3459

Register Number | | | | | | |

MATHEMATICS — Paper II

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

N. B. : 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.

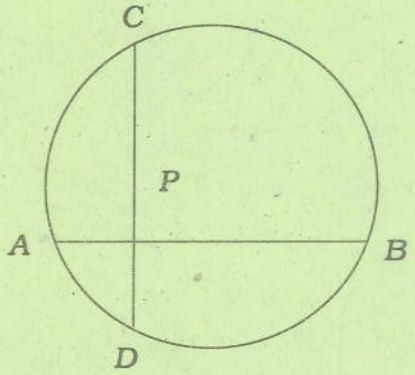
iii) Diagrams should be drawn, wherever necessary.

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 given figure, if $CP = 8$ units, $DP = 3$ units, $AP = 4$ units, then BP is equal to



a) 20 units

b) 12 units

c) 6 units.

[Turn over

2. The corresponding sides of two similar triangles are in the ratio 3 : 4. What is the ratio of their areas ?

a) 3 : 4

b) 9 : 16

c) 27 : 64.

3. The slope of a straight line is $1 / \sqrt{3}$. Its inclination is

a) 45°

b) 60°

c) 30°.

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

a) (2, 2)

b) (3, 3)

c) (0, 1).

5. $\frac{\sec \theta}{\operatorname{cosec} \theta} =$

a) $\cot \theta$

b) $\tan \theta$

c) $\frac{1}{\cos^2 \theta}$.

6. The value of $\frac{\cos 81°}{\sin 9°} =$

a) $\frac{1}{\sqrt{3}}$

b) 1

c) $\sin^2 9°$.

7. The Range of 10, 18, 5, 12, 3 is

   a) 13 b) 15 c) 12.

8. If A is of order 2×3, B is of order 3×4, then the order of AB is

   a) 4×2 b) 2×4 c) 4×3.

9. The set of all possible outcomes of a random experiment is called

   a) sample space

   b) set of events

   c) set of outcomes.

10. Which one of the following is a valid expression ?

    a) $8 - 2 + - 7$

    b) $A * * 6$

    c) $2\pi R$.

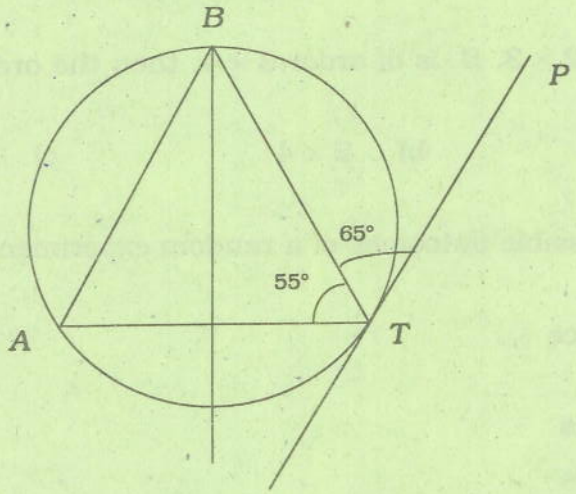
SECTION – B

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

11. In a triangle ABC, PQ is parallel to BC. If $AP = 4$ units, $PB = 7$ units, $AQ = 3$ units, find QC.

12. ABC is an equilateral triangle and AD is the perpendicular from A to BC. Prove that $AD^2 = 3\,BD^2$.

13. In the figure PT is a tangent to a circle. If $\angle PTB = 65°$, and $\angle BTA = 55°$, find $\angle ABT$.



14. Prove that $(\cos\theta - \sin\theta)^2 + (\cos\theta + \sin\theta)^2 = 2$.

15. Show that $\sin x \cdot \sec(90° - x) - \cot x \cdot \cot(90° - x) = 0$.

16. From the top of a tower 30 m high a person observes the base of a tree at an angle of depression measuring 45°. Find the distance between the tree and the tower.

17. Find the slope of a line perpendicular to the line joining the points $(-1, 4)$ and $(6, 3)$.

18. Find the equation of the line passing through $(-2, 5)$ and with slope $\frac{3}{4}$.

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

20. Find the S.D.of 2, 2, 2.

21. Two coins are tossed. Find the probability of getting

i) exactly two heads

ii) only one tail.

22. From a pack of 52 cards two cards are drawn successively with replacement.

Find the probability that the first card is a Queen and second is a Jack.

23. If $A = \begin{bmatrix} 4 & 6 \\ -3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -2 \\ 1 & 0 \end{bmatrix}$, find $3A - 2B$.

24. Find x and y if $\begin{pmatrix} 3x + y \\ x - 2y \end{pmatrix} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$.

25. Write the output for the following program :

```
10  READ   A, B, C
20  LET    X = A * * B + A * * C
30  PRINT  X
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 *BPT*.

OR

b) State and prove *A A A* similarity theorem.

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

OR

b) *ABC* is an isosceles triangle with $\angle B = \angle C$. The bisectors of $\angle B$ and $\angle C$ meet the opposite sides at *P* and *Q*. Prove that $PQ \parallel BC$.

28. a) If the line that contains $(a, -4)$ and $(0, -1)$ is perpendicular to the line that contains $(-5, 1)$ and $(-2, -1)$ find a.

OR

b) Find the equation of the line passing through $(-2, 4)$ and making an intercept on y-axis twice as long as that on x-axis.

29. a) If $A(3, 5)$, $B(-3, 4)$ and $C(2, -7)$ are the vertices of a triangle, find the equation of the median through *C*.

OR

b) Find the ratio in which the line joining the points $(3, 4)$ and $(5, -2)$ is divided by the y-axis.

SECTION – D

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

$4 \times 5 = 20$

30. a) Prove that $\frac{\tan\theta}{1-\cot\theta} = \frac{\cot\theta}{1-\tan\theta} = (\sec\theta \operatorname{cosec}\theta + 1)$.

OR

b) The angle of elevation of the top of a tower from a point on the ground level is 30°. On walking 40 m towards the tower, the angle of elevation is found to be 45°. Find the height of the tower.

31. a) Compute S.D. for the following frequency distribution :

X :	10	20	30	40	50	60	70
F :	3	6	9	13	10	7	2

OR

b) A die is thrown twice. Find the probability of getting the sum 5 or 9.

32. a) Solve : $\begin{bmatrix} 2 & -1 \\ 3 & 6 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 7 \end{bmatrix}$.

OR

b) If $A = \begin{bmatrix} -2 & -4 \\ 3 & 6 \end{bmatrix}$, find $f(A)$ where $f(x) = x^2 - 5x + 7$.

33. a) Write the BASIC program to find the area of a circle given the radius.

OR

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

SECTION – E

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

$1 \times 10 = 10$

34. a) Draw the tangents from a point 5 cm away from the centre of a circle of radius 3 cm and verify the length of the tangent arithmetically.

OR

b) Draw a triangle ABC with $AB = 5$ cm, $\angle A = 60°$ and $\angle B = 45°$ and enlarge it such that the sides are in the ratio 1 : 2.

SECTION – F

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

$1 \times 10 = 10$

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

C.I :	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	30 – 35	35 – 40
f :	4	7	12	18	15	11	6	3

OR

b) Find the median of the following distributions using both the ogives :

Scores :	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Frequency :	8	12	20	15	6