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)

Direction for question 1 to 4 : Find missing number of the following series question.

1. 4, 16, 36, ___, 100

    (A) 48   (B) 64   (C) 72   (D) 88

2. 1, 8, 27, 64, ___, 216

    (A) 72   (B) 81   (C) 144   (D) 125

3. 3, 15, 35, 63, ___

    (A) 99   (B) 89   (C) 88   (D) 101

4. 2, 8, 18, 32, ___

    (A) 48   (B) 52   (C) 50   (D) 64

Direction for question 5 to 8 : Each question of two words which have certain relationship to each other followed by four pair of related words. Select the pair which has the same relationship.

5. After : Before

    (A) First : Second   (B) Present : Past

    (C) Contemporary : historic   (D) Successor : Predecessor

6. Light : Blind

    (A) speak : dumb   (B) tongue : sound   (C) voice : vibration   (D) language : deaf

7. Ten : Decimal

    (A) Four : Quartet   (B) Two : Binary   (C) Five : Quince   (D) Seven : Septet

8. Pork : Pig

    (A) Rooster : Chicken   (B) Fish : Beef

    (C) Mutton : Sheep   (D) Lobster : Beef

9. If in a certain language BEST is coded as DGUV, then DELHI codes as :

    (A) E G N J K   (B) E F M I J   (C) F G N J L   (D) None of these

10. If BOMBAY is written as MYMYMY, then 'TAMILNADU' can be written as

    (A) ALD ALD ALD   (B) MNU MNU MNU   (C) TLU TLU TLU   (D) None of these

11. Choose the word which is different from rest

    (A) Cap   (B) Turban   (C) Hat   (D) Veil

12. Choose the word which is different from the rest

    (A) Kiwi   (B) Eagle   (C) Emu   (D) Ostrich

Direction for question 13 to 14 : Find missing value in the following questions.

13.

2	8	68
3	11	130
5	?	50

(A) 4 (B) 5 (C) 8 (D) 10

14.

(A)   (B)   (C)   (D)

15. A number of friends decided a party and planned to spend Rs. 96 on eatables. Four of them, however did not turn up. As a consequence the remaining had to contribute Rs. 4 each extra. The number of those who atteneded the party was :

(A) 12 (B) 8 (C) 16 (D) 20

16. I have a few pens to distribute. If i distribute 2 or 3 or 4 pens to each, then I am left with one pen, but if i distribute 5 each, then I am left with none. What is the minimum number pens i have to distribute?
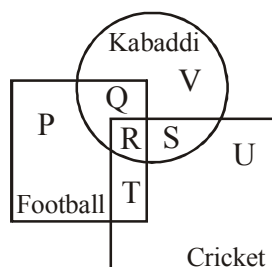
(A) 15 (B) 20 (C) 25 (D) 30

* **Direction for question 17 and 18 :** The diagram given below represent those students who play Cricket, Football and Kabaddi. Study the diagram and identify the students who play

17. All three games

(A) Q + R (B) R + S (C) R + T (D) R

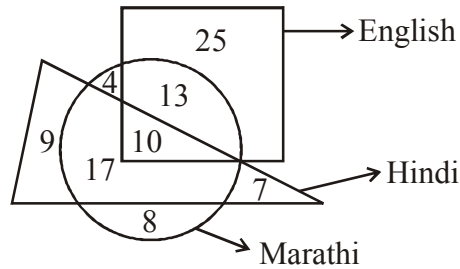18. Football and Cricket but not kabaddi

(A) R + S + T (B) R + T (C) T (D) P + T + U

* **Direction for question 19 and 20 :** In the following figure square represent the persons who know English, triangle to those know Hindi, circle those know Marathi.

19. How many can speak both English and Hindi only ?

    (A) 41 (B) 13 (C) 10 (D) None

20. How many can speak both Hindi and Marathi only ?

    (A) 27 (B) 17 (C) 25 (D) None of these

* **Direction for question 21 and 22 :** Let P, Q, R, S, T, U, V and W are sitting round the circle and facing the centre in following ways

    I.   P is second to the right to T who is neighbour of R and V

    II. S is not the neighbour of P

    III. V is the neighbour of P

    IV. Q is not between S and W, also W is not between U and S

21. Which of the following are not neighbours ?

    (A) RV (B) UV (C) RP (D) QW

22. Which one is immediate right to S ?

    (A) Q (B) U (C) W (D) P

* **Direction for question 23 and 24 :** Five girls are sitting on a bench to be photographed. Tani is to left of Sania and right to Pihoo, Chuni is to the right to Sana. Varsha is between Sana and Chuni.

23. Who is in the middle of photograph ?

    (A) Pihoo (B) Sana (C) Varsha (D) Tani

24. Who is the second from the left in photograph ?

    (A) Pihoo (B) Chuni (C) Varsha (D) Tani

25. In a row of boys, if A who is 10th from the left and B who is 9th from the right interchange their positions. If A becomes 15th from the left, then how many boys are there in the row ?

    (A) 24 (B) 23 (C) 27 (D) 28

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)**
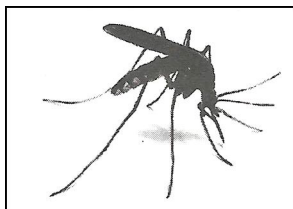
26. A car starting from rest traveling along a straight path with uniform acceleration covers S_1, S_2 and S_3 distances in the first, second and third seconds of its travel. Then the ratio of $\dfrac{(S_2 - S_1)}{(S_3 - S_2)}$ is _____ .

    (A) 3 : 5   (B) 1 : 2   (C) 1 : 3   (D) 1 : 1

27. A man of mass 65 kg is holding a bucket of mass 15 kg. He walks 50 m on a level road at a constant speed 3 m/s and then climbs up a hill of height 20 m. What is the work done by the man ?

    (A) 2.05 KJ   (B) 3.5 KJ   (C) 12 KJ   (D) 16 KJ

28. The bob of an oscillating simple pendulum arrives at one of the extreme positions 100 times in 200 sec, then the time period of the pendulum is _____ s

    (A) 2.5   (B) 2   (C) 1.5   (D) 1

29. The electrical energy consumed by a 30 W bulb in 5 minutes is _____

    (A) 9000 KJ   (B) 9 KJ   (C) 9000 MJ   (D) 9 MJ

30. The postulates of Bohr's atomic model is given below. Arrange them in the correct sequence.

    (I) As long as the electron revolves in a particular orbit, the elctron does not lose its energy. Therefor, these orbits are called stationary orbits and the electrons are said to be in stationary energy states

    (II) Electrons revolve round the nucleus in specified circular paths called orbits or shells

    (III) The energy associated with a certain energy level increases with the increase of its distance from the nucleus

    (IV) An electron jumps from a lower energy level to a higher energy level by absorbing energy. But when it jumps from a higher to lower energy level, energy is emitted in the form of electromagentic radiation

    (V) Each orbit or shell is associated with a definite amount of energy. Hence these are also called energy levels and are designated as K, L, M, N respectively

    (A) II → V → III → I → IV   (B) V → III → II → IV → I

    (C) III → I → II → IV → V   (D) V → I → III → IV → II

31. Excess intake of O_2 by a person results in several ill-effect. Which of the following activites leads to excess intake of O_2 ?

    (A) Deep sea diving   (B) Mountaineering

    (C) Travelling in an aeroplane   (D) Walking on the moon

32. Non-stick teflon coated cookwaves are generally recommended to heart patients because

    (A) non-stick cookwares do not absorb water   (B) non-stick cookwares do not absorb oil

    (C) non-stick cookwares cook faster   (D) non-stick cookwares are biodegradable

33. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?

    (A) Golgi apparatus   (B) Lysosomes

    (C) Smooth endoplasmic reticulum   (D) Vacuoles

34. The fungal disease causing maximum death of poultry bird is

(A) coryza   (B) pollorum   (C) rickets   (D) aspergillosis

35. Which of the following is a secondary pollutant

(A) PAN   (B) particulate matter

(C) hydrocarbons   (D) chloroflurocarbons

❖   *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. Action and reaction

(A) always act on two different objects   (B) are equal in magnitude

(C) are opposite in direction   (D) cancell out each other

37. Mark the correct statements w.r.t a concave spherical mirror,

(A) For real extended object, it can form a diminished virtual image

(B) For real extended object, it can form a magnified virtual image

(C) For a virtual extended object, it can form a diminished real image

(D) For a virtual extended object, it can form a magnified real image

38. Basicity of _____ is 1

(A) HCl   (B) HNO_3 (C) H_2SO_4 (D) $HClO_4$

39. Which of the following options consisting of diseases are not transmitteed by the vector shown in the figure?

Malaria, Yellow fever, Typhoid, Cholera, Dengue

(A) Typhoid   (B) Dengue and Malaria

(C) Cholera   (B) Yellow fever

40. Cutting down forest and using the land for other purposes is known as deforestation. It has adverse effects on the environment. Which of the following are correct regarding these effects?

(i) Decrease in soil erosion.

(ii) Increase in temperature

(iii) Ground water level gets lowered

(iv) Drought and floods.

(v) Increase in water holding capacity of the soil.

(A) (i), (ii)   (B) (ii) and (iv)

(C) (v) only   (D) (iii) and (iv)

❖ **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) $v^2 - u^2$ (p) Decreases potential energy

(B) Work done   (q) Increase in wavelength

(C) Current flowing through a conductor   (r) KWh

(D) Velocity of light decreases when light   (s) $2as$
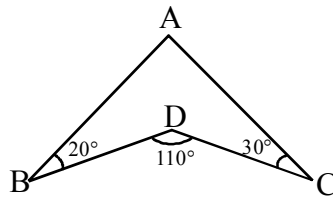
travels from air to glass

(t) at

❖ **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.   The area of crossection of a board pin needle was $10^{-6}\ m^2$. A force of 10 N was applied to press the pin on the board. The pressure exerted by the needle pin on the board was 1×10^x Pa. The value of x then is

43.   A certain force was applied to $1\ cm^2$ area of cross section to give a pressure of 10^5 Pa. If the same force is applied to a $1\ m^2$ area, then the pressure become 1×10^x Pa. The value of 'x' then is

44.   Number of unsaturated by hydrocarbons out of the following is

$C_3H_8, C_3H_6, C_2H_2, CH_4, C_3H_4, C_4H_{10}, C_2H_6, C_2H_4$

45.   How many of the following metals on reacting with sodium hydroxide solution produce hydrogen gas ?

Cu, Al, Fe, Zn

46.   A list consisting of the total names of some diseases are given. Count the total number of deficiency diseases amongst them.

Goitre, Leprosy, Diabets, Xerophthalmia, Haemophilia, Scurvy, Beri - bert.

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. If $x = \dfrac{1}{5 + 2\sqrt{6}}$, then $x^2 - 10x + 1 =$ ___

   (A) 1   (B) – 1   (C) 0   (D) 10

48. If $A = \{1, 2, 3, 4\}$, then how many subsets of A contain the element 3?

   (A) 24   (B) 28   (C) 8   (D) 16

49. $\log(x) - \log(2x - 3) = 1$, Then $x =$ _____

   (A) 30/19   (B) 20/19   (C) 19/30   (D) 19/20

50. The least positive integer x, which satisfies $|x - 2| > 7$?

   (A) 9   (B) 10   (C) 7   (D) 5

51. In the figure, $\angle ABD = 20°$, $\angle BDC = 110°$ and $\angle DCA = 30°$. What is the value of $\angle BAC$?

   (A) 30°   (B) 60°   (C) 90°   (D) 120°

52. At the most, how many cakes of soap dimensions $8\,cm \times 6\,cm \times 4\,cm$ can be placed in a wooden box of inner measures $28\,cm \times 16\,cm \times 12\,cm$?

   (A) 35   (B) 24   (C) 28   (D) 36

53. The mean of the following data is 9. Find the value of a.

x	2	4	5	8	a
f	3	1	6	4	6

   (A) 12   (B) 10   (C) 9   (D) 18

54. Factors of $x^4 - (x - z)^4$ is

   (A) $2x + z$ (B) $x + 2z$ (C) $2x - z$ (D) $z + 1$

55. If $(x + 2), (x^2 + 4)$ are length and breadth of a rectangle respectively, then the area will be ___

   (A) $x^3 + 2x^2 + 4x + 8$ (B) $x^3 + 4x^2 + x + 8$ (C) $x^3 + 8$ (D) $x^3 + x^2 + 8x + 4$

56. Given that the number, 1735538A36 is divisible by 3, where A is a digit, what are the possible value of A ?

   (A) 6   (B) 5   (C) 4   (D) 3

❖ **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. If $\log_3 |x - 2| = 2$ then the value of x is

    (A) 11 (B) 7 (C) -7 (D) -6

58. In the given figure, ABCD is a cyclic quadrilateral $\angle DAB = 50°$ and $\angle ABC = 80°$, EG and FG are angle bisectors of $\angle DEC$ and $\angle BFC$. then

    (A) $\angle FHG = 75°$ (B) $\angle DHE = 75°$ (C) $\angle DEH = 25°$ (D) $\angle DEH = 40°$

59. Thre are a total 70 ladies who watch at least one of the channels i.e.,., Zee TV, Sony TV and Star Plus. The total number of ladies who watch Zee TV or Sony TV but not star plus, the number of ladies who watch sony or star plus but not zee and the number of ladies who watch star plus or zee but not sony is 90. If 10 ladies watch all the three channels then

    (A) Number of ladies who watch at least two of these channels are 40.
    (B) Number of ladies who watch exactly one channel are 30.
    (C) Number of ladies who watch at least two of these channels are 50.
    (D) Number of ladies who watch exactly one channels are 40.

60. If $a + b = 11$ and $ab = 30$, then find the value of $(a - b)$
    (A) 1 (B) -1 (C) -2 (D) 2

61. A relation $R : Z \longrightarrow Z$ defined by $R = \{(x, y) / y = x^2 - 1\}$ is

    (A) Many to one relation (B) Into relation
    (C) One to many relation (D) One to One relation

❖ **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
(A) The area of triangle (in sq. m²) whose base is 24 cm and whose altitude is 15 cm is	(p) 11
(B) The diameter of a wheel is 1.26 m. How far will it travel in 500 revolutions in meters?	(q) 34650
(C) The height (in cm) of a cuboid where volume is $275\,\text{cm}^3$ and base area is $25\,\text{cm}^2$ is	(r) 180
(D) The circumference of the base of the cylinder is 132 cm and its height is 25 cm. The volume of the cylinder (in cm³) is	(s) 1980
	(t) 3000

❖   *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 $x = \dfrac{1}{2 - \sqrt{3}}$, then the value of $x^3 - 2x^2 - 7x + 10$ is equal to

64.   If $A = \left\{ p \in N,\ p \text{ is a prime and } p = \dfrac{7n^2 + 3n + 3}{n} \text{ for same } n \in N \right\}$, then the number of elements in the set A is

65.   If $\dfrac{3}{2}x + 2y = \dfrac{x}{4} - \dfrac{y}{2} = 1,$ then $x - y =$

66.   If $x + \dfrac{1}{x} = 3$, then $x^2 + \dfrac{1}{x^2} =$

67.   The ratio between the length and the perimeter of rectangular plot is $1 : 3$ the relation between the length and breadth of the plot is $K : 1$. Find K.

ANSWER KEY

MENTAL ABILITY

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

SCIENCE

26.	(D)	27.	(D)	28.	(B)	29.	(B)	30.	(C)
31.	(D)	32.	(B)	33.	(C)	34.	(D)	35.	(A)
36.	(ABC)	37.	(BC)	38.	(ABD)	39.	(AC)	40.	(BD)

41. $(A) \rightarrow (s), (B) \rightarrow (p), (C) \rightarrow (r), (D) \rightarrow (q)$ 42. (7)   43. (1)

44. (4)   45. (2)   46. (5)

MATHEMATICS

47.	(C)	48.	(C)	49.	(A)	50.	(B)	51.	(B)
52.	(C)	53.	(D)	54.	(C)	55.	(A)	56.	(C)
57.	(AC)	58.	(ABC)	59.	(AB)	60.	(AB)	61.	(A,B)

62. $(A \rightarrow r, B \rightarrow s, C \rightarrow p, D \rightarrow q)$ 63. (8)   64. (1)   65. (3)

66. (7)   67. (2)