



Time Allowed : 2.30 Hrs

Section - A

Note : i) Draw neat sketches wherever necessary. ii) Use of non-programmable calculator is permitted. Choose the correct answer. 15 X 1 = 15

- If $A \subset B$, then $A \cap B$ is A) B B) $A \setminus B$ C) A D) $B \setminus A$
- The sequence $-3, -3, -3, \dots$ is A) an A.P only B) a G.P only C) neither A.P nor G.P D) both A.P and G.P
- If a, b, c are in G.P, then $\frac{a-b}{b-c}$ is equal to A) $\frac{a}{b}$ B) $\frac{b}{a}$ C) $\frac{a}{c}$ D) $\frac{c}{b}$
- If the system $6x - 2y = 3$, $kx - y = 2$ has a unique solution, then A) $k = 3$ B) $k \neq 3$ C) $k = 4$ D) $k \neq 4$
- The remainder when $x^2 - 2x + 7$ is divided by $x+4$ is A) 28 B) 29 C) 30 D) 31
- Matrix $A = (a_{ij})_{m \times n}$ is a square matrix if A) $m < n$ B) $m > n$ C) $m = 1$ D) $m = n$
- The angle of inclination of a straight line parallel to X-axis is equal to A) 0° B) 60° C) 45° D) 90°
- If a straight line $y=2x+k$ passes through the point (1,2) then the value of k is equal to A) 0 B) 4 C) 5 D) -3
- The sides of two similar triangles are in the ratio 2:3, then their areas are in the ratio A) 9 : 4 B) 4 : 9 C) 2 : 3 D) 3 : 2
- In figure, if $\frac{AB}{AC} = \frac{BD}{DC}$, $\angle B = 40^\circ$, $\angle C = 60^\circ$ then $\angle BAD = ?$  A) 30° B) 50° C) 80° D) 40°
- $(1 + \tan^2 \theta) \sin^2 \theta =$ A) $\sin^2 \theta$ B) $\cos^2 \theta$ C) $\tan^2 \theta$ D) $\cot^2 \theta$
- In adjoining figure $\angle ABC = ?$  A) 45° B) 30° C) 60° D) 50°
- If the total surface area of a solid hemisphere is $12\pi \text{ cm}^2$ then its curved surface area is equal to A) $6\pi \text{ cm}^2$ B) $24\pi \text{ cm}^2$ C) $36\pi \text{ cm}^2$ D) $8\pi \text{ cm}^2$
- The variance of 10, 10, 10, 10, 10 is A) 10 B) $10\sqrt{3}$ C) 5 D) 0
- If P is the probability of an event A, then P satisfies A) $0 < p < 1$ B) $0 \leq p \leq 1$ C) $0 \leq p < 1$ D) $0 < p \leq 1$

Section - B

Note : i) Answer ten questions. ii) Answer any nine questions from the first fourteen questions. Question number 30 is compulsory. iii) Each question carries two marks. 10 X 2 = 20

- Let $U = \{4, 8, 12, 16, 20, 24, 28\}$, $A = \{8, 16, 24\}$, $B = \{4, 16, 20, 28\}$ find $(A \cup B)'$
- If $R = \{(a, -2), (-5, b), (8, c), (d, -1)\}$ represents the identity function, find the values of a, b, c and d
- Three numbers are in the ratio 2 : 5 : 7. If 7 is subtracted from the second, the resulting numbers form an arithmetic sequence. Determine the numbers.
- Simplify : $\frac{x^3 - 27}{x^2 - 9}$
- Determine the nature of the roots of the equation $x^2 - 8x + 12 = 0$.
- If $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & -5 \\ 3 & -5 & 6 \end{pmatrix}$ then verify that $[A']' = A$.
- If $A = \begin{pmatrix} 4 & -2 \\ 5 & -9 \end{pmatrix}$, $B = \begin{pmatrix} 8 & 2 \\ -1 & -3 \end{pmatrix}$ then find $6A + 3B$.
- Find the points which divides the line segment joining the points (3, 5), (8, 10) internally in the ratio 2 : 3.
- Show that the straight lines $3x - 5y + 7 = 0$ and $15x + 9y + 4 = 0$ are perpendicular.
- AB and CD are two chords of a circle which intersect each other internally at P. If $CP = 4 \text{ cm}$, $AP = 8 \text{ cm}$, $PB = 2 \text{ cm}$ then find PD
- Prove the identity $\sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}} = \csc \theta - \cot \theta$

27. A ladder leaning against a vertical wall, makes an angle of 60° with the ground. The foot of the ladder is 3.5 m away from the wall. Find the length of the ladder.
28. The radii of two circular cylinders are in the ratio 3 : 2 and their heights are in the ratio 5 : 3. Find the ratio of their curved surface areas.
29. The largest value in a collection of data is 7.44. If the range is 2.26 find the smallest value in the collection.
30. a) Two coins are tossed together. What is the probability of getting at most one head? (OR)
b) If the circumference of the base of a solid right circular cone is 236 cm and its slant height is 12 cm, find its curved surface area.

SECTION - C

Note : i) Answer any 9 questions. ii) Answer any eight questions from the first fourteen questions. Question number 45 is compulsory. iii) Each question carries five marks. $9 \times 5 = 45$

31. Using Venn diagram verify $A \setminus (B \cup C) = (A \setminus B) \cap (A \setminus C)$.
32. Let $A = \{0, 1, 2, 3\}$ and $B = \{1, 3, 5, 7, 9\}$ be two sets. Let $f: A \rightarrow B$ be a function given by $f(x) = 2x + 1$. Represent this function as
i) a set of ordered pairs ii) a table iii) an arrow diagram and iv) a graph
33. Find the sum to n terms of the series $6 + 66 + 666 \dots$
34. Find the total area of 12 squares whose sides are 12 cm, 13cm,23cm respectively.
35. A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 4 days, find the time that B would take to finish this work by himself.
36. If $m - nx + 28x^2 + 12x^3 + 9x^4$ is a perfect square, then find the values of m and n.
37. If $A = \begin{pmatrix} 5 & 2 \\ 7 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 1 \end{pmatrix}$ verify that $(AB)^T = B^T A^T$.
38. If the vertices of a ΔABC are A (2, -4), B (3, 3), and C (-1, 5) find the equation of the straight line along the altitude from the vertex B.
39. Find the area of the quadrilateral whose vertices are (6, 9), (7, 4), (4, 2) and (3, 7)
40. ABCD is a quadrilateral such that all of its sides touch a circle. If AB = 6 cm BC = 6.5 cm and CD = 7 cm find the length of AD.
41. A vertical tree is broken by the wind. The top of the tree touches the ground and makes an angle 30° with it. If the top of the tree touches the ground 30 m away from its foot, then find the actual height of the tree.
42. The radii of two circular ends of a frustum shaped bucket are 15 cm and 8 cm. If its depth is 63 cm, find the capacity of the bucket in litres. Take $\left(\pi = \frac{22}{7}\right)$.

43. Calculate the standard deviation of the following data

| | | | | | |
|---|---|----|----|----|----|
| X | 3 | 8 | 13 | 18 | 23 |
| Y | 7 | 10 | 15 | 10 | 8 |

44. The probability that A, B and C can solve a problem are $\frac{4}{5}$, $\frac{2}{3}$ and $\frac{3}{7}$ respectively. The probability of the problem being solved by A and B is $\frac{8}{15}$. B and C is $\frac{2}{7}$ and A and C is $\frac{12}{35}$. The probability of the problem being solved by all three is $\frac{8}{35}$. Find the probability that the problem can be solved by atleast one of them.
45. a) An iron right circular cone of diameter 8 cm and height 12cm is melted and recast into spherical lead shots each of radius 4 mm. How many lead shots can be made? (OR) b) Factorize the polynomial: $x^3 - 2x^2 - 5x + 6$.

SECTION - D

Note : i) This section contains 2 questions each with 2 alternatives. $2 \times 10 = 20$
ii) Answer both the questions choosing either of the alternatives. iii) Each question carries ten marks.

46. a) Construct a cyclic quadrilateral ABCD where AB = 6 cm, AD = 4.8, cm BD = 8 cm and CD = 5.5 cm. (OR)
b) Draw a circle of radius 3 cm. From an external point 7 cm away from its centre, construct the pair of tangents to the circle measure and verify their lengths.
47. a) Draw the graph of $y = 2x^2 + x - 6$ and hence solve $2x^2 + x - 10 = 0$. (OR)
b) Draw a graph for the data given. Find the number of days taken by 12 workers to complete the work.

| | | | | | | |
|-------------------|----|----|----|----|----|----|
| No of workers (x) | 3 | 4 | 6 | 8 | 9 | 16 |
| No of days (y) | 96 | 72 | 48 | 36 | 32 | 18 |