

SECTION - I

MENTAL ABILITY & LOGICAL REASONING
SINGLE ANSWER TYPE QUESTIONS

This section contains 15 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct. Each correct answer carries 4 marks. No negative marks. Zero marks if not attempted.

1. How many such digits are there in the number 724513 each of which is as far away from the beginning in the number as when they are arranged in the ascending order starting from left?
A) Four B) One C) Two D) Three
2. How many such pairs of letters are there in the word CREDIT each of which has as many letters between them in the word as in the English alphabet?
A) Four B) One C) Two D) Three
3. In a certain code DEAL is written as '3524' and LIE is written as '475'. How is IDLE written in that code?
A) 7345 B) 3745 C) 7342 D) 7245
4. If it is possible to make only one meaningful word with the first, the second, the seventh and the eighth letters of the word TEMPORAL, which of the following will be the first letter of that word? If more than one such word can be made, give 'Y' as the answer and if no such word can be made, give 'X' as the answer.
A) four B) One C) Two D) Three

Direction : Study the following arrangement carefully and answer the given question below.

M 2 R D E K 5 7 B J I 4 N P 8 A W 9 V 1 U F 3 H 6

5. Which of the following is the fourth to the right of the tenth from the left end?
A) P B) N C) K D) 4

Directions (6 - 10)

Rearrange the following sentences to make a meaningful paragraph and then answer the questions given below them.

- A. A class room discussion can be initiated in order to answer this very question.
- B. An electric current could not be made to traverse distilled water.
- C. Yet when salt and distilled water were mixed, then the solution became a liquid through which electricity could pass with ease.
- D. Neither would solid salt offer free passage to electricity.
- E. How could one explain this strange behaviour of solution.
- F. and, as the current passed through this solution, a deep seated decomposition took place.

6. Which of the following will be the FIFTH sentence?

- A) A B) B C) C D) E

7. Which of the following will be the FOURTH sentence?

- A) A B) B C) F D) E

8. Which of the following will be the LAST sentence?

- A) C B) B C) A D) E

9. Which of the following will be the THIRD sentence?

- A) C B) B C) A D) E

10. Which of the following will be the FIRST sentence?

- A) A B) C C) B D) E

11. The average age of a brother and sister was 35 years, 5 years ago. What will be their average age (in years) at present?

- A) 37.5 B) 42 C) 80 D) None

12. In a library 30 % of books are in English, 50% books are in Hindi and the remaining 500 are in other languages. What is the total no. of books in the library.

- A) 2700 B) 2750 C) 2555 D) 2500

13. Each student of a class of 45 students has to be given 2 pens and 3 pencils. If the price of pencil is Rs. 1, and that of a pen is Rs. 4, then what will be total price of pens and pencils of the whole class. (in Rs.)

- A) 485 B) 490 C) 495 D) 395

14. The ratio of girls and boys in a school is 3 : 7. The no. of boys is more by 400 than that of girls, What is the no. of boys in the school.

- A) 300 B) 700 C) 100 D) 500

15. In a class 20% students failed, 60% students secured average marks and the remaining students scored above average marks. How many students are there in the class.

- A) 25 B) 20 C) 30 D) cannot be determined.

SECTION - II

SINGLE ANSWER TYPE QUESTIONS

This section contains 5 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct. Each correct answer carries 4 marks. No negative marks. Zero marks if not attempted.

16. Sum of the intercepts made by the lines $y = x + 2$, $y = 2x + 3$, $y = 3x + 4$, $y = 50x + 51$ on y - axis is

- A) 5050 B) 1325 C) 1326 D) 1225

17. The least positive values that satisfy the given by the

equation $x^{y^z} + y^{z^x} + z^{x^y} = 5xyz$ for x, y, z are

- A) 1,2,3 B) 0,1,2 C) 0,1,1 D) none

18. If $P = \begin{bmatrix} 2 & -1 \\ 1 & x \end{bmatrix}$ and $|P^4| = 81$, then $x = ?$

- A) 1,2 B) -1,2 C) 1,-2 D) -1,-2

19. In ΔABC , $\angle ABC = 120^\circ$, $AB = 3$ and $BC = 4$. If perpendiculars drawn to AB at A and to BC at C meet at D , then the length of $CD = \dots\dots\dots$

- A) $10\sqrt{3}$ B) 10 C) $10/\sqrt{3}$ D) $\sqrt{30}$

20. The number 'n' is a perfect square. The next perfect square bigger than n is :

- A) $n(n+1)(n+2)(n+3)+1$ B) n^2-2n+1
C) n^2+n D) $n+2\sqrt{n}+1$

SECTION - III

MULTIPLE ANSWER QUESTIONS

This section contains 5 multiple correct answer (s) type questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONE OR MORE is/are correct. Each correct answer carries 4 marks. No negative marks. Zero marks if not attempted.

21. The positive numbers, two in number, whose arithmetic mean is A and geometric mean is B are

A) $A - \sqrt{A^2 - B^2}$

B) $B - \sqrt{A^2 - B^2}$

C) $A + \sqrt{A^2 - B^2}$

D) $B + \sqrt{A^2 - B^2}$

22. If $\{a_k\}$ is an A.P, with $a_4 + a_7 + a_{10} = 17$ and $\sum_{k=4}^{14} a_k = 77$,

If $a_n = 13$ then

A) $a = 5/3$

B) $d = 2/3$

C) $S_n = 132/3$

D) $n=18$

23. If A and B are 3×3 matrices and $|a| \neq 0$ then

A) $|AB| = 0 \Rightarrow |B| = 0$

B) $|AB| = 0 \Rightarrow B = 0$

C) $|A^{-1}| = |A|^{-1}$

D) $|A + A| = 2 |A|$

24. If $10! = 2^p 3^q 5^r 7^s$ then

A) $P + Q = 12$

B) $r - s = 3$

C) $qr = 8$

D) $p+q+r+s = 15$

25. If $a < b < c < d$ then the equation $(x-a)(x-c) + 2(x-b)(x-d) = 0$ has

A) Real roots

B) Imaginary roots

C) Distinct roots

D) none

SECTION - IV

INTEGER TYPE QUESTIONS

This section contains 5 questions. The answer to each question is a single digit integer ranging from 0 to 9. The correct digit below the question number in the OMR is to be bubbled. You will be awarded 4 marks for the correct answer and zero mark if no bubbles are darkened. No negative marks.

26. In one planet, there are as many days in a week as there are weeks in a month. The number of months in a year is twice the number of days in a month. If there are 1250 days in a year, how many days are there in a week = $5K/2$. Here K is ?
27. A, B, C can be any digit '0' through '9', possibly the same, $20ABC01$ is a perfect square. B is = $3K$, Here k is
28. The number of integer pairs (x,y) satisfying the equation $x(x+1) = 2^y$ are....
29. $\left(1 + \frac{1}{2}\right)\left(1 + \frac{1}{2^2}\right)\left(1 + \frac{1}{2^4}\right)\left(1 + \frac{1}{2^8}\right) \dots \infty = \dots$
30. The slope of the linear function f, if $f(3) = 9$, $f(-3) = -9$ is

SECTION - V
MATRIX MATCHING

This Section contains 5 questions. Each question has four statements (A, B, C and D) given in Column I and four statements (P, Q, R and S) in Column II. Any given statement in Column I can have correct matching with one or more statement(s) given in Column II. For example, if for a given question, statement B matches with the statements given in Q and R, then for that particular question, against statement B, darken the bubbles corresponding to Q and R in the ORS. You will be awarded 1 marks for each correct answer. There is no negative marks awarded for incorrect answer(s).

31. For $x^2 + a|x| + 1 = 0$ where 'a' is a parameter

- | | |
|---------------------|---------------|
| A) No real root | P) $a < -2$ |
| B) Two real roots | Q) $a = -2$ |
| C) Three real roots | R) ϕ |
| D) Four real roots | S) $a \geq 0$ |
- A) A - S ; B - Q ; C - R ; D - P;
 B) A - S, P ; B - Q ; C - R ; D - P;
 C) A - S ; B - Q ; C - R, Q ; D - P;
 D) A - S, P ; B - Q, R ; C - R ; D - P;

32. A) $\begin{bmatrix} 1 & 2 & 4 \\ 2 & 0 & -1 \\ x & -3 & 2 \end{bmatrix}$ is singular if $x =$ P) $-35/2$

B) $\begin{bmatrix} x+y & 8 \\ 0 & x-y \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ -1 & 5 \end{bmatrix} + \begin{bmatrix} 3 & 5 \\ 1 & -2 \end{bmatrix}$, $x =$ Q) 4

C) $\begin{bmatrix} 1 & x & 1 \\ 2 & 3 & 2 \\ 0 & 5 & 1 \\ 0 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ x \end{bmatrix} = 0$, $x =$ R) -1

D) $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ and $(A^4)^{-1} = \begin{bmatrix} 1 & 0 \\ x & 1 \end{bmatrix}$, $x =$ S) -4

- A) A - S ; B - Q ; C - R ; D - P;

- B) A - P ; B- Q; C- R; D-S;
 C) A -S ; B- Q; C- R,Q ; D-P;
 D) A -S,P ; B- Q,R; C- R; D-P;

- 33. Collinear points conditions**
- A) $(a,b+c); (b,c+a); (c,a+b)$ P) $ad = bc$
- B) $(a,b); (c,d); (a+c,b-d)$ Q) $\frac{1}{a} + \frac{1}{b} = 1$
- C) $(a,0); (0,b); (1,1)$ R) $a = 1/2, -1$
- D) $(a,2-2a); (-a+1,2a); (-4-a,6-a)$ S) Always
- A) A -S ; B- Q; C- R; D-P;
 B) A -P ; B- Q; C- R; D-S;
 C) A -S ; B- P; C- Q; D-R;
 D) A -S,P ; B- Q,R; C- R; D-P;
- 34. $f(x) = x^2$ defined over**
- A) $f : \mathbb{R} \rightarrow \mathbb{R}$ P) Injection, not surjection
- B) $f : \mathbb{R}^+ \rightarrow \mathbb{R}$ Q) Surjection, not injection
- C) $f : \mathbb{R} \rightarrow \mathbb{R}^+$ R) Bijection
- D) $f : \mathbb{R}^+ \rightarrow \mathbb{R}^+$ S) Not bijection
- A) A -S ; B- Q; C- R; D-P;
 B) A -P ; B- Q; C- R; D-S;
 C) A -S ; B- Q; C- R,Q ; D-P;
 D) A -S ; B- P; C- R; D-Q;
- 35. If $\cos \theta - \sin \theta = 1/5$, $0 < \theta < \pi/2$ then**
- A) $\sin \theta + \cos \theta$ P) 4/5
- B) $\sin 2\theta$ Q) 7/5
- C) $\cos 2\theta$ R) 24/25
- D) $\cos \theta$ S) 7/25
- A) A -S ; B- Q; C- R; D-P;
 B) A -P ; B- Q; C- R; D-S;
 C) A -Q ; B- R; C- S ; D-P;
 D) A -S,P ; B- Q,R; C- R; D-P;

SECTION- VI

COMPREHENSION TYPE

This section contains a paragraphs. Based upon the paragraph, 5 multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct. Each correct answer carries 4 marks. No negative marks. Zero marks if not attempted.

If $y = f(x)$, the set of all values of x , for which function is defined, is called domain of the function and the set of values of y for which $x = f^{-1}(y)$, is defined, is said to be range of the function. The function is written as $f: A \rightarrow B$, then A is said to be domain and B is said to be co-domain.

36. $f(x) = (3x-5)/2$ then $f^{-1}(x)$ is

A) $(2x+3)/5$

B) $(2x-3)/5$

C) $(2x-5)/3$

D) $(2x+5)/3$

37. $f(x) = (7/2)^{x+1}$ then $f^{-1}(x)$ is

A) $\log_{\frac{7}{2}} x - 1$

B) $\log_{\frac{7}{2}} x + 1$

C) $\log_x \frac{7}{2} - 1$

D) $\log_x \frac{7}{2} + 1$

38. $f(x) = (x+1)^2 - 1$ then $f^{-1}(x)$ is

A) $\sqrt{x+1} + 1$

B) $\sqrt{x+1} - 1$

C) $\sqrt{(x+1)^2 + 1}$

D) $\sqrt{(x+1)^2 - 1}$

39. $f: \mathbb{R} \rightarrow (0, \infty)$ and $f(x) = e^{14x+9}$ then $f^{-1}(x)$

A) $\frac{\log_e x - 9}{14}$

B) $\frac{\log_e x + 9}{14}$

C) $\frac{\log_e x - 14}{9}$

D) $\frac{\log_e x + 14}{9}$

40. $f: [0, \infty) \rightarrow [0, \infty)$ defined by $f(x) = x^2$ then $f^{-1}(x)$ is

A) \sqrt{x}

B) x^2

C) $\pm x$

D) Not defined

SECTION - VII

ASSERTION & REASONING

This section contains 5 reasoning type questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct. Each correct answer carries 4 marks. No negative marks for wrong answers. Zero marks if not attempted.

Codes:

- (A) Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
- (B) Both Assertion and Reason are true but the Reason is not correct explanation of the Assertion.
- (C) Assertion is true, but the Reason is false.
- (D) Assertion is false, but the Reason is true.

41. A :- If $\cos x = \cos y$ then $x = y$

R :- $\cos\left(\frac{-\pi}{6}\right) = \cos\left(\frac{\pi}{6}\right)$ but $\frac{-\pi}{6} \neq \frac{\pi}{6}$

42. A :- If mid point of the sides of a triangle are (1,0); (0,1) ; (1,1) then the centroid is (2/3,1)

R :- Centroid of the triangle is same as that formed by their mid points.

43. A :- If A and B are different matrices such that $A^3 = B^3$ and $A^2B = B^2A$ then $\det(A^2 + B^2) = 0$

R :- Square matrix A is non singular.

44. A :- $\lim_{x \rightarrow 0} \frac{|x|}{x} = 1$

R :- Left hand limit \neq Right hand limit.

45. A :- Roots of $6x^2 + 7x + 12 = 0$ are imaginary.

R :- Roots of $ax^2 + bx + c = 0$ are imaginary if its discriminant is negative.

SECTION -VIII

CONCEPTUAL QUESTIONS

This section contains 5 reasoning type questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct. Each correct answer carries 4 marks. 1 mark will be deducted for wrong answer. Zero marks if not attempted.

46. If α, β are roots of $px^2 - px + q = 0$, then $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} =$

- A) 1 B) -1 C) 2 D) -2

47. $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ and $n \in \mathbb{N}$ then $A^n =$

- A) $2^n A$ B) $2^{n-1} A$ C) nA D) $2^{n+1} A$

48. ${}^{30}C_{2r+3} = {}^{30}C_{3r-2}$ then $r =$

- A) 4 B) 5 C) 6 D) 7

49. $x^n + a^n \div x + a$ for n is any

- A) $n \in \mathbb{Z}^+$ B) $n \in \mathbb{Z}^-$ C) $n \in \mathbb{Z}$ D) n is odd or \mathbb{Z}^+

50. $\lim_{x \rightarrow 0} \frac{\sin x^0}{x} =$

- A) $\frac{\pi}{180}$ B) $\frac{180}{\pi}$ C) 1 D) -1

ALL THE BEST

SPACE FOR ROUGH WORK