

Standard 10 MATHEMATICS

Time: 2.30 Hrs.

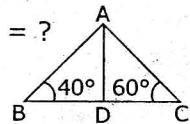
Marks: 100

Section - A

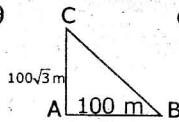
15 × 1 = 15

Note: i) Draw neat sketches wherever necessary. ii) Use of non-programmable calculator is permitted.

- 1) If $A \subset B$, then $A \cap B$ is
a) B b) $A \setminus B$ c) A d) $B \setminus A$
- 2) 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.
- 3) 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) $\frac{c}{b}$
- 4) 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) $K \neq 4$
- 5) The remainder when $x^2 - 2x + 7$ is divided by $x + 4$ is
a) 28 b) 29 c) 30 d) 31
- 6) Matrix $A = [a_{ij}]_{m \times n}$ is a square matrix if
a) $m < n$ b) $m > n$ c) $m = 1$ d) $m = n$
- 7) The angle of inclination of a straight line parallel to x-axis is equal to
a) 0° b) 60° c) 45° d) 90°
- 8) 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
- 9) 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
- 10) 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°



- 11) $(1 + \tan^2 \theta) \sin^2 \theta =$
a) $\sin^2 \theta$ b) $\cos^2 \theta$ c) $\tan^2 \theta$ d) $\cot^2 \theta$
- 12) In adjoining figure $\angle ABC = ?$
a) 45° b) 30°
c) 60° d) 50°



- 13) 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) $8\pi \text{ cm}^2$
- 14) The variance of 10, 10, 10, 10, 10 is
a) 10 b) $\sqrt{10}$ c) 5 d) 0
- 15) 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

10 × 2 = 20

- Note: i) Answer any 9 questions from the first 14 questions. Question number 30 is compulsory.
- 16) Let $U = \{4, 8, 12, 16, 20, 24, 28\}$, $A = \{8, 16, 24\}$, $B = \{4, 16, 20, 28\}$ find $(A \cup B)'$
 - 17) If $R = \{(a, -2), (-5, b), (8, c), (d, -1)\}$ represents the identity function, find the values of a, b, c and d.
 - 18) 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.
 - 19) Simplify: $\frac{x^3 - 27}{x^2 - 9}$
 - 20) Determine the nature of the roots of the equation $x^2 - 8x + 12 = 0$.
 - 21) If $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & -5 \\ 3 & -5 & 6 \end{pmatrix}$ then verify that $(A^T)^T = A$.
 - 22) If $A = \begin{pmatrix} 4 & -2 \\ 5 & -9 \end{pmatrix}$, $B = \begin{pmatrix} 8 & 2 \\ -1 & -3 \end{pmatrix}$ then find $6A - 3B$.
 - 23) Find the points which divide the line segment joining the points (3, 5) (8, 10) internally in the ratio 2:3.
 - 24) Show that the straight lines $3x - 5y + 7 = 0$ and $15x + 9y + 4 = 0$ are perpendicular.

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- 25) AB and CD are two chords of a circle which intersect each other internally at P. If CP = 4cm and AP = 8 cm, PB = 2 cm then find PD.
- 26) Prove the identity $\sqrt{\frac{1-\cos\theta}{1+\cos\theta}} = \operatorname{cosec}\theta - \cot\theta$
- 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 cylinder 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**9×5=45**

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.

- 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, 13 cm, 23 cm 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 $\pi = 22/7$)
- 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 $\frac{8}{15}$ B and C is $\frac{2}{7}$ and A and C is $\frac{12}{35}$. The probability of the problem being solved by all the 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 12 cm 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 - C

Note: i) 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