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. A merchant has 1000 kg of sugar part of which he sells at 8% profit and the rest at 18% profit. He gains 14% on the whole. The quantity sold at 18 % profit is

   (A) 400kg   (B) 560 kg   (C) 600 kg   (D) 640 kg

2. Neena returned house 3 days earlier than the time she had told mother, Neen's sister Veena reached fine days later than the day Neena was supposed to return. If Neena returned on Tursday, on what day did Veena return___

   (A) Friday   (B) Saturday   (C) Wednesday   (D) None

3. Which of the following animal is different from the rest

   (A) Chicken   (B) Snake   (C) Frog   (D) Crocodile

4. Choose the correct Venn diagram for the following. Musician, Scientist, Artist.

   (A)   (B)   (C)   (D)
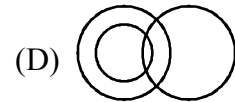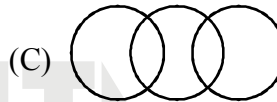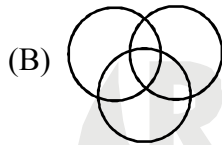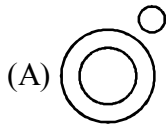
5. Anil, introducing a girl in a party , said she is the wife of the grandson of my mother. How is anil related to the girl ?

   (A) Father   (B) Grandfather   (C) Husband   (D) Father-in-law

6. Identify the missing term 9,19, 40,_____170.

   (A) 80   (B) 82   (C) 83   (D) 84

7. If 11th January 1997 was a sunday. What day of the week was on 7th January 2000?

   (A) Friday   (B) Sunday   (C) Monday   (D) Saturday

8. EARN is related to RANE and BON is related to NODB in the same way as TEAR is related to

   (A) AERT   (B) ATRE   (C) ARET   (D) REAT

9. A,B,C,D,E are sitting around a circle. If D is an right of A, B is second to the left of C, then who is second to the right of D?

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

10. Rahul puts his timepiece on the table in such a way that at 6 PM hour hand points to north. In which direction the minute hand will point at 9 : 15 PM?

    (A) South -East   (B) South   (C) North   (D) West

11.

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

12. 4,18,48,100,____. ?

    (A) 150   (B) 163   (C) 180   (D) 210

13.
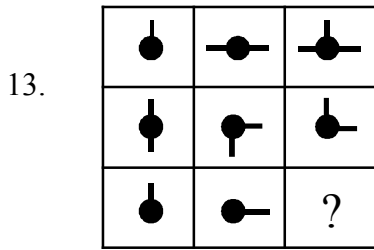
(A)   (B)   (C)   (D)

14. Which of the following contains the given image

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

15. If then

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

16.
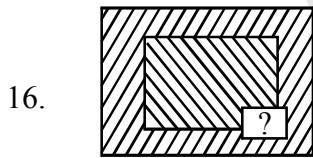
(A)   (B)   (C)   (D)

17. Two positions of a dice are shown below. If 1 is at the bottom which number will be on the top?

(A) 4   (B) 3   (C) 2   (D) 5

18. Two position of dice are shown dice and cube below. Identify the number opposite to face numbered 2?

(A) 6   (B) 3   (C) 1   (D) 4

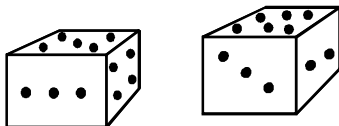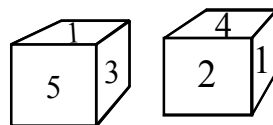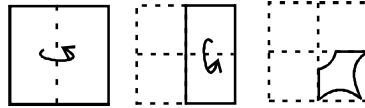19. A paper is folded in 3 steps in the given sequence & then cut___.

If the paper is opened again, identify the shape formed.

(A)   (B)   (C)   (D)
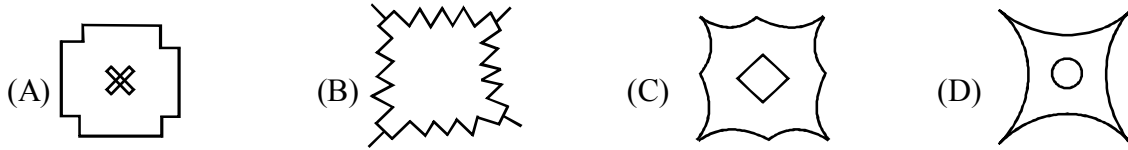
20. If sales made by XYZ in year 2015 is crores, then find the expense inward on printing in 2015
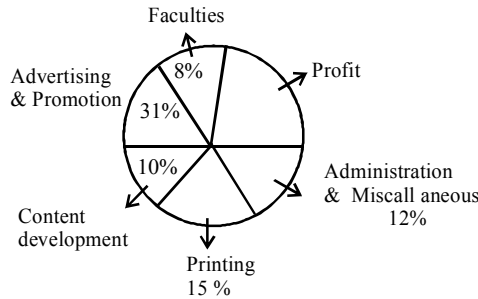
(A) 10 Crores   (B) 5 Crores   (C) 9 Crores   (D) 12 Crores

21. If a mirror is placed on line MN, then identify correct image of given word.

WATER

(A) ЯETAW   (B) ЯETAW

(C) ЯETAW   (D) ЯETAW

22. Identify next number in the sequence 15, 29, 56, 108, 208, ?
(A) 404   (B) 400   (C) 416   (D) 410

23. Select suitable figure following the sequence given

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

24. Identify number of squares in the given figure

(A) 16   (B) 9   (C) 25   (D) 30

25.

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

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. The length and breadth of a rectangle were measured using an instrument and the area was determined as 28.83 cm^2. The instrument used could be _____.

    (A) a vernier caliper whose least count is 0.1 mm
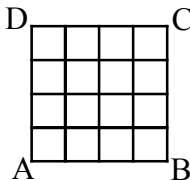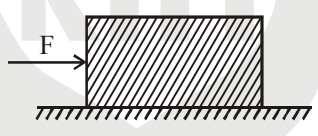
    (B) a metre scale

    (C) a vernier caliper whose least count is 0.3 mm

    (D) none of the above

27. If a limit vector is represented by $0.5\,\hat{i} + 0.8\,\hat{j} + c\,\hat{k},$ then the value of c is

    (A) ± 1 (B) $\pm \sqrt{0.11}$ (C) $\pm \sqrt{0.01}$ (D) $\pm \sqrt{0.39}$

28. A block of mass 2 kg is placed on the floor. The coefficient of static friction between the two surfaces is 0.4 A. force of 2.5 newton is applied on the block as shown. The force of friction between the block and the floor is

    (A) 7.84 N (B) 2.50 N (C) 6.45 N (D) 13.34 N

29. The uncertainty involved in the measurement of velocity of electron with a distance of 0.1Å is

    (A) $5.79 \times 10^8\,\text{m}/\text{s}$ (B) $5.79 \times 10^5\,\text{m}/\text{s}$ (C) $5.79 \times 10^6\,\text{m}/\text{s}$ (D) $5.79 \times 10^7\,\text{m}/\text{s}$

30. Ionic compounds do not conduct electricity in solid state. Identify the correct reason

    (A) Absence of oppositely charged ions in solid state

    (B) Absence of mobile ions in solid state

    (C) Absence of forces of attraction between ions in solid state

    (D) Absence of free electrons in solid state

31. In a hydrocarbon, the mass ratio of H to C is 1 : 3. The empirical formula of hydrocarbon is

    (A) CH (B) CH_2 (C) CH_4 (D) CH_3

32. Wax glands of honey bee are present in :

    (A) queen (B) drones (C) workers (D) both (A) and (C)

33. The proteins and lipids, essential for building the cell membrane, are manufactured by

    (A) endoplasmic reticulum (B) Golgi apparatus

    (C) Mitochondria (D) Peroxisomes

34. *Ascaris lumbricoides* is common roundworm of

    (A) liver (B) bile duct (C) large intestine (D) small intestine

35. Epithelial tissue always has an exposed outer surface and an inner surface anchored to connective tissue by a thin, non - cellular structure called the

    (A) nonstratified layer
    (B) stratified layer

    (C) basement membrane
    (D) fibroblast

❖ *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. According to Newton's universal law of gravitation. The gravitational force between two bodies is

    (A) Always attractive and depends on their masses

    (B) depends on the distance between them

    (C) depends on the medium between the bodies

    (D) does not depend of the medium between the bodies

37. An experiment is conducted to determine the velocity of sound resonating air column method where the first and second resonating lengths are 20 cm and 60 cm respectively for a tuning fork of frequency 100 Hz. Arrange the following steps in sequential order to determine the velocity of sound.

    (a) Note the frequency of the tunning fork (n) that is used to produce resonance in the closed organ tube

    (b) This will be the fundamental frequency of air column

    (c) The velocity of sound in air, $v = 2n (\ell_2 - \ell_1)$.

    (d) Identity the first and second resonating lengths when the tuning fork of frequency (n) is used from the given information. Let it be ℓ_1 and ℓ_2 respectively

    (A) a,b,c,d
    (B) a,c,b,d
    (C) a,b,d,c
    (D) c,a,b,d

38. The concentration of 9.8 g of H_2SO_4 in 500 ml solution is ?

    (A) 0.5 M
    (B) 0.2 M
    (C) 0.4 N
    (D) 0.02 M

39. Which one of the following is incorrect about tuberculosis?

    (A) It is caused by Salmonella

    (B) It commonly affects lungs

    (C) Bacteria release tuberculin toxin

    (D) Oral Rehydration Solution (ORS) is a prescribed therapy of the disease.

40. Choose the wrong statement

    (A) cells of striated muscles are multinucleate and unbranched.

    (B) Voluntary muscles or found in bronchi in lungs.

    (C) Contractile proteins are found in blood.

    (D) epithelial tissue have intercullular spaces between them

❖ *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) Orbital velocity   (p) $\sqrt{\dfrac{GM}{R}}$

(B) Velocity of sound in air   (q) $\sqrt{\dfrac{2GM}{R}}$

(C) Reflection of sound in open tube (r) standing waves

(D) Tracking a fish in ocean   (s) sonar

                                      (t) independent of Amplitude of vibration

❖ *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. A body starts from rest and moves with uniform acceleration for 3 s. It then decelerates uniformly for 2 s and stops. If the deceleration is $3\ ms^{-2}$, the maximum velocity of the body is _____ ms^{-1}.

43. An engine develops 10 kW power. How much time will it take to lift a mass of 200 kg to a height of 40 m ? (take $g = 10\ ms^{-2}$)

44. The element with atomic number 26 will be found in group

45. The value of n in molecular formula $Be_nAl_2Si_6O_{18}$ is

46. Which of the following names is/are not a type of soil ?

Loam, Biome, Gravel, Clay, Salt, Silt and Sand

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. In an election, two contestants A and B contested. x % of the total votes voted for A and (x + 20)% for B. If 20% of the voters did not vote, then find x.

(A) 30 (B) 25 (C) 40 (D) 35

48. The pair of linear equations $2x + ky - 3 = 0$, $6x + \dfrac{2}{3}y + 7 = 0$ has a unique solution if

(A) $k = \dfrac{2}{3}$ (B) $k \neq \dfrac{2}{3}$ (C) $k \neq 5$ (D) $k \neq \dfrac{2}{9}$

49. The condition that one root of $ax^2 + bx + c = 0$ may be the double of the other is :

(A) $b^2 = 2ac$ (B) $b^2 = 3ac$ (C) $2b^2 = 9ac$ (D) $2b^2 = 3ac$

50. In the figure given below (not to scale), D is a point on the circle with centre A and C is a point on the circle with centre B. $\overline{AD} \perp \overline{BD}$ and $\overline{BC} \perp \overline{CA}$. Then which of the following is true ?
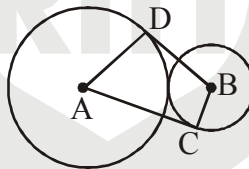
(A) BD = AC, when AD = BC (B) BD = AC, when $\overline{AD} \parallel \overline{BC}$

(C) Both (A) and (B) (D) BD = AC is always true

51. The coordinates of A and B are (1,2) and (2,3) point C lies in between A and B such that $AC + CB = AB$ and $\dfrac{AC}{CB} = \dfrac{4}{3}$. The coordinates of C are

(A) $\left(\dfrac{4}{7}, \dfrac{3}{7}\right)$ (B) $\left(\dfrac{4}{7}, \dfrac{11}{7}\right)$ (C) $\left(\dfrac{11}{7}, \dfrac{18}{7}\right)$ (D) None of these

52. If the first, second and last terms of an A.P. are a, b and 2a respectively, its sum is

(A) $\dfrac{ab}{2(b-a)}$ (B) $\dfrac{ab}{b-a}$ (C) $\dfrac{3ab}{2(b-a)}$ (D) None of these

53. The simplified value of $\sin^4 \alpha + \cos^4 \alpha + \dfrac{1}{2}\sin^2 2\alpha$ is

(A) -1 (B) $\sin \alpha + \cos \alpha$ (C) 0 (D) 1

54. Two dice are thrown together. The probability that sum of the numbers will be a multiple of 4 is

(A) $\dfrac{1}{2}$ (B) $\dfrac{1}{3}$ (C) $\dfrac{1}{8}$ (D) $\dfrac{1}{4}$

55. The mean of a set of 20 observations is 19.3. The mean is reduced by 0.5 when a new observation is added to the set. The new observation is

(A) 19.8   (B) 8.8   (C) 9.5   (D) 30.8

56. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - x - 4$, then the value of $\dfrac{1}{\alpha} + \dfrac{1}{\beta} - \alpha\beta$ is

(A) $\dfrac{15}{4}$ (B) $\dfrac{-15}{4}$ (C) 4   (D) 15

❖ *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. In the following distribution 3 , 5 , 7 , 4 , 2, 4 ,3, 1, 4 , 7

(A) Mean = 4   (B) Mode = 4   (C) Median = 4   (D) Mean = 5

58. If $A(1,2)$, $B(4,y)$, $C(x,6)$ and $D(3,5)$ are the vertices of a parallelogram taken in order, then

(A) $x = 3$ (B) $y = 6$

(C) length of $AB = \sqrt{10}$ units   (D) length of diagonal $AC = \sqrt{41}$ units

59. For what values of k, the equation $9x^2 + 3kx + 4 = 0$ has equal roots ?

(A) -2 (B) 4   (C) -4 (D) 9

60. If $R = \left\{ (a,b) / |a+b| = |a| + |b| \right\}$ is a relation on a set $\{-1,0,1\}$ then R is _____

(A) reflexive   (B) symmetric   (C) anti symmetric   (D) equivalence

61. If $5\begin{bmatrix} -3 & 1 \\ x & 2 \end{bmatrix} + \begin{bmatrix} y & 4 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} -15 & 9 \\ 6 & 2 \end{bmatrix}$ then

(A) $x + y = \dfrac{3}{5}$ (B) $x + y = 3$ (C) $5x + y - z = -9$ (D) $5x + y - z = 9$

❖ *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. Match the column

Column_I	Column_II
(A) Sum of the first 20 terms of A.P. $-6,0,6,12....$ is	p) 7500
(B) Sum of the first 14 terms of and A.P. is 1050 and its first term is 10. Its 20th term is	q) 1020
(C) Sum of the A.P. $1 + 3 + 5 + ...+ 199$ is	r) 200
(D) Sum of all odd numbers between 100 and 200 is	s) 10000
	t) 100

❖ ***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 = 2 and y =4 then

$$\left(\frac{x}{y}\right)^{x-y} + \left(\frac{y}{x}\right)^{y-x}$$ is equal to

64. For all r, such that $1 \le r \le 100, n\left(A_r\right) = r + 1$ and $A_1 \subset A_2 \subset A_3 ..... \subset A_{100}$. If $\bigcap\limits_{r=1}^{100} A_r$ contains P elements

then unit digit of P is

65. A copper cable, 32 cm long, having diameter 6 cm, is melted to form a sphere, then radius of sphere is

66. The 10th term of the sequence $\sqrt{3}, \sqrt{12}, \sqrt{27} ......$ is $\sqrt{3n^2}$. Find value of $\dfrac{n}{2}$

67. If $\begin{bmatrix} a & 3 \\ 4 & 5 \end{bmatrix}\begin{bmatrix} 3 & -2 \\ b & 8 \end{bmatrix} = \begin{bmatrix} 30 & 20 \\ 52 & c \end{bmatrix}$, then a + 4b − c is equal to

ANSWER KEY

Section - I : MENTAL ABILITY

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

Section - II : SCIENCE

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

41. $(A-p; B-t; C-r; D-s)$

42. (6)	43. (8)	44. (3)	45. (3)	46. (2)

Section - II : MATHEMATICS

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

62. $(A-s; B-r; C-p; D-q)$

63. (8)	64. (1)	65. (6)	66. (5)	67. (2)