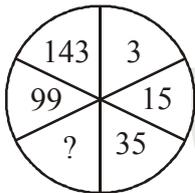


Section - I : MENTAL ABILITY

❖ **Q.No. 1 to Q.No. 25 Single correct answer type: In this type there is only one correct answer. Choose only one option for an answer : (Correct Answer : +3, Wrong Answer : -1, Unattempted: 0)**

1. 840, 168, 42, 14, 7,
 (A) 1 (B) 7 (C) 9 (D) 3
2. 1, 4, 2, 8, 6, 24, 22, 88,
 (A) 86 (B) 90 (C) 154 (D) 352
3. Defunct : Life
 (A) Stagnant : Motion (B) Orderly : Pattern (C) Arid : Desert (D) Obese : Weight
4. If BINARY is coded as DHPZTK then how will KIDNAP be coded ?
 (A) MKFPCQ (B) MHFPZQ (C) IKFMYO (D) MHFMCO
5. Anshu correctly remembers that his sister's birthday is before 20th but after 15th October but her father correctly remembers that his daughter's birthday is before 17th October. Anshu's sister's birthday falls on which day ?
 (A) 19th October (B) 16th October (C) 18th October (D) 15th October
6. Find the missing character in the following questions.



- (A) 63 (B) 56 (C) 60 (D) 65
7. Which of the following diagrams indicates the best relation between Iron, Lead and Nitrogen ?
 (A) (B) (C) (D)
8. If 'a' means '÷', 'b' means '+', 'c' means '-' and 'd' means '×', then 11 b 15 c 8 a 4 d 5 = ?
 (A) 36 (B) -16 (C) 26 (D) 16
9. One morning after sunrise, Vimal started to walk. During this walking, he met Stephen who was coming from opposite direction. Vimal watched that the shadow of Stephen is to the right of him. To which direction was Vimal facing ?
 (A) East (B) West (C) South (D) Data inadequate
10. Pointing to a photograph of a boy Subhash said, "He is the son of the only son of my mother." How is Subhash related to that boy ?
 (A) Brother (B) Uncle (C) Cousin (D) Father
11. The letters L, M, N, O, P, Q, R, S and T in their order are substituted by nine integers 1 to 9 but not in that order. 4 is assigned to P. The difference between P and T is 5. The difference between N and T is 3. What is the integer assigned to N ?
 (A) 4 (B) 5 (C) 6 (D) 7

12. In the following sequence of instructions, 1 stands for Run, 2 stands for Stop, 3 stands for Go, 4 stands for Sit and 5 stands for Wait. If the sequence were continued, which instruction will come next ?

4 4 5 4 5 3 4 5 3 1 4 5 3 1 2 4 5 4 5 3 4 5 3

- (A) Wait (B) Sit (C) Go (D) Run

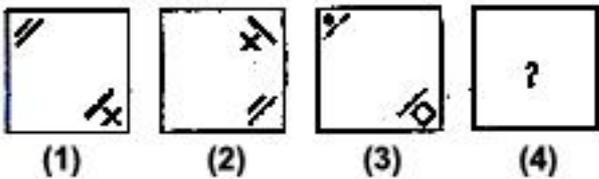
13. The following question consists of four figures marked A, B, C and D called the Problem Figures followed by four other figures marked 1, 2, 3 and 4 called the Answer Figures. Select the figure from amongst the Answer Figures will continue the same series as established by the four Problem Figures.

(A) E M E (B) m m m (C) E W E (D) W ? W



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

14. The following question consists of two sets of figures. Figures 1, 2, 3 and 4 constitute the Problem Set while figures A, B, C and D constitute the Answer Set. There is a definite relationship between figures 1 and 2. Establish a similar relationship between figures 3 and 4 by selecting a suitable figure from the Answer Set that would replace the question mark (?) in figure (4). Select a suitable figure from the Answer Figure that would replace the question mark (?).

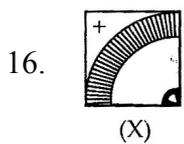


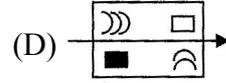
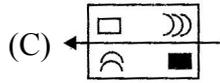
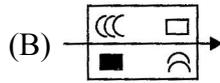
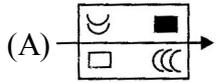
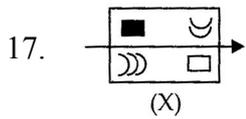
15. Choose the figure which is different from the rest.



Direction for question no. 16 & 17 :

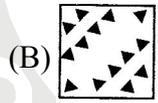
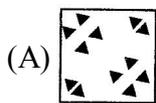
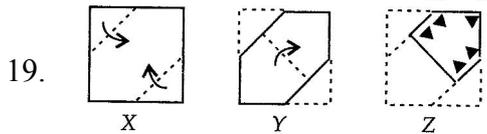
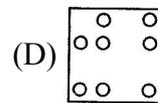
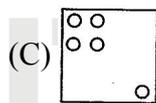
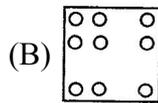
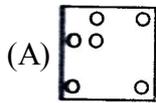
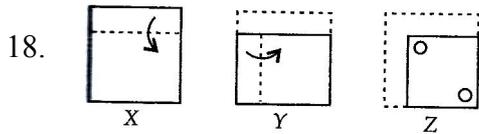
In each of the following questions, a word is followed by four alternatives (A), (B), (C) and (D) showing possible water images of that word. One out of these four alternatives show the exact water image of that word. Choose the alternative which shows the correct water images of the word.



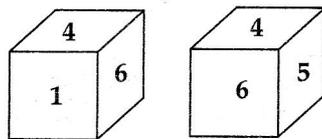


Direction for question no. 18 & 19 :

Each of the following questions consists of a set of three figures X, Y and Z showing a sequence of folding of a piece of paper. Figure (Z) shows the manner in which the folded paper has been cut. These three figures are followed by four answer figures from which you have to choose a figure which would most closely resemble the unfolded form of figure (Z).



20. Two positions of a dice are shown below. When number '1' is on the top. What number will be at the bottom?



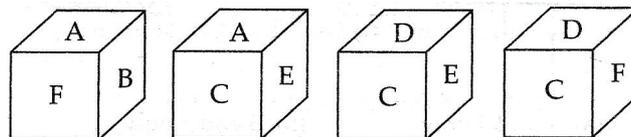
(A) 3

(B) 5

(C) 2

(D) 6

21. From the positions of a cube are shown below, Which letter will be on the face opposite to face with 'A'?



(A) D

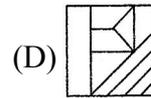
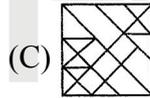
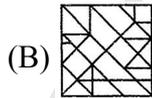
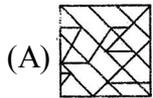
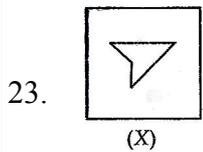
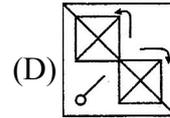
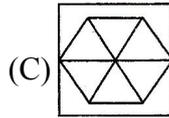
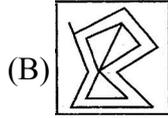
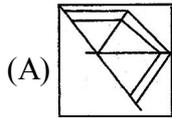
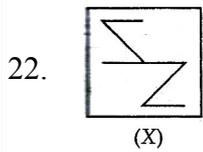
(B) B

(C) C

(D) F

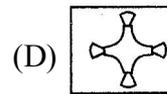
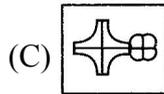
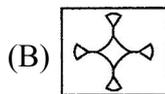
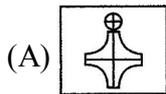
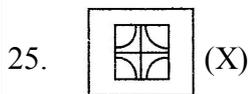
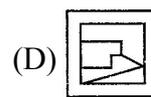
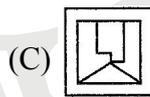
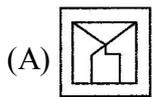
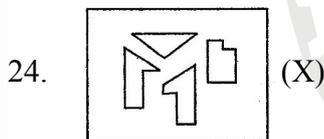
Direction for question no. 22 & 23 :

In each of the following questions, you are given a figure (X) followed by four alternative figures (A), (B), (C) and (D) such that figure (X) is embedded in one of them. Trace out the alternative figure which contains figure (X) as its part.



Direction for question no. 24 & 25 :

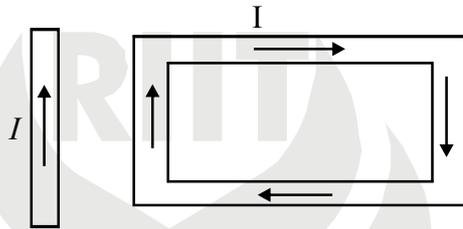
In each of the following questions, find out which of the figures A, B, C and D can be formed from the pieces given in figure. (X)



Section - II : SCIENCE

❖ *Q.No. 26 to Q.No.35 Single correct answer type: In this type there is only one correct answer. Choose only one option for an answer : (Correct Answer : +3, Wrong Answer : -1, Unattempted: 0)*

26. Masses of three wires of copper are in the ratio 1 : 3 : 5 and their lengths are in the ratio of 5 : 3 : 1. The ratio of their electrical resistances are
 (A) 1 : 3 : 5 (B) 5 : 3 : 1 (C) 1 : 15 : 125 (D) 125 : 15 : 1
27. Two conducting wires of same material and of equal lengths and equal diameters are first connected in series and then parallel in a circuit across the same potential difference. The ratio of heat produced in series and parallel combination would be
 (A) 1 : 2 (B) 2 : 1 (C) 1 : 4 (D) 4 : 1
28. A ray of light makes an angle of 10° with the horizontal and strikes a plane mirror which is inclined at an angle to the horizontal. The angle r for which reflected ray becomes vertical, is
 (A) 80° (B) 100° (C) 40° (D) 50°
29. A rectangle loop carrying a current I is situated near a long straight wire such that the wire is parallel to the one of the sides of the loop and is in the plane of the loop. If a steady current I is established in wire as shown in figure, the loop will



- (A) Rotate about an axis parallel to the wire (B) Move away from the wire or towards right
 (C) Move towards the wire (D) remain stationary
30. The ratio of radius of nuclei ${}_{13}\text{Al}^{27}$ and ${}_{52}\text{Te}^{125}$ is
 (A) $\frac{3}{5}$ (B) $\frac{4}{5}$ (C) $\frac{2}{5}$ (D) $\frac{1}{5}$
31. The velocity of a particle is given as follows $v = a + \frac{b}{c+t}$ where 't' is time. Find the dimensional formula for term $\frac{a}{bc}$
 (A) LT^{-1} (B) T^{-2} (C) LT (D) L^2T^{-2}
32. The energy of electron in second Bohr's orbit in the hydrogen atom is -3.41 eV. The energy of the electron in second Bohr's orbit of the He^+ ion would be
 (A) -85 eV (B) -13.64 eV (C) -1.70 eV (D) -6.82 eV
33. Which of the following is correct electronic configuration of chromium?
 (A) $[\text{Ar}] 3d^5 4s^1$ (B) $[\text{Ar}] 3d^4 4s^2$ (C) $[\text{Ar}] 3d^4 4s^1$ (D) $[\text{Ar}] 3d^5 4s^2$
34. Anaerobic Respiration takes place in
 (A) Mitochondria (B) Cytoplasm (C) Both A & B (D) Nucleus
35. _____ takes part in lateral flow of water in plants.
 (A) Vessels (B) Xylem Fibers (C) Sieve Tubes (D) Xylem Parenchyma

❖ **Q.No. 36 to Q.No.40 Multiple correct answer type: In this type there are one or more than one correct answer. Marks will be awarded only if all the correct options are marked.**

(Correct Answer : +4, Wrong Answer : 0)

36. Four charges, all of the same magnitude, are placed at the four corners of a square. At the centre of the square, the potential is V and the field is E . By suitable choices of the signs of the four charges, which of the following can be obtained ?
 (A) $V = 0, E = 0$ (B) $V = 0, E \neq 0$ (C) $V \neq 0, E = 0$ (D) $V \neq 0, E \neq 0$
37. A bird flies down vertically towards a water surface. To a fish inside the water, vertically below the bird, the bird will appear to
 (A) be farther away than its actual distance (B) be closer than its actual distance
 (C) move faster than its actual speed (D) move slower than its actual speed
38. Global warming do not focuses on an increase in the level of which of the following gases in the atmosphere.
 (A) Ozone (B) Sulphur dioxide (C) Carbon dioxide (D) Nitrous oxide
39. Which set (s) of quantum number is / are consistent with the theory?

- (A) $n = 2, l = 1, m = 0, s = \frac{-1}{2}$ (B) $n = 4, l = 3, m = -2, s = \frac{-1}{2}$
 (C) $n = 3, l = 2, m = -3, s = \frac{+1}{2}$ (D) $n = 4, l = 3, m = -3, s = \frac{+1}{2}$

40. Left lung has
 (A) 2 Lobes (B) Cardiac notch (C) 3 Lobes (D) Smaller than right lung

❖ **Q.No.41 Matrix Match Type: In this type statements are given in 2 columns which have to be matched. The statements in Column – I are labeled with choices A, B, C and D, while the statements in Column- II are labeled with choices p,q,r,s and t. For each option in column-I, there is only one correct option available in column-II :**

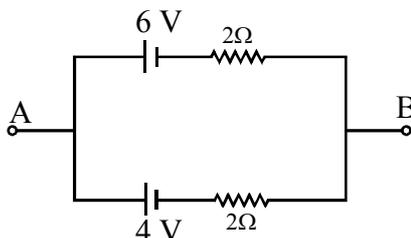
(Correct Answer : + 1.25 marks for each correct match, Wrong Answer : 0)

- | 41. Column - I | Column -II |
|--------------------------------------|---|
| (A) Inverted crown flint glass prism | (p) Deviation $\propto \frac{1}{\text{dispersive power}}$ |
| (B) Achromatism dispersion | (q) Deviation without dispersion |
| (C) Hollow prism | (r) Absence of chromatic aberration |
| (D) Glass slab | (s) Dispersion without deviation |
| | (t) A lateral shift occurs |

❖ **Q.No. 42 to Q.No.46 Integer type: The answer to each question is an integer ranging from 0 to 9 :**

(Correct Answer : +4, Wrong Answer : 0)

42. Two batteries of different emfs and different internal resistance are connected as shown in the figure. The voltage across AB in volts is



43. If the length of a conductor increases by 2% then what will be the percentage change in the resistance of the conductor.
44. P^H of 10^{-5} M NaOH solution is
45. How many of the following salts undergoes anionic hydrolysis.
KCl, NaF, $(HCOO)_2Ca$, CSI, NH_4Br , $Ba(CN)_2$, Na_3PO_4 , $KClO_4$ and $Mg(NO_2)_4$
46. Following are the organs involved in respiration in Humans —
Skin, Pharynx, Larynx, Trachea, oral Cavity, Mucus Membrane, Lungs

Section - III : MATHEMATICS

❖ **Q.No. 47 to Q.No.56 Single correct answer type: In this type there is only one correct answer.**

Choose only one option for an answer : (Correct Answer : +3, Wrong Answer : -1, Unattempted: 0)

47. P is the LCM of 2, 4, 6, 8, 10. Q is the LCM of 1, 3, 5, 7, 9. L is the LCM of P and Q. Which of the following is true ?
(A) $L = 21 P$ (B) $L = 4 Q$ (C) $L = 63 P$ (D) $L = 16 Q$
48. The pair of linear equations $2x + 5y = k$ and $kx + 15y = 18$ has infinitely many solutions if
(A) $k = 3$ (B) $k = 6$ (C) $k = 9$ (D) $k = 18$
49. A father's present age is 6 times his son's present age. Thirty years hence the father's age will be ten years less than twice the son's age. After how many years will the son's age be half of the father's present age ?
(A) 20 (B) 30 (C) 10 (D) 15
50. Suppose $a, b \in R$. If the equation $x^2 - (2a + b)x + \left(2a^2 + b^2 - b + \frac{1}{2}\right) = 0$ has two real roots, then
(A) $a = \frac{1}{2}, b = -1$ (B) $a = \frac{+1}{2}, b = 1$
(C) $a = 2, b = 1$ (D) $a = -2, b = -1$
51. A man saves Rs. 200 in each of the first three months of his service. Then each of the subsequent months his savings was Rs. 40 more than the savings of the immediately previous month. His total saving from the start of service will be Rs. 11040 after
(A) 21 months (B) 18 months (C) 19 months (D) 20 months
52. The value of $\sqrt{4\sqrt{48}}$ is :

53. The value of $\log_3 53$ lies between
 (A) $4\sqrt{3}$ (B) $4\sqrt[3]{3}$ (C) $4 \times 2^{\frac{1}{4}}$ (D) $4 \times 3^{\frac{1}{4}}$
54. If $ax^2 + 2x + a = 0$ has two equal roots, if
 (A) $\frac{1}{4}$ and $\frac{1}{3}$ (B) $\frac{1}{3}$ and $\frac{1}{2}$ (C) $\frac{1}{2}$ and 1 (D) None of these
55. In an A.P., sum of terms equidistant from the beginning and end, is constant which is the same as the sum of the first and last term
 (A) Yes (B) No (C) Sometimes false (D) None of these
56. Using the letters of the word PUBLIC, how many four letters words can be formed which begin with B and end with P? (Repetition of letters is not allowed)
 (A) 360 (B) 12 (C) 24 (D) 30

❖ **Q.No. 57 to Q.No.61 Multiple correct answer type: In this type there are one or more than one correct answer. Marks will be awarded only if all the correct options are marked.**

(Correct Answer : +4, Wrong Answer : 0)

57. The roots of $ax^2 + bx + c = 0$ are real when
 (A) $b^2 = 4ac$ (B) $b^2 < 4ac$ (C) $b^2 > 4ac$ (D) none of these
58. $\sin 63^\circ \cos 27^\circ + \cos 63^\circ \sin 27^\circ$ is equal to
 (A) $\sin^2 63^\circ + \cos^2 27^\circ$ (B) $\sin 90^\circ$ (C) 1 (D) $\sin^2 27^\circ + \sin^2 63^\circ$
59. If $x^2 + mx + 1 = 0$ and $(b - c)x^2 + (c - a)x + (a - b) = 0$ have both roots common, then
 (A) $m = -2$ (B) $m = -1$
 (C) a, b, c are in A.P. (D) a, b, c, are in H.P.
60. If $x = \sec \phi - \tan \phi$ and $y = \operatorname{cosec} \phi + \cot \phi$, then
 (A) $x = \frac{y+1}{y-1}$ (B) $x = \frac{y-1}{y+1}$ (C) $y = \frac{1+x}{1-x}$ (D) $xy + x - y + 1 = 0$
61. Three lines $px + qy + r = 0$, $qx + ry + p = 0$ and $rx + py + q = 0$ are concurrent, if
 (A) $p + q + r = 0$ (B) $p^2 + q^2 + r^2 = pq + qr + rp$
 (C) $p^3 + q^3 + r^3 = 3pqr$ (D) None of these

- ❖ **Q.No.62 Matrix Match Type:** In this type statements are given in 2 columns which have to be matched. The statements in Column – I are labeled with choices A, B, C and D, while the statements in Column- II are labeled with choices p,q,r,s and t. For each option in column-I, there is only one correct option available in column-II :

(Correct Answer : + 1.25 marks for each correct match, Wrong Answer : 0)

- | 62. Column I | Column II |
|--|--------------------|
| <p>(A) If α and β are the zero's of the polynomial $f(x) = x^2 - p(x+1) - c$ and $(\alpha + 1)(\beta + 1) = 0$ then the value of c is</p> | (p) 0 |
| <p>(B) Consider the following two A.P. s :
 A.P.₁ : 3, 5, 7, 9, (120 terms)
 A.P.₂ : 2, 5, 8, 11, (100 terms)
 And the number of terms which are identical in the two A.Ps is λ.

 Then $\left(\frac{\lambda}{10}\right)$ is</p> | (q) 1 |
| <p>(C) Value of the sum upto infinity $S = \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots$ to ∞ is λ.

 Then 4λ is</p> | (r) 3 |
| <p>(D) The length of the longest pole which can be put in a room of dimension $10m \times 10m \times 5m$ is (5λ) m .

 Then value of λ is</p> | (s) 4

(t) 2 |

- ❖ **Q.No. 63 to Q.No.67 Integer type:** The answer to each question is an integer ranging from 0 to 9 :
(Correct Answer : +4, Wrong Answer : 0)

63. If $\log_3 2$, $\log_3 (2^x - 5)$ and $\log_3 \left(2^x - \frac{7}{2}\right)$ are in A.P., then $(x/3)$ is equal to :
64. A committee of 4 persons is to be formed from 2 ladies, 2 old men and 4 young men, such that it includes atleast 1 lady, atleast 1 old men and atmost 2 young men. Then the total number of ways in which this committee can be formed is λ . Then $\frac{2\lambda}{41}$ is
65. An urn contains 9 red balls and p green balls. If the probability of picking a red ball is thrice that of picking a green ball, then p is equal to
66. If the p^{th} , q^{th} , r^{th} terms of a G.P. are b, c, d respectively, find the value of $b^{q-r} \cdot c^{r-p} \cdot d^{p-q}$
67. The surface area of a sphere is same as the curved surface area of cylinder with the same base radius R as that of the hemisphere. If H is the height of the cylinder, then write the value of $\frac{H}{R}$

ANSWER KEY

Section - I : MENTAL ABILITY

1. (B) 2. (A) 3. (A) 4. (D) 5. (B) 6. (A)
 7. (B) 8. (D) 9. (C) 10. (D) 11. (C) 12. (D)
 13. (C) 14. (B) 15. (B) 16. (D) 17. (D) 18. (C)
 19. (B) 20. (B) 21. (A) 22. (D) 23. (A) 24. (C)
 25. (C)

Section - II : SCIENCE

26. (D) 27. (C) 28. (D) 29. (C) 30. (A) 31. (B)
 32. (B) 33. (A) 34. (B) 35. (D) 36. (A,B,C,D)
 37. (A,C) 38. (A,B,D) 39. (A), (B), (D)
 40. (A,B,D) 41. ($A \rightarrow s, B \rightarrow r, p, C \rightarrow q, D \rightarrow q, t$)
 42. (5) 43. (4) 44. (9) 45. (6) 46. (4)

Section - II : MATHEMATICS

47. (C) 48. (B) 49. (D) 50. (B) 51. (A) 52. (D)
 53. (A) 54. (A) 55. (A) 56. (B) 57. (A, C)
 58. (B, C, D) 59. (A), (C) 60. (B), (C), (D)
 61. (A), (B), (C) 62. $A \rightarrow q, B \rightarrow s, C \rightarrow t, D \rightarrow r$
 63. (1) 64. (2) 65. (3) 66. (1) 67. (2)