8158

Register Number | | | | | | |

MATHEMATICS — Paper II

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

Instruction : Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

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.

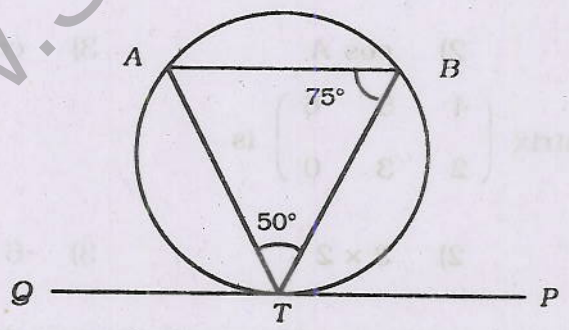
iii) Diagrams should be drawn, wherever necessary.

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 *ten* questions. $10 \times 1 = 10$

1. In the figure, *PT* is a tangent to the circle. If $\angle ATB = 50°$ and $\angle ABT = 75°$, then $\angle BTP =$



1) 50° 2) 55° 3) 40°.

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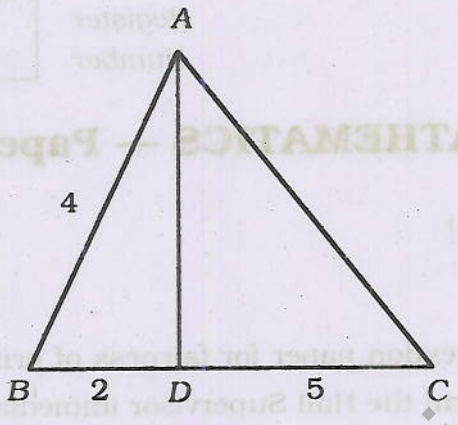
2. In the figure, AD bisects $\angle BAC$, then AC =



1) 10 2) 5 3) 20.

3. The slope of the line $3x - y - 8 = 0$ is

1) -3 2) 3 3) 8.

4. The centroid of the triangle whose vertices are (1, 2), (2, 3) and (3, 4) is

1) (3, 4) 2) $\left(\begin{matrix} 5 & 5 \\ 2 & 2 \end{matrix}\right)$ 3) (2, 3).

5. The value of $\frac{\tan 25^\circ}{\cot 65^\circ}$ =

1) 0 2) 1 3) 25.

6. $\frac{\text{cosec } A}{\sec A}$ =

1) $\tan A$ 2) $\cos A$ 3) $\cot A$.

7. The order of the matrix $\left(\begin{matrix} 4 & 5 & 6 \\ 2 & 3 & 0 \end{matrix}\right)$ is

1) 2×3 2) 3×2 3) 6×1.

8. The probability of getting a prime number in throwing a die once is

1) $\frac{1}{2}$ 2) $\frac{1}{6}$ 3) $\frac{4}{6}$.

9. The range of 10, 6, 18, 22, 5, 9 is

   1) 10 2) 12 3) 17.

10. Which one of the following is a valid variable name ?

   1) REM

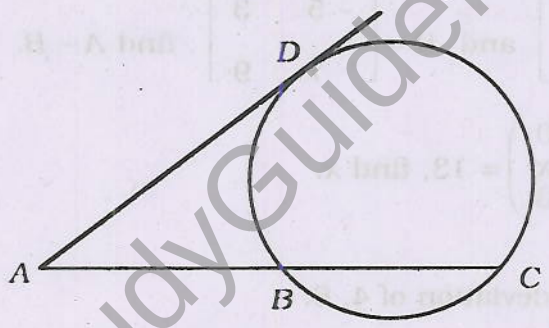
   2) AVG

   3) LET.

SECTION – B

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

11. In the figure, AD is a tangent and AC is a secant. If $AB = 4$, $BC = 5$, find AD.



12. $\Delta ABC \sim \Delta DEF$, $AB = 8$, $DE = 12$, area of ΔABC = 12 sq.units. What is the area of ΔDEF ?

13. In ΔABC, DE is parallel to BC, $AD = 2$, $DB = 5$, $EC = 4$, find AE.

14. Find the slope of the line perpendicular to $3x + 4y = 3$.

15. Find the equation of the line passing through (4, 5) and making equal intercepts on the axes.

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

17. Prove that $\sqrt{(1 + \cos A)(1 - \cos A)} = \sin A$.

18. The angle of depression of a point 100 m from the foot of a tree is 60°. How tall is the tree ?

19. Show that $\frac{\tan A}{\sin (90° - A) \sin A} - 1 = \tan^2 A$.

20. What is the probability that the number chosen from 11, 12, 13, 14, ... , 20 is not a prime number ?

21. A card is drawn at random. Find the probability of getting a red king.

22. If $A = \begin{bmatrix} 4 & -5 \\ -6 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} -5 & 3 \\ 7 & 9 \end{bmatrix}$, find $A - B$.

23. If $(2 \quad x \quad -1) \begin{pmatrix} 0 \\ x \\ 3 \end{pmatrix} = 13$, find x.

24. Find the standard deviation of 4, 6.

25. Write the output for the following program :

```
10  READ   X, Y, Z
20  LET    A = X * Y + ( Z + X )
30  PRINT  A
40  DATA   2, 3, 4
50  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 the Basic Proportionality theorem.

OR

b) Prove that if two triangles are equiangular to one another the two triangles are similar.

27. a) $ABCD$ is a trapezium with $AB \parallel CD$. E is the mid-point of AD. Prove that the line drawn parallel to AB through E bisects BC.

OR

b) In ΔABC, D is a point on BC such that $\angle ADC = \angle BAC$. Prove that $AC^2 = BC \cdot DC$.

28. a) Find the equation of the altitude through B of the triangle ABC whose vertices are $A(-5, 7)$, $B(-5, -5)$ and $C(2, 1)$.

OR

b) Find the ratio in which the line joining the points $(-2, 6)$ and $(6, 7)$ is divided by the x-axis.

29. a) The area of a triangle whose vertices are (1, 2), (2, 1) and (x, 3) is 5 sq.units. Find the value of x.

OR

b) If the line containing the points (a, 2) and (0, 5) is parallel to the line joining the points (0, 0), (– 5, 3), find a.

SECTION – D

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

$4 \times 5 = 20$

30. a) Prove that

$$\frac{\tan \theta}{\sec \theta - 1} - \frac{\tan \theta}{\sec \theta + 1} = 2 \cot \theta.$$

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) Calculate the standard deviation for the numbers

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

OR

b) A natural number less than or equal to 20 is chosen. Find the probability that it is even or a multiple of 5.

32. a) Solve for x and y if

$$x + 2y = \begin{bmatrix} 4 & 6 \\ -8 & 10 \end{bmatrix}, \quad x - y = \begin{bmatrix} 1 & 0 \\ -2 & -2 \end{bmatrix}.$$

OR

b) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, show that $A^2 - 4A - 5I = 0$.

33. a) Write a BASIC program to find the volume of a cylinder whose height and radius are given.

OR

b) Draw a flow chart to find the circumference of a circle.

SECTION – E

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

$1 \times 10 = 10$

34. a) Find the mean proportion between two straight line segments of length 9 cm and 4 cm and verify.

OR

b) Construct a ΔPQR such that $PQ = 5{\cdot}7$ cm, vertical angle $\angle R = 52$ and the median through R is 5 cm.

SECTION – F

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

$1 \times 10 = 10$

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

Class :	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30
Frequency :	7	18	25	30	15	5

OR

b) Draw the 'less than ogive' and find the median for the following :

Class :	6 – 12	12 – 18	18 – 24	24 – 30	30 – 36	36 – 42
Frequency :	7	3	5	9	6	2