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MATHEMATICS — Paper II

Time Allowed : $2\frac{1}{2}$ Hours]

[Maximum Marks : 100

- N. B. :**
- The question paper consists of six Sections – A, B, C, D, E and F.
 - Read the instructions under each Section before you start answering.
 - Diagrams should be drawn, wherever necessary.
 - Rough work and calculations should be shown legibly at the bottom of the pages in the answer-book.

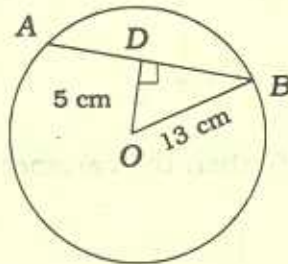
SECTION - A

Note : i) Answer all the ten questions.

ii) Each question carries one mark.

$$10 \times 1 = 10$$

1. In the diagram, $OD = 5$ cm, $OB = 13$ cm, then $AB =$



- 12 cm
- 24 cm
- 6 cm.

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2. The corresponding sides of two similar triangles are in the ratio 2 : 3, then the ratio of their areas is equal to
- a) 1 : 9 b) 8 : 27 c) 4 : 9.
3. Slope of x -axis is
- a) 1 b) - 1 c) 0.
4. The equation of the line passing through the point $(-2, 5)$ and parallel to y -axis is
- a) $y = 5$ b) $x = -2$ c) $-2x + 5y = 0$.
5. $\sin x \cdot \sec(90^\circ - x) - \cot x \cdot \cot(90^\circ - x)$ is equal to
- a) 1 b) $\frac{1}{2}$ c) 0.
6. $\operatorname{cosec}^2 37^\circ - \cot^2 37^\circ$ is equal to
- a) 0 b) 1 c) - 1.
7. Order of matrix A is
- $$A = \begin{pmatrix} 1 & 0 & -5 & 6 \\ 7 & 8 & 2 & 3 \end{pmatrix}$$
- a) 4×2 b) 2×4 c) 4×4 .
8. If the S.D. of a given data is 5, then the variance of the data is
- a) $\sqrt{5}$ b) 10 c) 25.
9. The probability of getting an odd number in throwing a dice once is
- a) $\frac{1}{2}$ b) $\frac{1}{6}$ c) 0.
10. The Basic statement which is used to assign a value to a variable is
- a) REM b) LET c) INPUT.

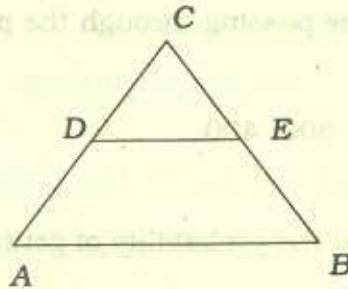
SECTION - B

Note : i) Answer any ten of the following questions.

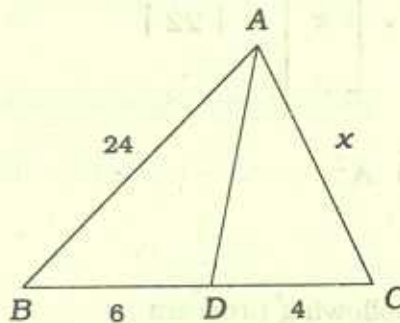
ii) Each question carries three marks.

$10 \times 3 = 30$

11. In the diagram $\angle A = \angle B$ and $AD = BE$ show that $DE \parallel AB$.



12. In the diagram AD is bisector of $\angle BAC$. Find x .



13. In $\triangle ABC$, $\angle A$ is a right angle and $\overline{AD} \perp \overline{BC}$. If $AD = 24$ units,

$DC = 18$ units, find BD .

14. A ladder 24 m long leans on the top of a building making an angle of elevation of 30° with the horizontal line. Find the height of the building.

15. Find the value of $\sin^2 30^\circ + 2 \tan^2 60^\circ - \frac{1}{2} \cos^2 45^\circ + \tan 45^\circ$.

16. Find the value of $\frac{1}{\cos^2 40^\circ} - \tan^2 40^\circ$.
17. If $(x, -5)$, $(-5, 1)$ and $(-1, 2)$ are collinear, find x .
18. Find the slope and y -intercept of the line $7x - 3y + 4 = 0$.
19. Find the equation of the line passing through the points $(-3, 1)$ and $(2, -4)$.
20. Find the S.D. of 100, 200, 300, 400.
21. A dice is thrown twice. Find the probability of getting the sum 5 or 9.
22. If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{1}{4}$, find $P(A \cap B)$.
23. Find x , if $[2 \ x \ -1] \times \begin{bmatrix} 0 \\ x \\ 3 \end{bmatrix} = [22]$.
24. If $A = \begin{bmatrix} -2 & -4 \\ 3 & 6 \end{bmatrix}$ find A^2 .
25. Write the output for the following program :

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10 READ A, B, C
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20 LET D = A + B
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30 LET E = D * C
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```
40 PRINT E
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50 DATA 2, 3, 5
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60 END
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SECTION - C

Note : i) Answer all the questions, choosing either (a) or (b) in each question.

ii) Each question carries five marks.

$4 \times 5 = 20$

26. a) State and prove Basic Proportionality theorem.

OR

b) State and prove AAA-similarity theorem.

27. a) Prove that three parallel lines cut any two transversals proportionally.

OR

b) In a parallelogram $ABCD$, A is joined to any point P on BC and if it meets DC produced at Q , prove that $PQ : AP = CQ : AB$.

28. a) Find the equation of the straight line passing through $(-1, 3)$ and parallel to the line joining $(5, -2)$ and $(-3, 1)$.

OR

b) Find the ratio in which the line joining the points $(2, -1)$ and $(4, -6)$ is divided by the x -axis.

29. a) Find the area of the quadrilateral whose vertices are $(1, 2)$, $(-3, 4)$, $(-5, 6)$ and $(4, -1)$.

OR

b) Find the equation of the line passing through $(-3, 6)$ and making intercepts on the axes equal in magnitude but opposite in sign.

SECTION - D

Note : i) Answer all questions, choosing either (a) or (b) in each question.

ii) Each question carries five marks. 4 × 5 = 20

30. a) Prove that $\frac{\sin A}{1 + \cos A} + \frac{\sin A}{1 - \cos A} = 2 \operatorname{cosec} A.$

OR

b) From the top of a cliff the angles of depression of the top and bottom of a tower of height 400 m are seen to be 45° and 60° . Find the height of the cliff.

31. a) Calculate the S.D. for the following data :

24, 32, 27, 40, 34, 29.

OR

b) Two dice are rolled and the products of the numbers found. What is the probability that the product so found is a prime number or an odd number ?

32. a) Find X and Y if $X + Y = \begin{bmatrix} 3 & 1 \\ -4 & 5 \end{bmatrix}$ and $X - Y = \begin{bmatrix} 5 & 3 \\ 2 & -7 \end{bmatrix}.$

OR

b) If $P = \begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 0 \\ 0 & 3 & 1 \end{bmatrix}$ and $Q = \begin{bmatrix} 0 & 1 & 3 \\ 2 & 1 & 1 \\ 1 & 0 & 2 \end{bmatrix}$ show that $PQ \neq QP.$

33. a) Write a BASIC program to find area of circle where its radius is given.

OR

b) Draw a flowchart to find area of a rectangle whose length and breadth are given.

SECTION - E

Note : i) Answer the question, choosing *one* of the alternatives (a) or (b).

ii) The question carries *ten* marks. $1 \times 10 = 10$

34. a) Construct a pair of tangents to a given circle of diameter 7 cm from a point 5 cm away from the centre. Measure the length and verify it.

OR

- b) Construct a rectangle of length 5 cm and breadth 4 cm and enlarge it such that the areas should be in the ratio 1 : 3.

SECTION - F

Note : i) Answer the question, choosing *one* of the alternatives (a) or (b).

ii) The question carries *ten* marks. $1 \times 10 = 10$

35. a) Draw the 'less than Ogive' and find median for the following data :

Class :	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30
Frequency :	4	2	8	12	10	6

OR

- b) Draw the 'greater than Ogive' and find the median for the following data :

Class :	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Frequency :	5	7	10	8	16