. 3 will complete the given pattern

ENGLISH LANGUAGE

51. Options 1 and 2 are close but self-centered is the correct choice for this question. Other options are contextually incorrect. *“it has a tendency to limit one because one thinks of one’s country as something different from the rest of the world.”*

52. other options are contextually incorrect. Option 3 is the only correct answer because it is stated in the passage, *“Nationalism, when it becomes successful, sometimes goes on spreading in an aggressive way and becomes a danger internationally”*.

53. since it is mentioned in the passage that a nation promoting aggressive nationalism becomes a danger internationally, it therefore becomes isolated from other countries. Hence option 4 is the best answer.

54. this is a clear cut answer. Others refer to the neighboring states or neighbors who prosper because they don’t have that burden to carry. *“Human beings today are not in a mood to tolerate this..”* Hence option 1 is the only correct answer.

55. this is the most appropriate title that can be given to the passage. The passage discusses the evils of aggressive nationalism and how if nationalism not properly applied can become a curse for a country. Having a sense of national

- identity is always good but it should be properly applied otherwise it can have a reverse effect. Other options do not bring out the essence of the given passage.
- 56.** this is a clear cut answer. The last line of the passage states *"He saw them as blossoms of promise and renewal, the only hope for mankind"*. Other options are factually incorrect.
- 57.** Options 1, 2 and 4 are all close ones. But option 4 is more complete an answer. AS a non-believer he desired to affirm his faith before believing anything. *"But as a self-proclaimed non-believer, he loved affirming his faith in life."* Option 1 is also a correct answer.
- 58.** Option 3 is the desired answer. Other options are factually incorrect. It is clearly stated in the passage that for both Science and humanities played equal roles in his understanding of the society.
- 59.** Option 4 is the desired answer. Refer to *"he never forgot that we should nourish the total man. As a scientist, he refused to believe in a benevolent power interested in men's affairs."* Given options are ambiguous.
- 60.** The passage discusses about Nehru's many sided personality and it is clearly mentioned in the passage that this is because of his interest in various fields, be it science, literature or religion. But 2 is given as the correct option.
- 61.** This is the correct option. Refer to *"In the contemporary arrangements for circulating the news, an important element, evaluation is always weak and often wanting entirely."*
- 62.** the author criticizes weak evaluation of news these days. Hence option 3 is the correct answer. Option 2 is also correct answer.
- 63.** Refer to "...does not amount to row of beans; deserves no one's attention and should travel the wires no farther." ('...no one's attention' it should be)
- 64.** Option 4 is partially correct but option 1 is the best answer since it is clearly stated in in the second line of the passage. *"The casual horrors and real disasters are thrown on a newspaper reader without discrimination."*
- 65.** Option 3 is the correct answer. Other options are factually incorrect.
- 66.** 'Appear' is the best fit. Other options are logically incorrect.
- 67.** it should be 'built mostly by bricks.' Other options although close are contextually incorrect.
- 68.** 'made' is the best possible answer for this blank, other options therefore can be ignored.
- 69.** it should be 'for' sanitation. Other options do not fit.
- 70.** the given blank requires a conjunction which will contradict the next part of the sentence therefore the suitable word is 'but'. Other options are hence incorrect.
- 71.** 'deciphered' is the correct answer. Other options are wrong logically.
- 72.** this is the correct option. The paragraph starting with S1 defines the utility of a dictionary. Its followed by Sand Q which form a mandatory pair expressing that we should not let a word pass unchallenged. They are followed by P and R which again as a mandatory pair tell us what to do in case we forget certain word.
- 73.** the paragraph deals with the building of underground railway in Calcutta. RP as a pair provides the reason why Calcutta needed an underground railway line. It IS followed by S and Q which again as a pair ends the topic with a fact stating that 'it was going to be the first in South Asia'.
- 74.** It should be illicit.

75. It should be ludicrous.
76. It should be 'advertise'. (But all the options can be spelt correctly).
77. it should be describe (but all the options can be spelt correctly).
78. it should be 'the more\the more'. Other options are grammatically incorrect.
79. it is the only correct option. Other options are grammatically incorrect.
80. this is the only correct option. Other options grammatically unfit.
81. Stringent here means 'strict'. Hence it goes along with 'investigation'. Other options therefore are incorrect.
82. it is the correct grammatical choice for the given blank which require something more formal. Out of the given options, 'had better' therefore is the best choice.
83. 'to' is the correct choice for this sentence.
84. 'to cry' is the best choice. '...to cry over something' is grammatically correct.
85. 'fodder' is the food used to feed animals. Hence it is the only correct option.
86. it is the correct option. *At close quarters* often means *close examination* of something.
87. 'An apple of discord' means *cause of quarrel*.
88. 'At large' can be conveyed through the word 'abscond'.
89. 'Take the bulls by horns' means facing some kind of difficulty. Hence 1 is the correct choice.
90. 'Buckle down' means 'get down to' which indicates working seriously on something.
- 91 Forsake is the correct synonym of abandon.
92. To hate intensely is the correct synonym of detest.

93. Provisional is the correct synonym of tentative.
94. Vague is synonymous to the word obscure.
95. Precise is the correct synonym of the word specific.
96. Prejudiced is the correct antonym of open minded.
97. Fickle is the correct antonym of dependable.
98. Respectful is the correct definition of impertinent.
99. Economical is the correct antonym of extravagance.
100. Explicit is the correct antonym of obscure.

SCHOLASTIC APTITUDE TEST

101.
$$S^{nth} = u + \frac{1}{2} a(2n - 1)$$

$$u = 0 \quad [\because \text{falling from rest}]$$

$$S^{2nd} : S^{3rd} : S^{5th} = \frac{3a}{2} : \frac{5a}{2} : \frac{9a}{2} = 3 : 5 : 9$$
102.
$$v' = \text{speed of midpoint}$$

$$v^2 - u^2 = 2as$$

$$v'^2 - u^2 = \frac{2as}{2}$$

$$= \frac{v^2 - u^2}{2}$$

$$v'^2 = u^2 + \frac{v^2 - u^2}{2}$$

$$= \frac{v^2 + u^2}{2}$$

$$v' = \sqrt{\frac{v^2 + u^2}{2}}$$
103. distance = speed $\times$ time

$$= \frac{2\pi r}{30} \times 45 = 3\pi r$$

displacement = $2r$
Ratio = $\frac{3\pi r}{2r}$

$$= \frac{3\pi}{2}$$

104. 3 resistors are in parallel,

$$\therefore \text{resultant} = \frac{x}{3}$$

then $\left(\frac{x}{3} + x\right)$ is in parallel with x

$\therefore$ Resultant of 5 resistors is $\frac{4x}{7}$

$$\frac{4x}{7} = 3$$

$$\Rightarrow x = \frac{21}{4} \Omega$$

105. Speed of 3 kg mass

$$\begin{aligned} \Rightarrow 216 &= \frac{1}{2}mv^2 \\ &= \frac{1}{2} \times 3 \times v^2 \end{aligned}$$

$$\therefore v = 12 \text{ m/s}$$

$$m_1v_1 = m_2v_2$$

[Law of conservation of momentum]

$$3 \times 12 = 6 \times v_2$$

$$\Rightarrow v_2 = 6 \text{ m/s}$$

106. Electrons can be transferred.

Loss of electrons leads to positive charge.

107. More the density of the liquid, then the required buoyant force will be created by displacing less liquid as buoyant force is equal to $v \times d \times g$

$$108. \quad t^2 = \frac{4\pi^2}{g}L$$

$$\Rightarrow T^2 \propto L$$

$$109. \quad \angle c = \angle r$$

$$\angle c = 90 - 40 = 50^\circ$$

$\therefore$ The three angles of triangle are 50° , 40° , 90°

110. uniform a , $\therefore v$ increases
then zero a , $\therefore v$ is uniform
and then again uniform a ,
 $\therefore v$ increases.

111. As the speed is constant,

$$T = mg = 800 \text{ N}$$

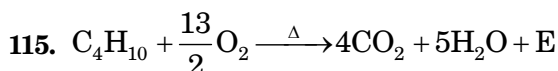
$$112. \quad P \propto V^2$$

$$V' = \frac{V}{2}$$

$$\therefore P' = \frac{P}{4} = \frac{40}{4} = 10 \text{ W}$$

113. Using right hand thumb rule.

114. It is possible only for light going from denser to rarer.



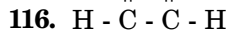
$\therefore$ 1 mole of C_4H_{10} combines with $\frac{13}{2}$ mole of O_2

$\therefore$ 3 mole of C_4H_{10} combines with $\frac{39}{2}$ mole of O_2

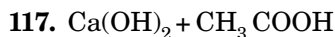
$$= \frac{3}{2} \times 9 \times 32$$

$$= 39 \times 16$$

$$= 624 \text{ g}$$



Ethanedial



$$\text{Meq of Ca(OH)}_2 = \text{Meq of CH}_3\text{COOH}$$

$$= 280 \times 0.5 \times 2$$

$$= 28 \times 5 \times 2$$

$$= 140 \times 2$$

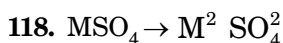
$$= \text{Meq of Ca(OH)}_2$$

$$/ \text{Meq of CH}_3\text{COOH}$$

$$280 = \frac{W}{E} \times 1000$$

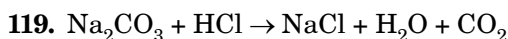
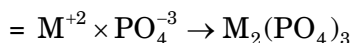
$$280 = \frac{W}{60} \times 1000$$

$$W = 16.8 \text{ g}$$



So M is M^{+2}

Posphate formula



$$\text{Meq of Na}_2\text{CO}_3 = \frac{W}{E} \times 1000$$

$$= \frac{5.3}{53} \times 1000$$

$$= 100$$

$$\text{E.M. of Na}_2\text{CO}_3 = \frac{MM}{n}$$

$$= \frac{106}{2} = 53$$

$$\text{Meq of HCl} = 250 \times \frac{1}{2} \times 1$$

$$= 125$$

So Before reaction

$$\text{Meq of Na}_2\text{CO}_3 = 100$$

$$\text{Meq of HCl} = 125$$

Limiting Reagent

After Reaction

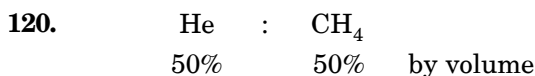
$$0 \quad 25 \quad 100 \quad 100 \quad 100$$

$$\text{So meq of NaCl} = 100$$

$$\frac{W}{E} \times 1000 = 100$$

$$\Rightarrow \frac{W}{58.5} \times 1000 = 100$$

$$\Rightarrow W = 5.85 \text{ g}$$



$$\text{mole} \quad \frac{50}{22.4} \quad \frac{50}{22.4}$$

$$\text{mass} \quad \frac{50}{22.4} \times 4 \quad \frac{50}{22.4} \times 16$$

$$\frac{200}{22.4} \text{ g} \quad \frac{800}{22.4} \text{ g}$$

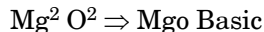
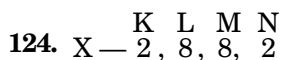
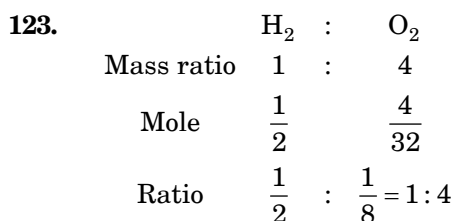
$$\begin{aligned} \% \text{ of CH}_4 &= \frac{\frac{800}{22.4}}{\frac{22.4}{1000}} \times 100 \\ &= \frac{800}{1000} \times 100 \\ &= 80\% \end{aligned}$$

121. 60% Copper

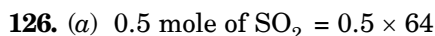
20% Nickel

20% Zinc

122. The protective power of lyophilic collids is measure in term of gold number



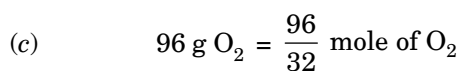
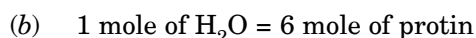
125. Alitame used as sweetner.



$$= 32 \text{ g}$$

$$= 0.5 \times 22.4$$

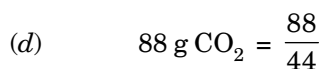
$$= 11.22$$



$$= 3 \text{ mole of O}_2$$

$$= 3 \times 2$$

$$= 6 \text{ mole of atom}$$



$$= 2 \text{ mole of C}_2$$

127. Rancidity is an oxidation process of oil food materials.

128. Deficiency of iodine leads to less production of Thyroxine which leads to a disease called Goitre.

- 129.** Body posture and balance is controlled by cerebellum.
- 130.** It is anaerobic part of respiration which takes place in cytoplasm $C_6H_{12}O_6$
 $\xrightarrow{\text{cytoplasm}} \text{pyruvate (3-carbon molecule)} + O_2$
- 131.** Oxygen rich blood from lungs is carried to heart through pulmonary veins.
- 132.** Pollen tube grows towards a sugary substance released by ovule in the ovary.
- 133.** Urine from urinary bladder and semen from var defrens, both are released into urethra to be given out.
- 134.** HCl is released in stomach by gastric glands to make the medium acidic so that pepsin is activated to break proteins.
- 135.** It is a cup shaped structure which consists of tuft of capillaries called glomerculus that helps in ultrafiltration of blood.
- 136.** It allows water to seep into the ground and helps to recharge ground water.
- 137.** Secretion of sweat is controlled by hypothalamus and it is stimulated by a combination of internal body temperature and mean skin temperature.
- 138.** Grass $\rightarrow$ Insect $\rightarrow$ Frog $\rightarrow$ snake
 (Secondary consumer) (Top consumer)
- 139.** It gets passed on to offspring. Rest all are acquired characteristics.
- 140.** Cholera is a bacterial diseases which spreads by contaminated food and water.
- 141.** Simplified form of the expression given below

$$\begin{aligned} & \frac{y^4 - x^4}{x(x+y)} - \frac{y^3}{y^2 - xy + x^2} \\ &= \frac{(y-x)(y+1x)(y^2+x^2)}{x(x+y)} - \frac{y^3}{y^2 - xy + x^2} \\ &= \frac{(y-x)(y^2+x^2)}{x} - \frac{y^3}{y^2 - xy + x^2} \end{aligned}$$

$$\begin{aligned} &= \frac{(y-x)(y^2+x^2) - y^3}{x(y^2 - xy + x^2)} \\ &= \frac{y^3 + yx^2 - xy^2 - x^3 - y^3}{x(y^2 - xy + x^2)} \\ &= \frac{yx^2 - xy^2 - x^3}{xy^2 - x^2y + x^3} \\ &= \frac{-1(xy^2 - x^2y + x^3)}{(xy^2 - x^2y + x^3)} = -1 \end{aligned}$$

Hence option (3) is correct.

142. As given : $a = \frac{4xy}{x+y}$

So, $\frac{a}{2x} = \frac{4xy}{2x(x+y)} \quad \& \quad \frac{a}{2y}$

$$= \frac{4xy}{2y(x+y)}$$

$$\Rightarrow \frac{a}{2x} = \frac{2y}{x+y} \quad \& \quad \frac{a}{2y}$$

$$= \frac{2x}{x+y} \quad \dots(i)$$

Using componendo and dividendo in equation no. (i) we get,

$$\frac{a+2x}{a-2x} = \frac{(2y)+(x+y)}{\{2y-(x+y)\}}$$

and $\frac{a+2y}{a-2y} = \frac{2x+(x+y)}{2x-(x+y)}$

$$\Rightarrow \frac{a+2x}{a-2x} = \frac{3y+x}{y-x} \quad \dots(ii)$$

$$\frac{a+2y}{a-2y} = \frac{3x+y}{-(y-x)} \quad \dots(iii)$$

Adding (ii) & (iii) we get

$$\begin{aligned} \frac{a+2x}{a-2x} + \frac{a+2y}{a-2y} &= \frac{(3y+x) - (3x+y)}{(y-x)} \\ &= \frac{2y-2x}{y-x} \end{aligned}$$

$$\frac{a+2x}{a-2x} + \frac{a+2y}{a-2y} = \frac{2(y-x)}{(y-x)} = 2$$

Hence option (4) is correct.

143. For equation : $\frac{x^2 - bx}{ax - c} = \frac{m-1}{m+1}$,

Standard form is :

$$(m+1)x^2 - x(bm + b + ma - a) + cm - c = 0$$

For roots to be equal in magnitude but opposite in sign condition is $b = 0$

$$\text{i.e., } -(bm + b + ma - a) = 0$$

$$\Rightarrow m = \frac{a-b}{a+b}$$

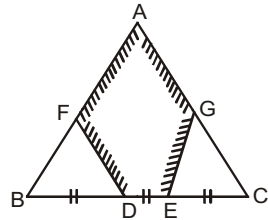
Hence option (1) is correct.

144. $x = 3, y = 4, z = 9$ is correct set of solution by simple verification of answers.

Hence option (1) is correct.

145. Let length of $BD = DE = EC = a$ units.

$$\Rightarrow BC = AC = AB = 3a \text{ units}$$



$$\text{Now area of } \triangle ABC = \frac{\sqrt{3}}{4} (3a)^2$$

$$\text{area of } \triangle ABC = \frac{\sqrt{3}}{4} \times 9a^2 = \frac{9\sqrt{3}a^2}{4} \quad \dots(i)$$

area of $\triangle BDF$ + area of $\triangle ECG$

$$= \frac{2 \times \sqrt{3}}{4} a^2 \quad \dots(ii)$$

$\Rightarrow$ area of shaded region

$$= \frac{9\sqrt{3}}{4} a^2 - \frac{2\sqrt{3}}{4} a^2 = \frac{7\sqrt{3}}{4} a^2 \quad \dots(iii)$$

Hence ratio of area of shaded portion to area of $\triangle ABC$

$$= \frac{\frac{7\sqrt{3}}{4} a^2}{\frac{9\sqrt{3}}{4} a^2} = \frac{7}{9}$$

Hence option (2) is correct.

146. As $A + B = 90^\circ$

$$\Rightarrow B = 90^\circ - A$$

So value of $\frac{\tan A \cdot \tan B + \tan A \cot B}{\sin A \sec B}$

$$- \frac{\sin^2 B}{\cos^2 A} \text{ will be as}$$

$$\frac{\tan A \times \tan(90^\circ - A) + \tan A \cot(90^\circ - A)}{\sin A \times \sec(90^\circ - A)}$$

$$- \left(\frac{\sin^2(90^\circ - A)}{\cos^2 A} \right)$$

$$= \frac{\tan A \cot A + \tan A \tan A}{\sin A \times \csc A} - \left(\frac{\cos^2 A}{\cos^2 A} \right)$$

$$= \frac{1 + \tan^2 A}{1} - 1 = \tan^2 A$$

$$= \tan^2(90^\circ - B) = \cot^2 B$$

Hence option (2) is correct.

147. Given expression can be written as

$$\frac{1}{(2-1) \times (2+1)} + \frac{1}{(4-1)(4+1)}$$

$$+ \frac{1}{(6-1)(6+1)} + \dots + \frac{1}{(20-1)(20+1)}$$

$$= \frac{1}{1 \times 3} + \frac{1}{3 \times 5} + \frac{1}{5 \times 7} + \dots + \frac{1}{19 \times 21}$$

$$= \frac{1}{2} \left\{ \left(\frac{1}{1} - \frac{1}{3} \right) + \left(\frac{1}{3} - \frac{1}{5} \right) + \left(\frac{1}{5} - \frac{1}{7} \right) \right.$$

$$\left. + \dots + \left(\frac{1}{19} - \frac{1}{21} \right) \right\}$$

$$= \frac{1}{2} \left[\frac{1}{1} - \frac{1}{3} + \frac{1}{3} - \frac{1}{5} + \frac{1}{5} - \frac{1}{7} + \dots + \frac{1}{19} - \frac{1}{21} \right]$$

$$= \frac{1}{2} \times \left\{ \frac{1}{1} - \frac{1}{21} \right\}$$

$$= \frac{1}{2} \times \frac{20}{21} = \frac{10}{21}$$

Hence option (1) is correct.

148. As $2^{\sin x + \cos y} = 1$

$$\Rightarrow 2^{\sin x + \cos y} = 2^0$$

$$\Rightarrow \sin x + \cos y = 0 \quad \dots(i)$$

$$\text{Let } \sin x = a$$

$$\text{and } \cos y = b$$

$$\Rightarrow a + b = 0 \quad \dots(ii)$$

$$\text{So, } 16^{(a+b)} = 4^1$$

$$\Rightarrow 2^{4(a+b)} = 2^2$$

$$\Rightarrow 4(a+b) = 2$$

$$\Rightarrow a + b = \frac{1}{2} \quad \dots(iii)$$

On solving (ii) & (iii) we get

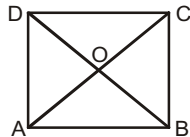
$$a = -\frac{1}{2}$$

$$\text{and } b = \frac{1}{2}$$

Hence option (i) is correct.

149. As area of square is 4 units.

So its side = $\sqrt{4} = 2$ units.



As side is 2 units

So length of diagonal = $2\sqrt{2}$ units

$$\Rightarrow OA = OB = OC = OD$$

$$= \frac{1}{2} \text{Length of diagonal}$$

$$\Rightarrow OA = OB$$

$$= OC = OD$$

$$= \frac{1}{2} \times 2\sqrt{2}$$

$$= \sqrt{2} \text{ units}$$

Hence perimeter of one of

$$\Delta = \sqrt{2} + \sqrt{2} + 2$$

$$= (2 + 2\sqrt{2}) \text{ units}$$

Hence perimeter of all 4 triangles

$$= 4 \times (2 + 2\sqrt{2})$$

$$= 8(1 + \sqrt{2}) \text{ units}$$

150.

$$AS = AE$$

$$= EF = FB$$

$$\text{So area of } \Delta CEF = \frac{1}{3} \text{ area } \Delta ABC$$

$$= \frac{1}{6} \text{ area } \square ABCD$$

$$\text{So, } \frac{\text{area } \Delta CEF}{\text{area } \square ABCD} = \frac{1}{6}$$

Hence option (1) is correct.

151. Let tens place digit be a

and units place digit be b

$$\text{So AGC (I) } 10a + b = 4 \times (a + b) + 3 \quad \dots(i)$$

$$\text{Also AGC (II) } 10a + b = 3ab + 5 \quad \dots(ii)$$

On solving equation no. (i) & (ii) we will get

$$a = 2 \text{ \& } b = 3$$

$$\text{Hence number is } 10a + b = \boxed{23}$$

Hence option (2) is correct.

152. Let total number of students be ' n '

So average weight = n

$$\text{Now } \frac{n^2 + 21}{n + 1} - n = n - \frac{n^2 + 18}{n + 1}$$

$$\Rightarrow n = 20$$

Hence option (3) is correct.

153. Let 4 positive integers are, a, b, c and d

$$\text{So AGC (I) : } a + b + c + d = 125 \quad \dots(i)$$

$$\text{Also AGC (II) : } a + 4 = b - 4$$

$$= 4 \times c$$

$$= \frac{d}{4}$$

$$\text{Let each of } a + 4 = b - 4$$

$$= 4 \times c$$

$$= \frac{d}{4} = y$$

$$\Rightarrow \begin{aligned} a &= y - 4, \\ b &= y + 4, \\ c &= \frac{y}{4} \\ \text{and } d &= 4y \end{aligned} \quad \dots(ii)$$

On solving (i) & (ii) we get $y = 20$

So, $a = 24, b = 16,$

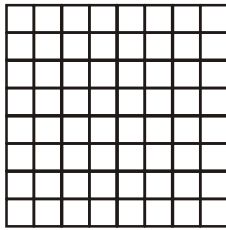
$$c = \frac{20}{4} = 5$$

$$\text{and } d = 20 \times 4 = 80$$

Hence 4 numbers are 24, 16, 5 & 80

Hence option (1) is correct.

154.



A chess board has 8×8 squares
so total number of squares will be

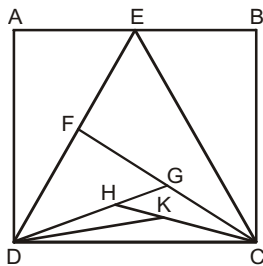
$$\begin{aligned} &1^2 + 2^2 + 3^2 + 4^2 + 5^2 + 6^2 + 7^2 + 8^2 \\ &= \frac{8 \times (8+1) \times (2 \times 8 + 1)}{6} = (204) \end{aligned}$$

Hence option (3) is correct.

{ Using formula : $1^2 + 2^2 + 3^2 + \dots$

$$+ n^2 = \frac{(n)(n+1)(2n+1)}{6}$$

155.



$$\text{AGC ar } \triangle ADE = \text{ar } \triangle BEC = 1$$

$$\Rightarrow \text{ar } \triangle DEC = \frac{4}{2} = 2$$

$$\Rightarrow \text{ar } \triangle DFC = \frac{2}{2} = 1$$

$$\Rightarrow \text{ar } \triangle DGC = \frac{1}{2}$$

$$\Rightarrow \text{ar } \triangle DHC = \frac{1}{4}$$

$$\Rightarrow \text{ar } \triangle DKC = \frac{1}{4 \times 2} = \frac{1}{8}$$

Hence option (2) is correct.

156. $xy = z, yz = x, xz = y$

$$\Rightarrow x^2 y^2 z^2 = xyz$$

$$xyz = 1$$

$$z^2 = 1$$

$$\Rightarrow z + 1, x = \pm 1, y = \pm 1$$

$$xy + zy + zx = 3$$

Hence option (3) is correct.

157. $V = \pi r^2 h$

$$S = 2\pi r h + 2\pi r^2$$

$$\frac{V}{S} = \frac{\pi r^2}{2\pi r + 2\pi r^2}$$

$$= \frac{1}{2} \left(\frac{r}{1+r} \right)$$

$$= \frac{1}{2} \left[1 - \frac{1}{r+1} \right]$$

Hence option (1) is correct.

158. Let original height be h units.

$$\text{So increased height} = h + \frac{10}{100} \times h$$

$$= \frac{11}{10} h$$

Similarly if original radius is r
then decreased radius

$$= r - \frac{10}{100} \times r$$

$$= \frac{9}{10} r$$

So, new CSA = $2\pi rh$

$$= 2 \times \pi \times \frac{9}{10} r \times \frac{11}{10} \times h$$

$$= \frac{198\pi}{100} rh$$

original CSA = $2\pi rh$

$$\text{decrease in CSA} = 2\pi rh - \frac{198}{100}\pi rh$$

$$= \frac{2}{100}\pi rh$$

$$\text{So \% decrease} = \frac{\text{decrease}}{\text{original}} \times 100$$

$$= \frac{2\pi rh}{100} \times 100$$

$$= 1\%$$

Hence option (2) is correct.

159. Let height AD = x

So, In $\triangle ADC$

$$6^2 = h^2 + CD^2$$

$$\Rightarrow CD^2 = 36 - h^2$$

$$\Rightarrow CD = \sqrt{36 - h^2} \quad \dots(i)$$

Now in $\triangle ADB$

$$AB^2 = BD^2 + AD^2$$

$$\Rightarrow 16^2 = \left(12 + \sqrt{36 - h^2}\right)^2 + h^2$$

$$\Rightarrow 256 = 144 + 36 - h^2 + 2\sqrt{36 - h^2} + h^2$$

$$\Rightarrow \sqrt{36 - h^2} = \frac{19}{6} \text{ cm}$$

Hence option (3) is correct.

160. As given that

$$\sqrt{x-1} + \sqrt{y-2} + \sqrt{z-3} = 0$$

$$\Rightarrow \sqrt{x-1} = 0, \sqrt{y-2} = 0, \sqrt{z-3} = 0$$

$$\Rightarrow x-1 = 0, y-2 = 0, z-3 = 0$$

$$\Rightarrow x = 1, y = 2, z = 3$$

Hence option (1) is correct.

■ ■

NTSE - 2017

MENTAL ABILITY TEST

Directions (Q. 1 to 5) : In the number series given below, one number is missing. Each series is followed by five alternatives (1), (2), (3), (4), and (5). One of them is the right answer. Identify and indicate it as per the "instructions".

1. 13, 74, 290, 650, ...

(1) 1248	(2) 1470
(3) 1346	(4) 1452
(5) 1625	

2. 1, 11, 35, 79, ...

(1) 81	(2) 93
(3) 149	(4) 124
(5) 136	

3. 1, 5, 15, 34, ...

(1) 50	(2) 48
(3) 37	(4) 65
(5) 72	

4. 3, 13, 31, 57, ...

(1) 65	(2) 72
(3) 88	(4) 94
(5) 91	

5. 2, 35, 104, 209, ...

(1) 350	(2) 248
(3) 256	(4) 311
(5) 413	

Directions (Q. 6 to 10) : In each of the following questions, a letter series is given, in which some letters are missing. The missing letters are given in the proper sequence as one of the alternative. Find the correct alternative.

6. A BBC AAB CCA BBCC

(1) BACB	(2) ABBA
(3) CABA	(4) AABC
(5) ACBA	

7. BC B C B CCB

(1) BBCB	(2) CBBC
(3) CBCB	(4) BCBC
(5) CCBB	

8. C BBB AB BBB AB BB

(1) BACBB	(2) AABCB
(3) ABACB	(4) ABCCB
(5) ABBCC	

9. C BCCD CCDB CDBCC BC

(1) DBCD	(2) DBDD
(3) BDAA	(4) BDCD
(5) DCBD	

10. BA B AAB A B

(1) AABB	(2) BABB
(3) BAAB	(4) ABBA
(5) ABAA	

Directions (Q. 11 to 15): Questions have become wrong due to wrong order of signs. Choose the correct order of signs from the five alternatives given under each question, so that the equations becomes right. Write it in your answer sheet against the corresponding question number.

11. $6 + 3 = 4 \times 22$

(1) $\times + =$	(2) $+ - \times$
(3) $= \times -$	(4) $+ - =$
(5) $+ \times -$	

12. $12 \div 3 = 4 \times 11$

(1) $+ \div =$	(2) $\times + =$
(3) $+ - =$	(4) $\times = -$
(5) $\div = \times$	

13. $16 \times 4 \div 3 = 7$

(1) $\div \times =$	(2) $- \div =$
(3) $+ = -$	(4) $+ - =$
(5) $\div + =$	

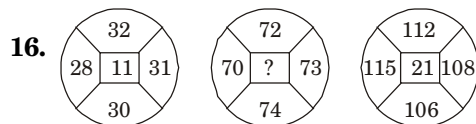
14. $7 \div 3 = 8 - 13$

- (1) $\div + =$ (2) $\times - =$
 (3) $\div = +$ (4) $- + =$
 (5) $- \times =$

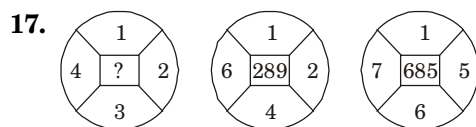
15. $15 - 3 \times 4 = 9$

- (1) $+ \times =$ (2) $\times - =$
 (3) $+ - =$ (4) $\div + =$
 (5) $+ \div =$

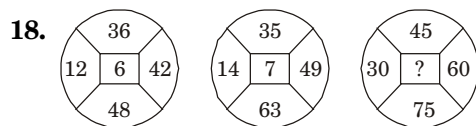
Directions(Q. 16 to 20): In these questions, numbers are placed in the figures on the basis of some rules. One place is vacant which is indicated as “?”. Find out the correct alternatives to replace the question mark “?”.



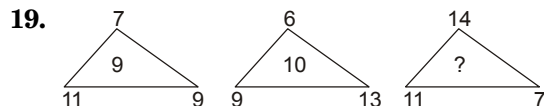
- (1) 14 (2) 15
 (3) 16 (4) 17
 (5) 18



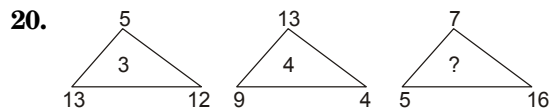
- (1) 14 (2) 15
 (3) 16 (4) 17
 (5) 18



- (1) 12 (2) 15
 (3) 18 (4) 21
 (5) 24



- (1) 7 (2) 9
 (3) 4 (4) 5
 (5) 10



- (1) 5 (2) 4
 (3) 10 (4) 8
 (5) 6

Directions (Q. 21 to 25): Some letters are given in column I and some digits are given in column II. Each digit of column II represents only letter of column I. Study the columns and write the alternative letter after choosing the correct alternative against the corresponding question.

Column-I	Column-II
ABLMS	24538
QRLBA	93526
PTQAB	52601
LRNPQ	93716
ATRNP	29071
MSPTQ	84106
QPNAR	16729
RABLS	29583
TSLBA	80325
PLQST	31860

21. The code for M is

- (1) 0 (2) 8
 (3) 1 (4) 6
 (5) 4

22. The code for N is

- (1) 9 (2) 6
 (3) 1 (4) 7
 (5) 2

23. The code for A is

- (1) 9 (2) 5
 (3) 2 (4) 8
 (5) 3

24. The code for S is ...

- (1) 3 (2) 2
 (3) 5 (4) 0
 (5) 8

25. The code of P is ...

- (1) 3 (2) 8
(3) 0 (4) 1
(5) 6

Directions (Q. 26 to 30): There are six person in a family A, B, C, D, E and F.

- (i) C is the sister of F.
(ii) A is the brother of the husband of E
(iii) D is the father of A and D is the grand father of F
(iv) There are two fathers, three brothers and a mother in the family.

On the basis of above details, choose the correct alternatives.

26. What is the relationship between E and F?

- (1) Daughter (2) Son
(3) Husband (4) Grandson
(5) Father-in-law

27. What is the mother?

- (1) E (2) D
(3) C (4) B
(5) A

28. How many male members are there in this family?

- (1) One (2) Two
(3) Three (4) Four
(5) Five

29. Who is the husband of E?

- (1) F (2) D
(3) B (4) C
(5) A

30. How many persons are there in the category of brothers?

- (1) 1
(2) 2
(3) 4
(4) 2
(5) 3

Directions (Q. 31 to 35): There are four terms in each question. The term right to symbol: have some relationship as the term of the left to symbol :: and out of the four, one term is missing, which is among one of the given five alternatives. Find the correct alternatives.

31. KMF : LLH :: RMS : ...?....

- (1) TVT (2) SUS
(3) SLR (4) SSU
(5) SLU

32. GFH : EGG ::?.....:FSS

- (1) GHF (2) HRT
(3) HGF (4) HFG
(5) GEF

33. UVST : WTUR ::?..... : RILO

- (1) PKJQ (2) TSUV
(3) UVTS (4) TSVU
(5) SRUT

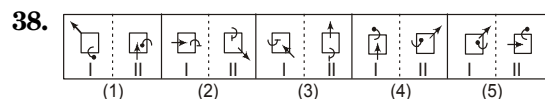
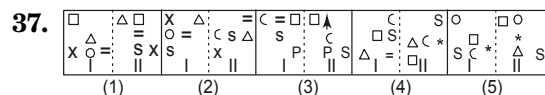
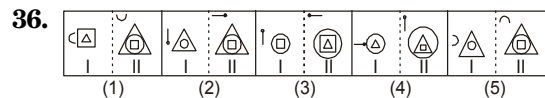
34. Newspaper : Editor :: Film : ?

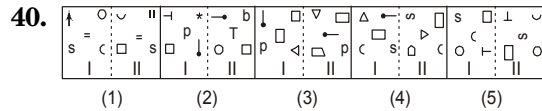
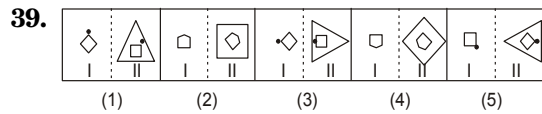
- (1) Actor (2) Producer
(3) Director (4) Musician
(5) Audience

35. Smoke : Pollution : War :

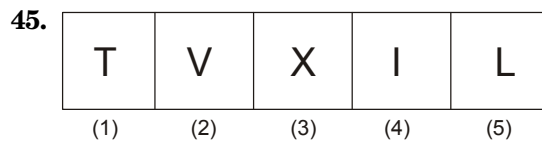
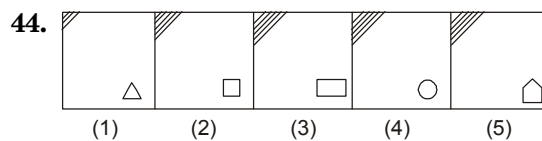
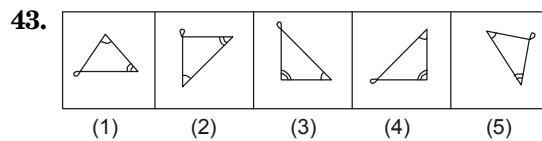
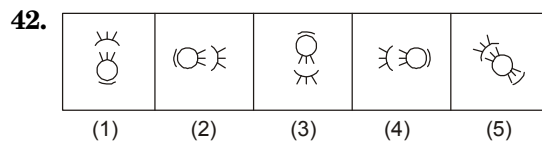
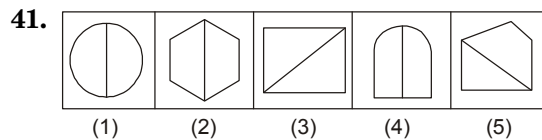
- (1) Victory (2) Death
(3) Army (4) Enemy
(5) Treaty

Directions (Q. 36 to 40): In each of the following questions, in four out of the five figures of element I is related to element II in some particular way. Find out the figure in which the element is not related to element II.



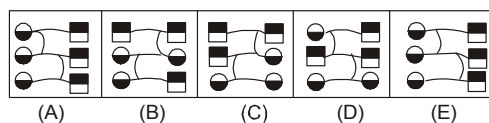


Directions(Questions 41 to 45): out of the five figure (1), (2), (3), (4), (5) given in each problem, four are similar in a certain way. Choose the figure which is different from the other figures.

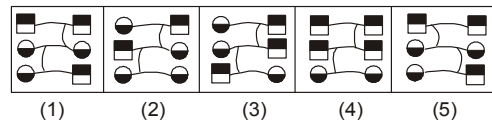


Directions (Q. 46 to 50): Each of the following questions consists of the five figures marked A, B, C, D and E called the problem figures followed by five alternatives marked 1, 2, 3, 4 and 5 called the answer figures. Select a figure which will continue the same series established by the five problem figures.

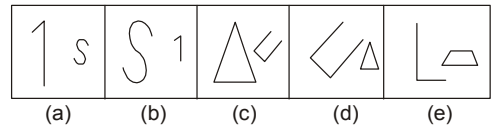
46. Problem figure



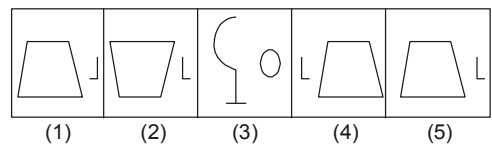
Answer figure



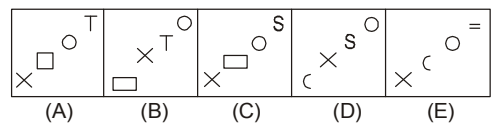
47. Problem figure



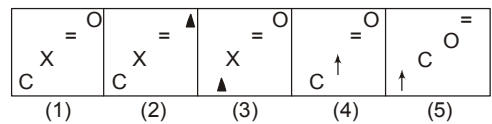
Answer figure



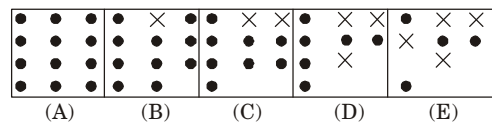
48. Problem figure



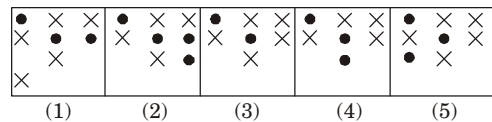
Answer figure



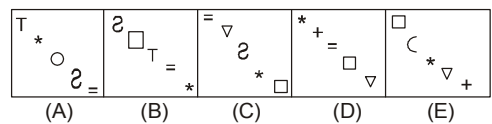
49. Problem figure



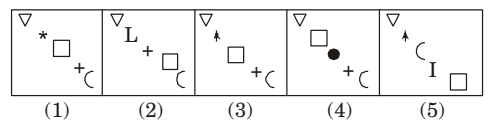
Answer figure



50. Problem figure



Answer figure



ENGLISH LANGUAGE

Directions (Q. 51 to 55): Read the following passage and answer the questions given after it.

Nationalism, of course, is a curious phenomenon which at a certain stage in a country's history gives life, growth and unity but at the same time, it has a tendency to limit one because one thinks of one's country as something different from the rest of the world. One's perceptive changes and one is continuously thinking of one's own struggles and virtues and failing to the exclusion of their thoughts. The result is that the same nationalism, which is the symbol of growth for people, becomes a symbol of cessation of that growth in mind. Nationalism, when it becomes successful, sometimes goes on spreading in an aggressive way and becomes a danger internationally. Whatever line of through you follow, you arrive at the conclusion that some kind of balance must be found. Otherwise something good can turn into evil. Culture, which is essentially good, become not only static but aggressive and something that breeds conflict and hatred, when looked at from a wrong point of view. How will you find a balance, I don't know. Apart from the political and economic problems of the age, perhaps, that is the greatest problem today because behind it, there is tremendous search for something, which cannot be found. We turn to economic theories because they have an undoubted importance. It is folly to talk of culture or even of god, when human beings starve and die. Before one can talk about anything else, one must provide the normal essentials of life to human beings. That is where economics comes in. Human beings today are not in mood to tolerate this suffering and starvation and inequality, when they see that the burden is not equally shared. Others profit, while they only bear the burden.

51. Negative national feeling can make a nation.

(1) selfish	(2) self centred
(3) indifferent	(4) dangerous

52. The greatest problem in the middle of the passage refers to the question....

- (1) how to mitigate hardship to human beings.
- (2) how to share the economic burden equally.
- (3) how to contain the dangers of aggressive nationalism.
- (4) how to curb international hatred

53. Aggressive nationalism ...

- (1) endangers national unity.
- (2) leads to stunted growth
- (3) breeds threat to international relations.
- (4) isolates a country.

54. 'Others' in the last sentence refer to

- (1) other neighbours
- (2) other nations
- (3) other people
- (4) other communities

55. Suitable title for this passage is ...

- (1) Nationalism and national problems
- (2) Nationalism is not enough
- (3) Nationalism breeds unity
- (4) Nationalism, a road to world unity.

Directions (Q. 56 to 60): Read the following passage and answer the questions given after it. Nehru was a many sided personality. He enjoyed reading and writing books, as much as he enjoyed fighting political and social evils or resisting tyranny. In him, the scientist and the humanist were held in perfect balance. While he kept looking at special problems from a scientific standpoint, he never forgot that we should nourish the total man. As a scientist, he refused to believe in a benevolent power interested in men's affairs. But as a self proclaimed non-believer, he loved affirming his faith in life and the beauty of nature. Children he adored. Unlike, Wordsworth he did not see them as trailing clouds of glory from the recent sojourn in heaven. He saw them as a blossoms of promise and renewal, the only hope for mankind.

- 56.** Nehru through that children...
- (1) were trailing clouds of glory.
 - (2) held promise for a better future.
 - (3) were like flowers to be loved and admired
 - (4) held no hope for mankind
- 57.** Nehru enjoyed ...
- (1) reading and writing books
 - (2) fighting with benevolent power
 - (3) respecting tyranny
 - (4) resisting believers as he is a self proclaimed non believer.
- 58.** Which of the statements reflects Nehru's point of view?
- (1) Humanism is more important than science.
 - (2) Science is supreme and humanism is subordinate to it
 - (3) Science and humanism are equally important.
 - (4) There is no ground between humanism and science.
- 59.** In this passage, "a benevolent power interested in men's affairs" means..
- (1) beauty of nature.
 - (2) a supernatural power of god.
 - (3) the spirit of science
 - (4) the total man
- 60.** A many sided personality means...
- (1) a complex person having varied interests.
 - (2) a secretive person
 - (3) a person having varied interests
 - (4) a capable person

Direction (Q. 61 to 65): Read the following passage and answer the questions given after it. The casual horrors and real disasters are thrown on a newspaper reader without discrimination. In the contemporary arrangements for circulating the news, an important element, evaluation is always weak

and often wanting entirely. There is no point anywhere along the line somewhere someone puts his foot down for certain and says, "This is important and that does not amount to row of beans; deserves no ones attention and should travel the wires no farther". The junk is dressed up to look as meaningful as the real news.

- 61.** Evaluation of news would imply....
- (1) less dependence on modern systems of communication.
 - (2) More careful analysis of each news story and its value.
 - (3) separating beans from junk.
 - (4) discriminating horrors from disasters.
- 62.** The writer of the above passage...
- (1) Seems to be happy with the contemporary arrangements for circulating news.
 - (2) is shocked by the casual stories about horrors and disasters reported in the newspaper.
 - (3) wants better evaluation of news before publication.
 - (4) wants to put his foot down on news stories.
- 63.** In the above passage, the phrase "amounts to a row of beans means that the news
- (1) is weak and often waning entirely.
 - (2) deserves no one attention
 - (3) should travel the wires
 - (4) is junk, dressed up as real news.
- 64.** Newspapers lack a sense of discrimination because ...
- (1) they do not separate the real news from mere sensationalism.
 - (2) they have to accept whatever is received on the wires.
 - (3) limited man power makes serious evolution impossible.
 - (4) people don't see the difference between 'junk' and 'real' news.

65. The passage implies that

- (1) there has to be censorship on newspapers.
- (2) there is no point in having censorship
- (3) newspapers always dress up junk to look real
- (4) one has to be strict in selecting news items.

Direction(Questions 66 to 71): In the following passage, there are some numbered blanks. Fill in the blanks by selecting the most appropriate word for each blank.

Recent discoveries show that Indians of early days _66_ to have been highly civilized in many ways. They had massive public buildings and comfortable dwelling houses _67_ mostly by brick. They had _68__ arrangements _69__ good sanitation and an elaborate drainage system. They knew how to write _70_ their language which has not yet been _71_ was not alphabetic but syllabic like the Sumerian language.

66. (1) intend (2) appear
(3) behave (4) decided
67. (1) designed (2) formulated
(3) built (4) construct
68. (1) ignored (2) made
(3) started (4) less
69. (1) inspite (2) by
(3) from (4) for
70. (1) but (2) because
(3) while (4) since
71. (1) talked (2) written
(3) deciphered (4) formed

Direction(Questions 72 and 73): The following sentences are from a paragraph. The first and the last sentences / parts are given. Choose the order in which the four sentences / parts (PQR should appear to complete the paragraph.

72. S₁ : The dictionary is the best friend of your task.

S₂ :

S₃ :

S₄ :

S₅ :

S₆ : Soon you will realize that this is an exciting task.

P: That may not be possible always.

Q: It is wise to look it up immediately.

R: Then it must be firmly written on the memory and traced at the first opportunity.

S: Never allow a strange word to pass unchallenged.

Choose the correct sequence from the options given below.

- (1) PQRS (2) QRPS
(3) SQPR (4) SPRQ

73. S₁ : Calcutta, unlike other cities, kept its trams.

S₂ :

S₃ :

S₄ :

S₅ :

S₆ : The foundation stone was laid in 1972.

P : As a result, there was horrendous congestion.

Q : It was going to be the first in south Asia.

R : They run down the centre of the road

S : To ease in, the city decided to build an underground railway line.

Choose the correct sequence from the given options.

- (1) PRSQ
(2) RPSQ
(3) PSQR
(4) SQRP

Directions (Q. 74 to 77): For each of the following groups of four words, find the incorrectly spelt word.

- 74.** (1) Imperative (2) illicit
(3) imminent (4) immature
- 75.** (1) logical (2) ludicrucous
(3) lonesome (4) laughter
- 76.** (1) periphery (2) advertise
(3) courteous (4) indefinite
- 77.** (1) dismiss (2) dispel
(3) disservice (4) describe

Directions (Q. 78 to 85): Select the most appropriate option to fill in the blanks from the given alternatives.

- 78.** you shout at your children, ... they will ignore it.
(1) more / more
(2) the more / the more
(3) the more / the most
(4) the most / the most
- 79.** My laddus weren't ... a disaster ... I'd thought they would be, but they didn't taste very good.
(1) such / as (2) so / that
(3) as / as (4) more / than
- 80.** Radha : Your failure in the exam comes down to your lack of studying.
Uzma: I know. I needed to have ...
(1) prepared thoroughly more.
(2) thoroughly more prepared.
(3) thorough preparation more.
(4) prepared more thoroughly.
- 81.** Anyone wishing to work as a secret agent must first undergo a background investigation.
(1) tiny
(2) handy
(3) stingy
(4) stringent

- 82.** A : Did Priya apologize after the argument?
B : No, but she ... do so soon.

- (1) had better (2) would rather
(3) better had to (4) should rather

- 83.** If you refuse to work hard, your endeavors will amount ... nothing.

- (1) for (2) to
(3) with (4) by

- 84.** There is no reason ... over spilled milk.

- (1) to cry (2) to save
(3) to serve (4) to boil

- 85.** Grain is commonly used as for animals.

- (1) Commodity (2) fodder
(3) implements (4) fumigation

Directions (Q. 86 to 90): Choose the one which best expresses the meaning of the given phrase.

- 86.** At close quarters

- (1) close examinations.
(2) live near to each other.
(3) live far to each other.
(4) in love

- 87.** an apple of discord

- (1) cause of wealth
(2) cause of quarrel
(3) cause of happiness
(4) cause of illness.

- 88.** At large

- (1) very famous
(2) not famous
(3) abscond
(4) very far

- 89.** take the bull by horns

- (1) face a difficulty or danger confidently.
(2) run away from a difficulty or danger
(3) face a difficulty or danger boldly
(4) pull the bull's horns

90. buckle down

- (1) work seriously
- (2) take it easy
- (3) drop a subject
- (4) go for a vacation

Directions (Q. 91 to 95): Select word which means the same as the given words.

91. abandon

- (1) try
- (2) join
- (3) keep with
- (4) forsake

92. detest

- (1) love
- (2) to hate intensely
- (3) neglect
- (4) to support

93. tentative

- (1) prevalent
- (2) portable
- (3) wry
- (4) provisional

94. Obscure

- (1) block
- (2) vague
- (3) obstruct
- (4) vague

95. Specific

- (1) proper
- (2) uncommon
- (3) noteworthy
- (4) precise.

Directions (Q. 96 to 100): Select the word which means the opposite of the given word.

96. open minded

- (1) zealous
- (2) prejudiced
- (3) shrewd
- (4) unpretentious

97. dependable

- (1) judgemental
- (2) patient
- (3) fickle
- (4) cautious

98. impertinent

- (1) healthy
- (2) respectful
- (3) inadequate
- (4) smooth

99. extravagance

- (1) luxury
- (2) poverty
- (3) economical
- (4) cheapness

100. obscure

- (1) implicit
- (2) obnoxious
- (3) explicit
- (4) pedantic

SCHOLASTIC APTITUDE TEST

101. This diagram shows that process of



- (1) Binary Fission
- (2) Multiple fission
- (3) Regeneration
- (4) Budding

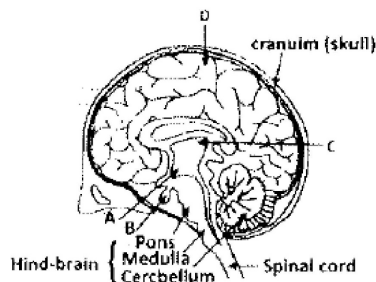
102. The gene which control the blood group represented by the letter

- (1) B
- (2) E
- (3) I
- (4) O

103. Person who are infected with _____ can donate eyes.

- (1) AIDS
- (2) Diabetes
- (3) Hepatitis B or C
- (4) Rabies

104. Which part of brain shows pituitary gland?



- (1) B
- (2) C
- (3) D
- (4) A

105. The hormone which promote cell division in plants is _____

- (1) Gibberellins
- (2) Absciscic acid
- (4) Cytokinins
- (4) Auxins

106. Which one of the following is a type of nutrition in Amoeba?

- (1) Holozoic
- (2) Autotrophic
- (3) Parasitic
- (4) Saprophytic

107. _____ transports products of photosynthesis from the leaves where they are synthesized to other parts of the plant.

- (1) Xylem (2) lymph
(3) nephrons (4) phloem

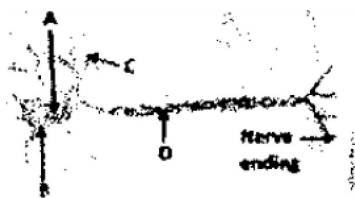
108. Which of the following is a biotic components of an ecosystem?

- (1) Living organisms
(2) Temperature
(3) Soil and minerals
(4) All of the above

109. _____ is a dark muscular diaphragm that controls the size of the pupil.

- (1) cornea (2) retina
(3) Iris (4) Crystalline lens

110. Which part of neuron shows dendrite?



- (1) D (2) C
(3) B (4) A

111. Which part of the cell is also termed as 'suicide bags of the cell'?

- (1) Ribosomes (2) Golgi bodies
(3) Lysosomes (4) Mitochondria

112. Which tissue of the following connects bone and muscle?

- (1) Ligament (2) Cartilage
(3) Areolar Tissue (4) Tendon

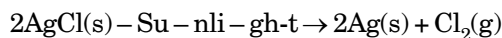
113. Which of the following is correct order for classification of animals.

- (a) Kingdom, phylum, Class, Order, Family, Genus, Species
(2) Kingdom, Phylum, Order, Class, Genus, Family, species
(3) Kingdom, Class, Order, Phylum, Genus, Family, Species
(4) Kingdom, Class, Genus, Phylum, Family, Order, Species

114. What factors could lead to the rise of new species?

- (1) Natural Selection
(2) Genetic drift
(3) Acquisition of traits during life time
(4) All of above

115. White silver chloride turns _____ in sunlight.



- (1) Grey (2) Brown
(3) Blue (4) Green

116. Which one of the following is not an organic acid?

- (1) Citric acid (2) Formic acid
(3) Carbonic acid (4) Carboxylic acid

117. What type of reaction is this?



- (1) Redox reaction
(2) Displacement reaction
(3) Double displacement reaction
(4) Decomposition reaction

118. The atmosphere of Venus is made up of thick white and yellowish cloud of _____

- (1) Acetic acid (2) Sulphuric acid
(3) Nitric acid (4) Hydrochloric acid

119. Aqua regia is a highly corrosive, fuming liquid. It is one of the few reagents that is able to dissolve _____

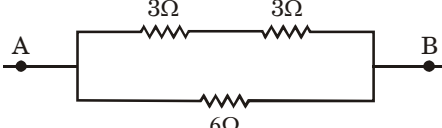
- (1) Platinum (2) Gold
(3) Both 1 and 2 (4) Neither 1 or 2

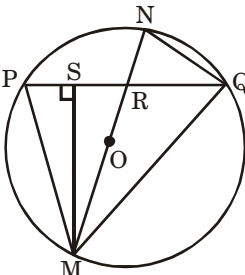
120. _____ is a non-metal but it is lustrous.

- (1) Carbon (2) Sulphur
(3) Bromine (4) Iodine

121. _____ plants are one of the most efficient convertors of sunlight into chemical energy.

- (1) Jatropha
(2) Sugarcane
(3) Cotton
(4) Sunflower

- 122.** The head of a soap molecule is known as _____.
 (1) Hydrocarbon
 (2) Hydrophobic
 (3) Hydrogen Carbonate
 (4) Hydrophilic
- 123.** Esters are formed by the combination of
 (1) Alcohol + Aldehyde
 (2) Carboxylic Acid + Alcohol
 (3) Carboxylic Acid + Aldehyde
 (4) Alcohol + Aldehyde
- 124.** _____ Was the element which was discovered later and replaced Exaaluminum.
 (1) Scandium (2) Gallium
 (3) Germanium (4) Silicon
- 125.** An isotope of _____ is used in the treatment of cancer.
 (1) Cobalt (2) Iodine
 (3) Uranium (4) Chlorine
- 126.** Face cream is an example of _____.
 (1) Aerosol (2) Emulsion
 (3) Foam (4) Gel
- 127.** For spherical mirrors of small apertures, the radius of curvature is found to be _____.
 (1) equal the focal length.
 (2) twice the focal length
 (3) thrice the focal length.
 (4) there is no relation between them.
- 128.** A convex mirror used for rear-view on an automobile has a radius of curvature of 3.00 m. If a bus is located at 5.00 m from this mirror, find the size of the image.
 (1) 0.32 m (2) 0.23 m
 (3) 0.87 m (4) 1.15 m
- 129.** The net power (P) of three lenses having powers P₁, P₂ and P₃ placed in contact is given by
 (1) $P = P_1 \times P_2 \times P_3$
 (2) $P = P_1 + P_2 + P_3$
 (3) $1/P = 1/P_1 + 1/P_2 + 1/P_3$
 (4) $P = (P_1 + P_2 + P_3)/3$
- 130.** Two wires that are made up of two different materials whose specific resistance are in the ratio 2 : 3, length in ratio 3 : 4 and area in 4 : 5. The ratio of their resistance is
 (1) 6 : 5 (2) 6 : 8
 (3) 5 : 8 (4) 1 : 2
- 131.** The equivalent resistance between the points A and B in the circuit as shown in the figure below is
- 
- (1) 3 (2) 13
 (3) 6 (4) 1/3
- 132.** What is the unit of resistivity
 (1) Ωm^2 (2) Ωm^{-1}
 (3) Ωm^{-2} (4) Ωm
- 133.** 100 J of heat are produced each second in a 4 Ω resistance. Find the potential difference across the resistor
 (a) 400 V (2) 10 V
 (3) 20 V (4) 25 V
- 134.** Two bulbs are marked 100W, 220V and 50W, 110 V. Calculate the ratio of their resistances.
 (1) 2 : 1 (2) 1 : 2
 (3) 3 : 4 (4) 1 : 3
- 135.** An induced current is produced when a magnet is moved into a coil. The magnitude of induced current does not depend on
 (a) The speed with which the magnet is moved
 (2) The resistivity of the wire of the coil
 (3) The number of turns of the coil
 (4) The strength of the magnet
- 136.** A Strong smelling substance called ethyl mercaptane which is added to LPG cylinders to help in the detection of gas leakage has the chemical formula as
 (1) $\text{C}_2\text{H}_5\text{SH}$ (2) $\text{C}_2\text{H}_5\text{CHO}$
 (3) $\text{C}_2\text{H}_5\text{OH}$ (4) $\text{C}_2\text{H}_5\text{COOH}$

- 137.** The aviation fuel which is used in the engine of jet aeroplanes is very close to
 (1) Diesel (2) Natural Gas
 (3) Petrol (4) Kerosene
- 138.** The unit of solar constant is
 (1) kWh (2) kW/m
 (3) kW/m² (4) kW/m³
- 139.** The flaws like internal cracks etc. in the metal blocks are detected by using _____
 (1) Reverberation (2) Ultrasound
 (3) Infrasound (4) Echo location
- 140.** A person standing at a certain distance from a wall produces a loud sound. He hears the echo of the sound after 1.8s. Calculate the distance between the wall and the observer if the velocity of sound in air is 340 m/s.
 (1) 612m (2) 306 m
 (3) 377.7m (4) 755.4m
- 141.** If $\left(\sqrt[3]{2}\right)^{12} \times (\sqrt{5})^8 = [(2 \times 5)^2]^x$ then the value of x is _____.
 (1) 4 (2) 2
 (3) 10 (4) 12
- 142.** The average of 9 numbers is 18. If the average of first five numbers is 19 and the average of last 5 numbers is 17, find the 5th number.
 (1) 16 (2) 20
 (3) 18 (4) 22
- 143.** In $\triangle PQR$, $PQ = PR$ and X is the midpoint of PQ , XY is parallel to QR and meets PR at point Y . What kind of triangle is PXY ?
 (1) Isosceles (2) Scalene
 (3) Equilateral (4) Right triangle
- 144.** If α, β are roots of polynomial $6x + K$ such that $\alpha^2 + \beta^2 + \alpha\beta = \frac{8}{3}$, then find the value of K .
 (1) -8 (2) 8
 (3) -4 (4) 8
- 145.** If $x^2 - 5x + 1 = 0$ then the value of $x^5 + \frac{1}{x^5}$ is _____.
 (1) 2025 (2) 2725
 (3) 2225 (4) 2525
- 146.** If $\operatorname{cosec} \theta + \sin \theta = 2$, then the value of $\operatorname{cosec}^{50} \theta + \sin^{50} \theta$ is _____.
 (1) 2 (2) 100
 (3) 0 (4) 50
- 147.** The sum of squares of two consecutive even numbers added by 4 is always divisible by _____.
 (1) 24 (2) 16
 (3) 8 (4) 32
- 148.** If $\operatorname{cosec} 4x = \sec 5x$, then the value of $\sin 3x + \cos 6x$ is _____.
 (1) 1 (2) 3
 (3) 0 (4) -3
- 149.** The ratio of radius of base to the height of a right circular cylinder is 1 : 2. If its volume is 2156 cm³, then its total surface area is _____.
 (1) 1024 cm² (2) 924 cm²
 (3) 874 cm² (4) 1204 cm²
- 150.** In the given figure, $MP = 16$, $MQ = 10$. The value of $MO \times MS$ is _____.

- (1) 160 (2) 100
 (3) 120 (4) 80
- 151.** The 7th term of an AP is 5 times the first term and its 9th term exceeds twice the 4th term by 1. The first term of the AP is _____.
 (1) 151 (2) -39
 (3) 3 (4) -124

152. Find the centre of circle passing through the points (1, 4), (-2, 6) and (3, 7).

- (1) (1, 1) (2) (0, 0)
 (3) $\left(\frac{1}{2}, \frac{7}{2}\right)$ (4) $\left(\frac{1}{2}, \frac{13}{2}\right)$

153. The length of shadow of a building, when the sun's altitude is 60° , is 20 m less than what it was when it was 45° . The height of the building is ____.

- (1) 54.48 m (2) 47.32 m
 (3) 64.32 m (4) 57.48 m

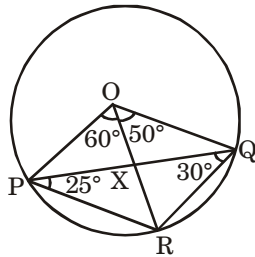
154. If $\frac{6^6 + 6^6 + 6^6 + 6^6 + 6^6 + 6^6}{2^6 + 2^6} \times$

$$\frac{5^6 + 5^6 + 5^6 + 5^6 + 5^6}{3^6 + 3^6 + 3^6} = 5^n$$

then the value of n is ____.

- (1) 6 (2) 0
 (3) 12 (4) 7

155. In the given Figure, the value of $\angle P \times R$ is ____.



- (1) 580° (2) 100°
 (3) 95° (4) 120°

156. If $x^m \cdot y^n = 7889$, where x and y are prime numbers, the value of $x + y$ is ____.

- (1) 30 (2) 60
 (3) 100 (4) 300

157. If $a = \frac{p-q}{p+q}$, $b = \frac{q-r}{q+r}$, $c = \frac{r-p}{r+p}$, then the

value of $\frac{(1+a)(1+b)(1+c)}{(1-a)(1-b)(1-c)}$ is ____.

- (1) 1 (2) 0
 (3) 121 (4) 11

158. If radius of a right circular cylinder is increased by 10% and height is decreased by 10% its volume will

- (1) increase by 9.8%
 (2) decrease by 9.8%
 (3) increase by 8.9%
 (4) decrease by 8.9%

159. The perimeter of a right isosceles triangle is $(2 + \sqrt{2})$ m. The length of its hypotenuse is ____.

- (1) 2 m (2) 4 m
 (3) $\sqrt{6}$ m (4) $\sqrt{2}$ m

160. A fraction becomes $\frac{5}{7}$ if 2 is added to both

its numerator and denominator. If 4 is added to numerator and 3 is added to

denominator, the fraction becomes $\frac{7}{8}$.

Find the original fraction.

- (1) $\frac{8}{11}$ (2) $\frac{3}{5}$
 (3) $\frac{5}{11}$ (4) $\frac{7}{9}$

161. "For this earth is not allotted to anyone nor is it presented to anyone as a gift. It is awarded by providence to people who in their hearts have the courage to conquer it, the strength to preserve it and the industry to put it to the plough." Whose ideology is this?

- (1) Benito Mussolini
 (2) Adolf Hilter
 (3) Ho Chi Minh
 (4) Stalin

162. According to the census of 1921, 12 to 13 million people perished as a result of ...

- (1) First World War (2) Epidemics
 (3) Famines (4) All the above

- 163.** Find out the wrong statement about Giuseppe Mazzini?
- (1) He was a member of the secret society of the Carbonari.
 - (2) He believed "The God had intended nations to be the natural units of mankind.
 - (3) He was the founder of young Europe
 - (4) None of the above
- 164.** Who wrote the book "The History of the loss of Vietnam"?
- (1) Phan Boi Chau (2) Ho Chi Minh
 - (3) Huynh Phu So (4) Phan Chu Trinh
- 165.** Compulsory Elementary Education Act was made in England in the year ...
- (1) 1829 (2) 1849
 - (3) 1860 (4) 1870
- 166.** Who developed the concept of "The principle of the Garden City"?
- (1) Andrew Means
 - (2) Henry Mayhew
 - (3) Ebenezer Howard
 - (4) Haussman
- 167.** Who wrote "Ninety five Theses" criticizing many of the practices and rituals of the Roman Catholic Church?
- (1) Martin Luther (2) Thomas Pain
 - (3) J.V. Schley (4) Richard M. Hoe
- 168.** Kashi baba, a Kanpur mill worker wrote and published "Chhote Aur Bade Ka Sawal" in 1938 to show the links between
- (1) Caste and Class exploitation.
 - (2) Caste and Religion relation
 - (3) Income and Untouchability
 - (4) Industrialists and Politicians
- 169.** "Only a decade ago, they were as illiterate, helpless and hungry as our own masses, who could be more astonished then an unfortunate Indian like myself to see how they had removed the mountains of ignorance and helplessness in these few years." Name the Indian, who quoted this Russian revolution?
- (1) M N Roy
 - (2) Rabindranath Tagore
 - (3) Mahatama Gandhi
 - (4) Jawaharlal Nehru
- 170.** Find out the wrong statement related to Franklin Roosevelt.
- (1) Announced New Deal Policy to eradicate economic depression.
 - (2) Introduced the much needed Social Security system.
 - (3) President of America during Second World War.
 - (4) None of the above.
- 171.** The Ryotwari settlement was introduced by the British in the
- (1) Madras Presidency
 - (2) Bengal presidency
 - (3) Central Presidency
 - (4) Assam Presidency
- 172.** The famous Quit Indian resolution was passed on
- (1) August 18, 1942 (2) April 4, 1942
 - (3) April 14, 1942 (4) August 8, 1942
- 173.** Sikkim, West Bengal, Assam and Arunachal Pradesh have common frontiers with ...
- (1) China (2) Bhutan
 - (3) Bangladesh (4) Myanmar
- 174.** Which of these is not a Himachal Range?
- (1) Dhauladhar (2) Pirpanjal Range
 - (3) Kailash Range (4) Mahabharat Range
- 175.** The Himalayas is divided into four major Geological sections. Choose among the following which is not one of them.
- (1) Nepal Himalayas - Between Kali and Teesta.
 - (2) Mahabharat Himalayas – Between Indus and Gilgit.
 - (3) Kumaon Himalayas - Between Sutlej and Teesta
 - (4) Assam Himalayas – Between Teesta and Dihang.

- 176.** Match list A with B and Select the correct answer using the codes given below the list

List – A**List – B**

- (a) Hyderabad is warmer than Mumbai
(b) Snowfall in Himalayas.
(c) North western plain gets rainfall in winter
(d) rainfall in summer
- (i) Altitude
(ii) Mango showers.
(iii) Distance from sea
(iv) Western depression

a b c d

- (1) iii ii iv i
(2) ii i iii iv
(3) ii i iv ii
(4) iv ii i iii
- 177.** Which one of the following bio-reserves of India is not included in the world network of bioreserve?
- (1) Sunderbhan (2) Gulf of Mannar
(3) Nanda Devi (4) Silent Valley
- 178.** Highest Annual Growth Rate in India was recorded in these decades
- (1) 1981, 1971, 1991 (2) 1991, 2001, 1971
(3) 1971, 2001, 1991 (4) 1961, 1971, 1981
- 179.** Which of these is not related to Conservation of Resources?
- (1) The club of Rome advocated resources conservation for the first time in a more systematic way in 1968.
(2) Brundtland Commission Report, 1987 introduced the concept of “Sustainable Development”.
(3) E.F Schumacher is the author of the book “Small is Beautiful”.
(4) Earth Summit was held in New York in 1997.
- 180.** With reference to Indian agriculture, which of the following statements is not correct
- (1) India is the largest producer as well as the consumer of pulses in the world.

- (2) India is the second largest producer of rice in the world after China
(3) Tea is an important beverage crop introduced in India initially by the Persians.
(4) groundnut is a kharif crop and accounts for about half of the major oil seeds produced in the country.

- 181.** In which of these following industries, limestone is not used?

- (1) Cement industry.
(2) Iron and Steel industry.
(3) Oil refinery industry.
(4) None of the above.

- 182.** Find the wrongly matched.

- (1) Ferrous mineral - Iron ore
(2) Non-ferrous mineral - Mica
(3) Non-Metallic mineral - Limestone
(4) Fuel minerals - Coal

- 183.** Identify the non-fibre crop?

- (1) Hemp (2) Cotton
(3) Natural Silk (4) Rubber

- 184.** The south-east Trade winds are attracted towards the Indian sub-continent in the month of June due to ...

- (1) the effect of the westerlies
(2) the effect of Somaliya current.
(3) the presence of low atmospheric pressure over North-west India.
(4) None of the above

- 185.** Consider the following two statements on power sharing and select the answer using the codes given below.

- (a) Power sharing is good for democracy
(b) It helps to reduce the possibility of conflicts between social groups.

Which of these statements are true and false?

- (1) Both a and b are true
(2) Both a and b are false
(3) a is true but b is false
(4) a is false but b is true

186. Match the following countries and the path democracy has taken in that country

Country	Path to Democracy
(a) Nepal	(i) End of One party Rule
(b) Chile	(ii) King agreed to give up his powers
(c) Ghana	(iii) End of Military Dictatorship
(d) Poland	(iv) Freedom from British Colonial Rule

Codes:

a	b	c	d
(1) (i)	(ii)	(iv)	(iii)
(2) (ii)	(iii)	(iv)	(i)
(3) (iii)	(ii)	(i)	(iv)
(4) (iv)	(i)	(iii)	(ii)

187. Consider the following statements about pressure groups and parties

- Pressure groups are the organized expression of the interests and views of specific social sections.
- Pressure groups take positions on political issues
- All pressure groups are political parties.

Which of the statements given above are correct?

(1) a, b, and c	(2) a and b
(3) b and c	(4) a and c

188. Match the ministry with the news that the ministry may have released

A	B
(a) A new policy is being made to increase the jute exports from the country.	(i) Ministry of Defence
(b) Telephone services will be made more accessible to rural areas	(ii) Ministry of Health
(c) The price of rice and wheat sold under the public distribution system will go down.	(iii) Ministry of & Commerce Industry.

(d) A pulse polio campaign will be launched	(iv) Ministry of Commerce and Industry.
(e) The allowances of the soldiers posted on high altitudes will be increased.	(v) Ministry of Communications and Information technology.

Codes:

a	b	c	d	e
(1) i	iii	ii	iv	v
(2) iv	v	iii	ii	i
(3) iii	v	ii	i	iv
(4) ii	v	iii	iv	i

189. Find out the right which is not under the Indian Constitution?

- Freedom of Speech and Expression.
- Move freely through the Country
- Practice any profession
- None of the above

190. Find out the wrong statement about National Human Rights Commission.

- This is an independent Commission established by law in 1993
- Present Chairman for National Human Rights Commission is Justice Jeevan Reddy
- Like National Human Rights Commission, there are State Human Rights Commissions in 14 states of the country.
- There is no fee or any formal procedure to approach the National Human rights commission.

191. Find out the subject which is under concurrent list?

- Police
- Communication
- Marriages and Divorce
- None of the above

- 192.** A struggle known as “Bolivia’s water war” took place in city.
 (1) Cochabamba (2) Lapaz
 (3) Trinidad (4) Montero
- 193.** Consider the following statements.
 (i) Equitable allocation of resources.
 (ii) Generation of employment.
 (iii) Tax concession to big corporates
 (iv) Universalization of public distribution.
 Which of the factors given above can bring inclusive growth in our country?
 (1) (i), (ii), (iii) (2) (i), (ii), (iv)
 (3) (i), (iii), (iv) (4) (ii), (iii), (iv)
- 194.** Which of the following is wrong related to Antyodaya Anna Yojana?
 (1) Antyodaya Anna Yojana was launched in December 2000.
 (2) 2 crore families have been covered under the antyodaya Anna Yojana
 (3) Wheat is supplied at the rate of Rs.6 and rice at the rate of Rs. 7 under this scheme.
 (4) None of the above
- 195.** Find out the correct one related to under employment
 (1) They do not want to work
 (2) They work in a lazy manner.
 (3) They work less than what they are capable of doing
 (4) They are not paid for their work
- 196.** Find out the wrong one about Secondary sector.
 (1) Secondary sector is also called as industrial sector
 (2) Manufacturing of bricks and sugar come under secondary sector
 (3) The share of secondary sector is more in current GDP is India
 (4) None of the above
- 197.** Which among the following is money function?
 (1) Medium of exchange
 (2) Unit of account
 (3) Store of value
 (4) All the above
- 198.** Consider the following statements about Globalisation.
 (a) The most common route for investment by MNC’s in countries around the world is to buy existing local companies.
 (b) Investment made by Multinational companies is called foreign investment.
 (c) Cargill Foods, an American company purchased and Indian company called Parakh Foods.
 (d) Ford Motors is one of the biggest German Automobile manufacturer.
 Which of the given statements are True?
 (1) a, c, d (2) a, b, c
 (3) b, c, d (4) a, b, c, d
- 199.** In which year, did the Bengal Famine occur, which was responsible for the death of 30 lakh people in Bengal Province?
 (1) 1933
 (2) 1943
 (3) 1953
 (4) 1963
- 200.** Find out the wrong one related to Annapurna Scheme(APS)
 (1) Introduced in the year 2000.
 (2) A scheme meant for indigent senior citizens.
 (3) 10 kg of food grains are supplied freely under the scheme
 (4) none of the above.

ANSWERS

MENTAL ABILITY TEST

1. (1)	2. (3)	3. (4)	4. (5)	5. (1)	6. (5)	7. (3)	8. (4)	9. (1)	10. (4)
11. (1)	12. (3)	13. (5)	14. (2)	15. (4)	16. (4)	17. (*)	18. (2)	19. (3)	20. (5)
21. (5)	22. (4)	23. (3)	24. (5)	25. (4)	26. (2)	27. (1)	28. (4)	29. (3)	30. (5)
31. (5)	32. (2)	33. (1)	34. (3)	35. (2)	36. (1)	37. (4)	38. (3)	39. (5)	40. (2)
41. (5)	42. (5)	43. (4)	44. (1)	45. (4)	46. (1)	47. (5)	48. (2)	49. (3)	50. (3)

ENGLISH LANGUAGE

51. (2)	52. (3)	53. (4)	54. (1)	55. (2)	56. (2)	57. (4)	58. (3)	59. (4)	60. (2)
61. (2)	62. (3)	63. (2)	64. (1)	65. (3)	66. (2)	67. (3)	68. (2)	69. (4)	70. (1)
71. (3)	72. (3)	73. (2)	74. (2)	75. (2)	76. (2)	77. (4)	78. (2)	79. (1)	80. (4)
81. (4)	82. (1)	83. (2)	84. (1)	85. (2)	86. (1)	87. (2)	88. (3)	89. (1)	90. (1)
91. (4)	92. (2)	93. (4)	94. (2)	95. (4)	96. (2)	97. (3)	98. (2)	99. (3)	100. (3)

SCHOLASTIC APTITUDE TEST

101. (3)	102. (3)	103. (2)	104. (1)	105. (3)	106. (1)	107. (4)	108. (1)	109. (3)	110. (2)
111. (3)	112. (4)	113. (1)	114. (4)	115. (1)	116. (3)	117. (1)	118. (2)	119. (3)	120. (4)
121. (2)	122. (4)	123. (2)	124. (2)	125. (1)	126. (3)	127. (2)	128. (2)	129. (2)	130. (3)
131. (1)	132. (4)	133. (3)	134. (1)	135. (3)	136. (1)	137. (1)	138. (3)	139. (2)	140. (2)
141. (2)	142. (3)	143. (1)	144. (4)	145. (4)	146. (1)	147. (3)	148. (1)	149. (2)	150. (4)
151. (3)	152. (4)	153. (2)	154. (4)	155. (3)	156. (1)	157. (1)	158. (3)	159. (4)	160. (2)
161. (2)	162. (3)	163. (4)	164. (1)	165. (4)	166. (3)	167. (1)	168. (1)	169. (2)	170. (4)
171. (1)	172. (4)	173. (2)	174. (3)	175. (3)	176. (3)	177. (4)	178. (1)	179. (4)	180. (3)
181. (3)	182. (3)	183. (4)	184. (3)	185. (1)	186. (2)	187. (2)	188. (2)	189. (2)	190. (2)
191. (3)	192. (1)	193. (2)	194. (4)	195. (3)	196. (3)	197. (4)	198. (2)	199. (2)	200. (4)

EXPLANATIONS

MENTAL ABILITY TEST

1. 13, 74, 290, 650, 1370

$$\begin{aligned}
 \text{Here, } 2^2 + 3^2 &= 13 \\
 5^2 + 7^2 &= 74 \\
 11^2 + 13^2 &= 290 \\
 17^2 + 19^2 &= 650 \\
 23^2 + 29^2 &= \boxed{1370}
 \end{aligned}$$

2. 1, 11, 35, 79, 149

$$\begin{aligned}
 \text{Here } n &= \text{no. of terms} = 5 \\
 \text{So general term} &= n^3 + n^2 - 1 \\
 &= 5^3 + 5^2 - 1 \\
 &= 125 + 25 - 1 = \boxed{149}
 \end{aligned}$$

3. 1, 5, 15, 34, 65

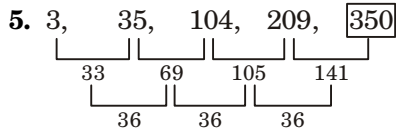
Here $n = \text{no. of terms} = 5$

$$\begin{aligned}
 \text{So general term} &= \frac{n(n^2 + 1)}{2} \\
 &= \frac{5(5^2 + 1)}{2} \\
 &= 65
 \end{aligned}$$

4. 3, 13, 31, 57, 91

$\begin{array}{ccccccc}
 & \boxed{10} & & \boxed{18} & & \boxed{26} & & \boxed{34} \\
 & \boxed{8} & & \boxed{8} & & \boxed{8} & &
 \end{array}$

So the next term = $57 + 34 = \boxed{91}$



So next term = $209 + 141 = \boxed{350}$

6. A A BB / C C AA / B B CC / A A BB / CC
ACBA

7. B C C B / B C C B / B C C B
 $\therefore$ CBCB

8. C A BBB B / C A BBBB / C A BBB B
= ABCCB

9. C D BCCD / B CCDB / C CD BCC / D BCC
= DBCD

10. B A A B / B A A B / B A A B
= ABBA

11. From option (a)

$$\times + =$$

$$\text{then } 6 \times 3 + 4 = 22 \text{ (true)}$$

12. From option (a)

$$+ \div =$$

$$12 + 3 \div 4 = 11$$

$$12 + \frac{3}{4} = \frac{51}{4} \neq 11$$

From option (b)

$$\times + =$$

$$12 \times 3 + 4 = 11$$

$$40 \neq 11$$

From option (c)

$$+ - =$$

$$12 + 3 - 4 = 11 = 11 \text{ (true)}$$

13. Using $\div + =$ sign we get

$$16 \div 4 + 3 = 7 \text{ (true)}$$

14. Using $+ - =$ sign we get

$$7 \times 3 - 8 = 13 \text{ (true)}$$

15. Using $\div + =$ sign we get

$$15 \div 3 + 4 = 9 \text{ (true)}$$

16. From given questions

$$32 + 31 + 30 + 28 = 121 = (11)^2$$

$$70 + 72 + 73 + 74 = 289 = \boxed{(17)^2}$$

$$112 + 108 + 100 + 175 = 441 = (21)^2$$

17. From given question

$$1^3 + 2^3 + 3^3 + 4^3 = 100$$

$$1^2 + 2^2 + 4^3 + 6^3 = 289$$

$$1^3 + 5^3 + 6^3 + 7^3 = 685$$

18. According to question HCF of the given number

$$\text{HCF of } (12, 36, 42, 48) = 6$$

$$\text{HCF of } (14, 35, 49, 63) = 7$$

$$\text{HCF of } (30, 45, 60, 75) = \boxed{15}$$

19. $7 - 9 + 11 = 9$

$$13 - 9 + 6 = 10$$

$$11 - 14 + 7 = \boxed{4}$$

20. From the given question

$$5 + 12 + 13 = 30 = |3 - 0| = 3$$

$$13 + 9 + 4 = 26 = |2 - 6| = 4$$

$$7 + 5 + 16 = 28 = |2 - 8| = 6$$

21-25. From the given question

A $\rightarrow$ 2 (as 2 is common number in the given code for ATRNP & ABLMS)

M $\rightarrow$ 4 (as 48 is common number in the given code for MSPTQ & ABLMS)

S $\rightarrow$ 8 (as 8 is common number in the given code for MSPTQ & ABLMS)

N $\rightarrow$ 7 (as 1 is common number in the given code for PTQAB & ATRNP)

P $\rightarrow$ 1 (as 1 is common number in the given code for PTQAB & ATRNP)

21. So the code for M is 4.

22. The code for N is 7

23. The code for A is 2

24. The code for S is 8.

25. The code for P is 1.

26-30.

D is father of A and grandfather of F

So, A is father of F then D, A are two fathers

C is sister of F. So, C is daughter of A.

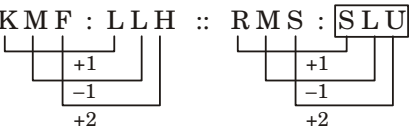
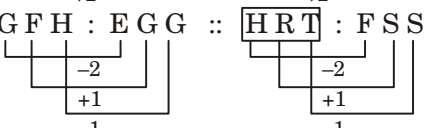
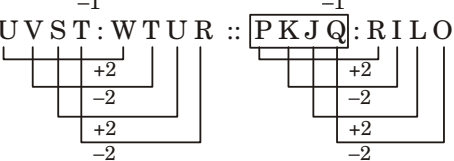
Only one mother O, it is evident that E is wife of A and hence the mother of C and F.

E is mother

F is the son of A

A made, B is brother $\rightarrow$ male of D, E $\rightarrow$ male

F male (as he is brother) Total 4

31. KMF : LLH :: RMS : SLU
- 
32. GFH : EGG :: HRT : FSS
- 
33. UVST : WTUR :: PKJQ : RILO
- 

34. 'Newspaper' is related to 'Editor' similarly 'Film' is related to 'Director'.
35. 'Smoke' is related to 'Pollution' similarly 'War' is related to 'Death'.
41. In the given question fig. all the shape is divided into two parts except question fig. (5).
42. In the given question fig. each fig. is made by 90° in clockwise direction except question fig. (5).
44. In the given question fig. all shape formed by line except question fig. (4).
45. In the given question fig. all alphabet letter formed by two lines except question fig. (4).
49. In the given fig. dotted circle is reduced in each fig. and is substituted by multiply (x) sign.

ENGLISH LANGUAGE

51. Options 1 and 2 are close but self-centered is the correct choice for this question. Other options are contextually incorrect. "...it has a tendency to limit one because one thinks of one's country as something different from the rest of the world."
52. other options are contextually incorrect. Option 3 is the only correct answer because it is stated in the passage, "Nationalism, when it becomes successful, sometimes goes on spreading in an aggressive way and becomes a danger internationally".
53. since it is mentioned in the passage that a nation promoting aggressive nationalism becomes a danger internationally, it therefore becomes isolated from other countries. Hence option 4 is the best answer.
54. this is a clear cut answer. Others refer to the neighboring states or neighbors who prosper because they don't have that burden to carry. "Human beings today are not in a mood to tolerate this..." Hence option 1 is the only correct answer.
55. this is the most appropriate title that can be given to the passage. The passage discusses the evils of aggressive nationalism and how if nationalism not properly applied can become a curse for a country. Having a sense of national identity is always good but it should be properly applied otherwise it can have a reverse effect. Other options do not bring out the essence of the given passage.
56. this is a clear cut answer. The last line of the passage states "He saw them as blossoms of promise and renewal, the only hope for mankind". Other options are factually incorrect.
57. Options 1, 2 and 4 are all close ones. But option 4 is more complete an answer. AS a non-believer he desired to affirm his faith before believing anything. "But as a self-proclaimed non-believer, he loved affirming his faith in life..." Option 1 is also a correct answer.
58. Option 3 is the desired answer. Other options are factually incorrect. It is clearly stated in the passage that for both Science and humanities played equal roles in his understanding of the society.
59. Option 4 is the desired answer. Refer to "...he never forgot that we should nourish the total man. As a scientist, he refused to believe in a benevolent power interested in men's affairs." Given options are ambiguous.
60. The passage discusses about Nehru's many sided personality and it is clearly mentioned in the passage that this is because of his interest in various fields, be it science, literature or religion. But 2 is given as the correct option.

61. This is the correct option. Refer to "In the contemporary arrangements for circulating the news, an important element, evaluation is always weak and often wanting entirely."
62. the author criticizes weak evaluation of news these days. Hence option 3 is the correct answer. Option 2 is also correct answer.
63. Refer to "...does not amount to row of beans; deserves no one's attention and should travel the wires no farther." ('...no one's attention' it should be)
64. Option 4 is partially correct but option 1 is the best answer since it is clearly stated in in the second line of the passage. "The casual horrors and real disasters are thrown on a newspaper reader without discrimination."
65. Option 3 is the correct answer. Other options are factually incorrect.
66. 'Appear' is the best fit. Other options are logically incorrect.
67. it should be 'built mostly by bricks.' Other options although close are contextually incorrect.
68. 'made' is the best possible answer for this blank, other options therefore can be ignored.
69. it should be 'for' sanitation. Other options do not fit.
70. the given blank requires a conjunction which will contradict the next part of the sentence therefore the suitable word is 'but'. Other options are hence incorrect.
71. 'deciphered' is the correct answer. Other options are wrong logically.
72. this is the correct option. The paragraph starting with S1 defines the utility of a dictionary. Its followed by Sand Q which form a mandatory pair expressing that we should not let a word pass unchallenged. They are followed by P and R which again as a mandatory pair tell us what to do in case we forget certain word.
73. the paragraph deals with the building of underground railway in Calcutta. RP as a pair provides the reason why Calcutta needed an underground railway line. It IS followed by S and Q which again as a pair ends the topic with a fact stating that 'it was going to be the first in South Asia'.
74. It should be illicit.
75. It should be ludicrous.
76. It should be 'advertise'. (But all the options can be spelt correctly).
77. it should be describe (but all the options can be spelt correctly).
78. it should be 'the more\the more'. Other options are grammatically incorrect.
79. it is the only correct option. Other options are grammatically incorrect.
80. this is the only correct option. Other options grammatically unfit.
81. Stringent here means 'strict'. Hence it goes along with 'investigation'. Other options therefore are incorrect.
82. it is the correct grammatical choice for the given blank which require something more formal. Out of the given options, 'had better' therefore is the best choice.
83. 'to' is the correct choice for this sentence.
84. 'to cry' is the best choice. '...to cry over something' is grammatically correct.
85. 'fodder' is the food used to feed animals. Hence it is the only correct option.
86. it is the correct option. At close quarters often means close examination of something.
87. 'An apple of discord' means cause of quarrel.
88. 'At large' can be conveyed through the word 'abscond'.
89. 'Take the bulls by horns' means facing some kind of difficulty. Hence 1 is the correct choice.

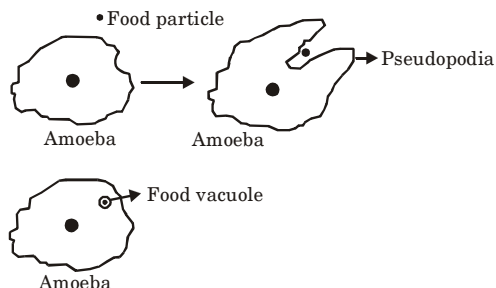
90. 'Buckle down' means 'get down to' which indicates working seriously on something.
91. Forsake is the correct synonym of abandon.
92. To hate intensely is the correct synonym of detest.
93. Provisional is the correct synonym of tentative.
94. Vague is synonymous to the word obscure.
95. Precise is the correct synonym of the word specific.
96. Prejudiced is the correct antonym of open minded.
97. Fickle is the correct antonym of dependable.
98. Respectful is the correct definition of impertinent.
99. Economical is the correct antonym of extravagance.
100. Explicit is the correct antonym of obscure.

SCHOLASTIC APTITUDE TEST

101. Regeneration

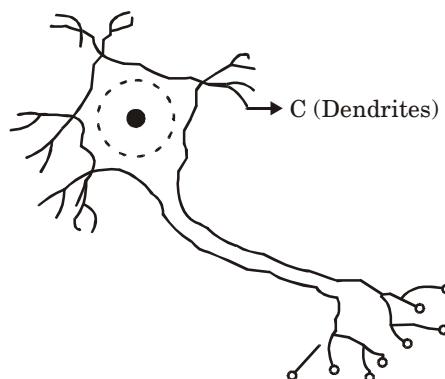
In example shown in figure the organism is Planaria (Dugesia)

102. I (Imunoagglutinin gene)
103. Diabetes is non infectious.
104. 'B' Indicates Pituitary gland.
105. Cytokinins induce cell division in plants.
106. Holozoic nutrition.

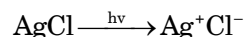


107. Phloem transports food.
108. Living organisms are biotic components of ecosystem.
109. Iris

110.



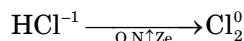
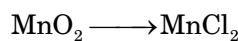
111. Lysosomes are suicidal bags.
112. Tendons connects Bones to muscles.
115. AgCl is decomposed photochemically into sunlight and turns grey



Used in black and white photography.

116. Carbonic acid (H_2CO_3) is an inorganic acid, rest are organic acids.

117. $+4 \xrightarrow{\text{O.N}\downarrow} +2 \Rightarrow \text{reduction}$



(Oxidation)

118. Atmosphere of venus is made up of thick clouds of H_2SO_4 .
119. Aqua regia, also called royal water is the most corrosive, mixture in world used to corrode "Pt" and "Au".
120. Iodine though non-metals, but it is bluish-black Cautious solid.
121. Sugarcane.
122. Head of a soap molecule is polar and Hydrophilic.
124. Eka alumimium $\rightarrow$ Gallium.
125. Cobalt-60 is radioisotope and used in gamma ray therapy for cancer treatment.
126. Face cream is an example of emulsion.
127. For spherical mirror with smack aperture, the radius of curvature is twice the focal length.
129. The three lenses are of power P_1, P_2, P_3
Hence net power (P) is given by P
$$= P_1 + P_2 + P_3$$

130. $\frac{f_1}{f_2} = \frac{2}{3}$, $\frac{l_1}{l_2} = \frac{3}{4}$ and $\frac{A_1}{A_2} = \frac{4}{5}$

Now as we know that

$$R = \rho \frac{l}{A}$$

$$\therefore \frac{R_1}{R_2} = \frac{f_1 l_1}{A_1} \times \frac{A_2}{f_2 l_2}$$

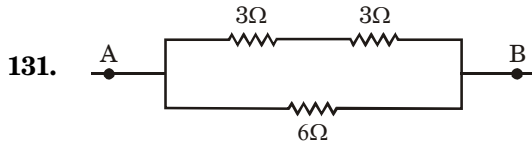
$$\therefore \frac{R_1}{R_2} = \frac{f_1}{f_2} \times \frac{l_1}{l_2} \times \frac{A_2}{A_1}$$

$$\therefore \frac{R_1}{R_2} = \left(\frac{2}{3}\right) \times \left(\frac{3}{4}\right) \times \left(\frac{5}{4}\right)$$

$$\therefore \frac{R_1}{R_2} = \frac{5}{8}$$

$$\therefore R_1 : R_2 = 5 : 8$$

$\therefore$ Option (3) is correct.



$$R_{AB} = (3 + 3)\Omega \parallel 6\Omega$$

$$\therefore 6\Omega \parallel 6\Omega = \frac{6 \times 6}{6 + 6} = \frac{36}{12} = 3$$

$$\therefore \boxed{R_{AB} = 3\Omega}$$

$\therefore$ Option (1) is correct

132. As we know that

$$R = \frac{\rho l}{A}$$

$$\therefore \rho = \frac{R \times A}{l}$$

Now unit of resistivity,

$$= \frac{\Omega \times m^2}{m} = \Omega \cdot m$$

$\therefore$ Option (4) is correct

133. $V = RI$

As we know that

$$\therefore H = I^2 R t$$

$$\therefore H = VI t \quad [\because V = IR]$$

$$\therefore H = \frac{V^2}{R} t \quad \left[\because I = \frac{V}{R} \right]$$

$$\therefore V^2 = \frac{HR}{t}$$

$$\therefore V^2 = \frac{100 \times 4}{1}$$

$$\therefore V = (10 \times 2)V$$

$$\therefore V = 20 V$$

$\therefore$ Option (3) is correct

134. As we know that

$$R = \frac{V^2}{P}$$

$$\therefore \frac{R_1}{R_2} = \frac{V_1^2}{P_1} \times \frac{P_2}{V_2^2}$$

$$= \frac{(220)^2}{100} \times \frac{50}{(110)^2}$$

$$= \frac{220 \times 220}{2 \times 110 \times 110}$$

$$\frac{R_1}{R_2} = \frac{2}{1}$$

$$\therefore R_1 : R_2 = 2 : 1$$

$\therefore$ Option (1) is correct

135. When magnet is moved into a coil an induced current is produced and is given by

$$I = \frac{E_{\text{ind}}}{R}$$

$\therefore$ Magnitude of induced current does not depend on number of turns of the coil

141. $(\sqrt[3]{2})^{12} \times (\sqrt{5})^8 = [(2 \times 5)^2]^x$

$$\therefore \left(2^{\frac{1}{3}}\right)^{12} \times \left(5^{\frac{1}{2}}\right)^8 = 10^{2x}$$

$$\therefore 2^4 \times 5^4 = 10^{2x}$$

$$\therefore 10^4 = 10^{2x}$$

$$\therefore 2x = 4$$

$$\therefore \boxed{x = 2}$$

$\therefore$ Option (2) is correct.

142. Average of a numbers is 18

$$\therefore \text{sum of a number} = (9 \times 18) = 162$$

Now average of first five number is 19

$$\therefore \text{sum fo first five number} = (19 \times 5) = 95$$

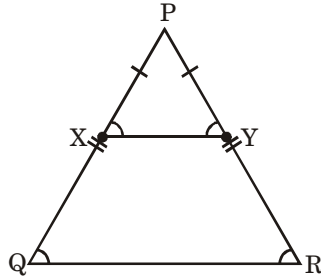
and average of last five number is 17

$$\therefore \text{sum of last five number} = (17 \times 5) = 85$$

$$\begin{aligned} \text{Hence } 5^{\text{th}} \text{ number} &= (95 + 85) - 162 \\ &= 180 - 162 = 18 \end{aligned}$$

$\therefore$ Option (3) is correct.

143.



In $\triangle PQR$

$$PQ = PR \Rightarrow \angle Q = \angle R$$

$$\text{and } \angle X = \angle Y \quad (\because XY \parallel QR)$$

Thus $\triangle PXY$ is on isosceles triangle

$\therefore$ Option (1) is correct.

146. $\operatorname{cosec} \theta + \sin \theta = 2$

$$\Rightarrow \theta = \frac{\pi}{2}$$

$$\text{Now } \operatorname{cosec}^{50} \theta + \sin^{50} \theta$$

$$= \operatorname{cosec}^{50} \left(\frac{\pi}{2} \right) + \sin^{50} \left(\frac{\pi}{2} \right)$$

$$= 1 + 1 = 2$$

$\therefore$ Option (1) is correct.

147. Let two consecutive even number be $2a$ and $2a + 2$

Now according to question

$$\begin{aligned} (2a)^2 + (2a + 2)^2 + 4 \\ &= 4a^2 + 4a^2 + 8a + 4 + 4 \\ &= 8a^2 + 8a + 8 \\ &= (a^2 + a + 1) \end{aligned}$$

Hence it is clear that it is always divisible by '8'.

$\therefore$ Option (3) is correct.

148. $\operatorname{cosec} 4x = \sec 5x$

$$\therefore \operatorname{cosec} 4x = \operatorname{cosec} (90^\circ - 5x)$$

$$[\because \operatorname{cosec} (90^\circ - \theta) = \sec \theta]$$

$$\Rightarrow 4x = 90^\circ - 5x$$

$$\therefore 9x = 90^\circ$$

$$\therefore \boxed{x = 10^\circ}$$

Now $\sin 3x + \cos 6x$

$$= \sin 30 + \cos 60 = \frac{1}{2} + \frac{1}{2} = 1$$

$\therefore$ Option (1) is correct.

149.

$$\frac{r}{h} = \frac{1}{2}$$

$$h = 2r \quad \dots(i)$$

Volume of right circular cylinder $= \pi r^2 h$

$$\therefore 2156 = \pi r^2 h \quad \dots(ii)$$

Solving equation (i) and (ii) we get

$$r = 7 \text{ cm and } h = 14 \text{ cm}$$

Now total surface area of cylinder

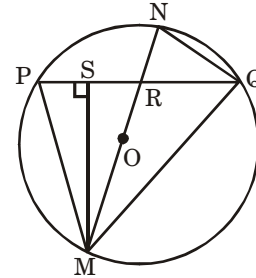
$$= 2 \pi r(r + h)$$

$$= 2 \times \frac{22}{7} \times 7(7 + 14)$$

$$= 2 \times 22 \times 21 = 42 \times 22 = 924 \text{ cm}^2$$

$\therefore$ Option (2) is correct.

150.



$$\triangle PMS \approx \triangle NMQ$$

$$\therefore \frac{PM}{NM} = \frac{MS}{MQ}$$

$$\therefore \frac{16}{NM} = \frac{MS}{10}$$

$$\therefore \frac{16}{2r} = \frac{MS}{10}$$

$[\because NM \text{ is twice the radius}]$

$$\therefore \frac{16}{2 \times OM} = \frac{MS}{10}$$

$$\therefore MO \times MS = 8 \times 10 = 80$$

151. 7th term of an A.P = $a + 6d$

9th term of an A.P = $a + 8d$

4th term of an A.P = $a + 3d$

Now according to question

$$(a + 6d) = 5a$$

$$\therefore 6d = 4a$$

$$\therefore 2a = 3d \quad \dots(i)$$

$$\text{and } (a + 8d) - 2(a + 3d) = 1$$

$$\therefore -a + 2d = 1$$

$$\therefore 2d = 1 + a$$

$$\therefore 2\left(\frac{2a}{3}\right) = 1 + a \quad \left[\because d = \frac{2a}{3}\right]$$

$$\therefore \frac{4a}{3} = 1 + a$$

$$\therefore 4a = 3 + 3a$$

$$\therefore \boxed{a = 3}$$

$\therefore$ Option (1) is correct.

152. Let the points on circle the

A(1, 4), B(-2, 6) and C(3, 7)

Now from option (4)

$$\text{Let } C' \left(\frac{1}{2}, \frac{13}{2} \right)$$

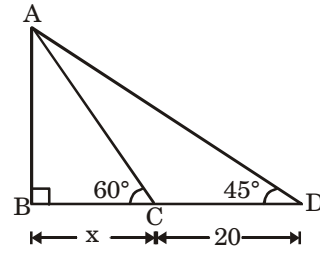
$$\begin{aligned} \text{Now } C'A &= \sqrt{\left(1 - \frac{1}{2}\right)^2 + \left(4 - \frac{13}{2}\right)^2} \\ &= \sqrt{\frac{1}{4} + \frac{25}{4}} = \frac{\sqrt{13}}{2} \end{aligned}$$

$$\begin{aligned} CB &= \sqrt{\left(\frac{1}{2} + 2\right)^2 + \left(\frac{13}{2} - 6\right)^2} \\ &= \sqrt{\frac{25}{4} + \frac{1}{4}} = \frac{\sqrt{13}}{2} \end{aligned}$$

$$\begin{aligned} \text{and } C'C &= \sqrt{\left(3 - \frac{1}{2}\right)^2 + \left(7 - \frac{13}{2}\right)^2} \\ &= \sqrt{\frac{25}{4} + \frac{1}{4}} = \frac{\sqrt{13}}{2} \end{aligned}$$

$\therefore$ Option (4) is correct.

153.



Here 'AB' represents building

In $\triangle ABC$,

$$\tan 60^\circ = \frac{AB}{x}$$

$$\therefore \sqrt{3} = \frac{AB}{x}$$

$$\therefore x = \frac{AB}{\sqrt{3}} \quad \dots(i)$$

and in $\triangle ABD$

$$\tan 45^\circ = \frac{AB}{20 + x}$$

$$\therefore 20 + x = AB \quad \dots(ii)$$

Now Substituting value of 'x' from equation (i) in equation (ii) we get

$$20 + \frac{AB}{\sqrt{3}} = AB$$

$$\therefore 20\sqrt{3} + AB = \sqrt{3} AB$$

$$\therefore 20\sqrt{3} = \sqrt{3} AB - AB$$

$$\therefore 20\sqrt{3} = AB(\sqrt{3} - 1)$$

$$\therefore AB = \frac{20\sqrt{3}}{\sqrt{3} - 1} = 47.32 \text{ m}$$

$\therefore$ Option (2) is correct.

$$154. \frac{6^6 + 6^6 + 6^6 + 6^6 + 6^6 + 6^6}{2^6 + 2^6} \times$$

$$\frac{5^6 + 5^6 + 5^6 + 5^6 + 5^6}{3^6 + 3^6 + 3^6} = 5^n$$

$$\therefore \frac{6 \cdot 6^6}{2 \cdot 2^6} \times \frac{5 \cdot 5^6}{3 \cdot 3^6} = 5^n$$

$$\therefore \frac{6 \cdot 6^6}{6 \cdot 6^6} \times 5 \cdot 5^6 = 5^n$$

$$\therefore 5^7 = 5^n$$

$$\therefore n = 7$$

$\therefore$ Option (4) is correct.

156. $x^m y^n = 7889$
 $\therefore (7)^3 \times (23)^1 = 7889$
 $\Rightarrow x = 7, y = 23, m = 3 \text{ and } n = 1$
 Now $x + y = 7 + 23 = 30$
 $\therefore$ Option (1) is correct.

157. $\frac{p-q}{p+q}, b = \frac{q-r}{q+r}, c = \frac{r-p}{r+p}$

Now, $\frac{(1+a)(1+b)(1+c)}{(1-a)(1-b)(1-c)}$

$$= \frac{\left[1 + \left(\frac{p-q}{p+q}\right)\right] \left[1 + \left(\frac{q-r}{q+r}\right)\right] \left[1 + \left(\frac{r-p}{r+p}\right)\right]}{\left[1 - \left(\frac{p-q}{p+q}\right)\right] \left[1 - \left(\frac{q-r}{q+r}\right)\right] \left[1 - \left(\frac{r-p}{r+p}\right)\right]}$$

$$= \frac{(2p)(2q)(2r)}{(2q)(2r)(2p)} = 1$$

$\therefore$ Option (1) is correct.

158.

Radius	Height
↓	↓
+ 10%, + 10%	- 10%

 Now % equivalent for +10%, +10%

$$= 10 + 10 + \left[\frac{10 \times 10}{100} \right]$$

$$= 10 + 10 + 1$$

$$= 21\%$$

Now % equivalent for 21%, -10%

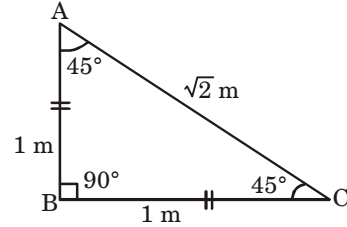
$$= \left[21 - 10 + \left[\frac{(21)(-10)}{100} \right] \right] \%$$

$$= (11 - 2.1)\%$$

$$= + 8.9\%$$

$\therefore$ Option (3) is correct.

159.



Perimeter of $\triangle ABC$

$$= 2AB + AC$$

$$= 2(1) + \sqrt{2}$$

$$= (2 + \sqrt{2})m$$

$\therefore$ Length of Hypotenuse AC

$$= \sqrt{2}m$$

$\therefore$ Option (4) is correct.

160. $\frac{x+2}{y+2} = \frac{5}{7}$

$$\therefore 7x + 14 = 5y + 10$$

$$\therefore 7x - 5y + 4 = 0 \quad \dots(i)$$

and $\frac{x+4}{y+3} = \frac{7}{8}$

$$\therefore 8x + 32 = 7y + 21$$

$$\therefore 8x - 7y + 11 = 0 \quad \dots(ii)$$

Solving equations (i) and (ii) we get

$$x = 3 \text{ and } y = 5$$

$$\therefore \text{original fraction } \frac{x}{y} \text{ is } \frac{3}{5}$$

$\therefore$ Option (2) is correct.

■ ■