6758

Register Number

MATHEMATICS — Paper II

Time Allowed : $2\frac{1}{2}$ Hours] [Maximum Marks : 100

Note : i) The question paper consists of *six* Sections– **A, B, C, D, E** and **F.**

ii) Read the instructions under each Section before you start answering.

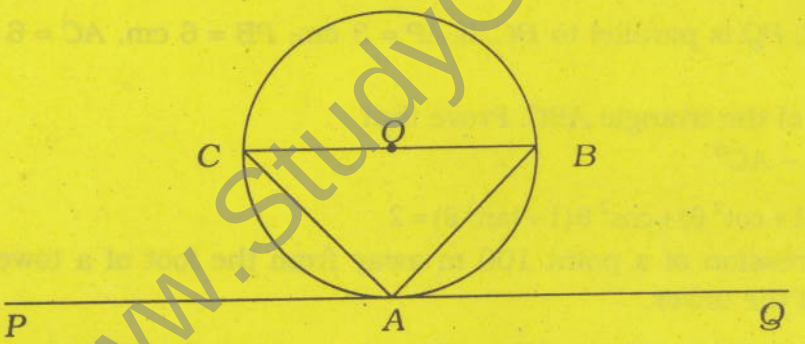
iii) Diagrams should be drawn, wherever necessary.

iv) Rough work and calculations should be shown legibly at the bottom of the pages in the answer-book.

SECTION – A

Note : Answer *all* the questions. $10 \times 1 = 10$

1. In the figure, PQ is a tangent at A. If CB is a diameter of the circle and $m\angle PAC = 60°$ then $m\angle ACB$ is



1) 60° 2) 30° 3) 150°

2. In ΔABC, $m\angle A = 90°$ and $AD \perp BC$. If $BD = 9$ units, $DC = 4$ units then AD is equal to

1) 36 units 2) 13 units 3) 6 units

3. Slope of the line which is perpendicular to the line $6x + 9y - 7 = 0$ is

1) $-\frac{2}{3}$ 2) $\frac{3}{2}$ 3) $\frac{6}{9}$

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4. The point of intersection of the medians of a triangle whose vertices are (9, –4) (–2, 5) and (5, 2) is

   1) (12, 3) 2) $\left(6, \frac{3}{2}\right)$ 3) (4, 1)

5. If $\tan 57° = \cot x°$, then the value of x is equal to

   1) 33° 2) 123° 3) 57°

6. $(\sec A - 1)(\sec A + 1)$ is equal to

   1) $\cot^2 A$ 2) $\text{cosec}^2 A$ 3) $\tan^2 A$

7. When two coins are tossed the probability of getting no heads is

   1) $\frac{1}{4}$ 2) $\frac{1}{2}$ 3) 0

8. The range of first ten odd natural numbers is

   1) 9 2) 18 3) 20

9. The order of AB is 3×4 and the order of A is 3×2, then the order of B is

   1) 2×3 2) 2×4 3) 4×3

10. REM is the short form of

    1) remainder 2) remember 3) remark

SECTION – B

Note : Answer any *ten* questions. $10 \times 3 = 30$

11. The tangent drawn from a point P, at a distance of 13 cm from the centre of a circle, is of length 12 cm. Calculate the diameter of the circle.

12. In a triangle ABC, PQ is parallel to BC. If $AP = 3$ cm, $PB = 6$ cm, $AC = 6$ cm, find QC.

13. AD is an altitude of the triangle ABC. Prove that $BD^2 - CD^2 = AB^2 - AC^2$

14. Prove that $\sin^2\theta(1+\cot^2\theta) + \cos^2\theta(1+\tan^2\theta) = 2$

15. The angle of depression of a point 100 m away from the foot of a tower is 60°. Find the height of the tower.

16. Find the value of $\sin 28° \sec 62° + \tan 35° \tan 55°$ without using the table.

17. Determine the value of x, if the line with slope $\frac{3}{2}$ contains the points $(x, 8)$ and $(-3, -4)$.

18. If the centre of a circle is (2, – 6) and one end point of a diameter is (1, –1), find the other end.

19. Find the area of the rectangle whose vertices are (1, 2), (–2, 5), (0, 7) and (3, 4).

20. If $A = \begin{bmatrix} 2 & 3 \\ -1 & 0 \\ 4 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ -1 & 2 \\ 0 & 3 \end{bmatrix}$, find $3A - 2B$.

21. Construct a 2×3 matrix whose elements are given by $a_{ij} = i - j$.

22. Find the variance of the numbers 1, 3, 5, 7 and 9.

23. In a single throw of two dice, find the probability of getting two numbers whose sum is 9.

24. One number is chosen out of the numbers 11, 12, 13, ... 20. What is the probability that the number chosen is not a prime number.

25. Write the output of the following program :

```
10  READ A, B
20  LET X = A * B
30  LET Y = X ^ 3
40  PRINT Y
50  DATA 1, 5
60  END
```

SECTION – C

Note : Answer all the questions choosing either (a) or (b) in each question. $4 \times 5 = 20$

26. a) State and prove Basic Proportionality theorem.

Or

b) State and prove SAS similarity theorem.

27. a) In ΔABC, AD is drawn perpendicular to BC. Prove that $AB^2 + CD^2 = AC^2 + BD^2$.

Or

b) Two circles intersect at A and B. A common tangent touches the circles at P and R. Prove that $m\angle PAR + m\angle PBR = 180°$.

28. a) Find the equation of the line through (–5, 2) and perpendicular to the line $3x - 4y + 11 = 0$.

Or

b) A line passing through the point (3, –11) makes intercepts on the axes in the ratio 3 : 5. Find the equation of the line.

29. a) Two consecutive vertices of a parallelogram are (3, 2) and (5, 4). If the diagonals intersect at (2, 4), find the other two vertices.

Or

b) The line segment joining A and B is divided externally by the point (– 4, 4) in the ratio 4 : 5. If A is (0, – 4) , find B.

SECTION – D

Note : Answer all questions choosing either (a) or (b) in each question. $4 \times 5 = 20$

30. a) Show that : $\tan^2 x - \sin^2 x = (\cos x - \sec x)^2$

Or

b) On walking 50 m away from a chimney in a horizontal line through its base, the angle of elevation of the top of the chimney changes from 45° to 30°. Find the height of the chimney.

31. a) Solve $x + 2y = \begin{bmatrix} 6 & 7 \\ 8 & 2 \end{bmatrix}$, $x + 3y = \begin{bmatrix} 7 & 10 \\ 8 & 6 \end{bmatrix}$

Or

b) Find x and y, if $\begin{bmatrix} 3 & 2 \\ 5 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 7 \end{bmatrix}$

32. a) A die is thrown twice. Find the probability of getting a sum 6 or 10 or 12.

Or

b) Find the range and standard deviation of the numbers 22, 18, 32, 27, 20 and 25.

33. a) Write a BASIC program to find the compound interest, given the principal, number of years and rate of interest.

Or

b) Draw a flowchart to find the volume of a cylinder, given the height and base radius of the cylinder.

SECTION – E

Note : Answer the question choosing one of the alternatives (a) or (b). $1 \times 10 = 10$

34. a) Construct a triangle PQR. Given PQ = 5.8 cm, $m\angle R = 50°$ and the median through R is of length 5 cm.

Or

b) Construct a pair of tangents to a circle of diameter 9 cm from a point 7.5 cm from the centre of the circle. Measure the tangents and verify the lengths.

SECTION – F

Note : Answer the question choosing either (a) or (b). $1 \times 10 = 10$

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

Marks	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
No. of students	2	4	8	16	10	7	5

Or

b) Find the median using 'greater than ogive' :

Wages in Rs.	40 – 80	80 – 120	120 – 160	160 – 200	200 – 240	240 – 280
No. of persons	6	10	18	24	11	5