8558

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

   ii) ʻDiagrams should be drawn, wherever necessary.

   iii) 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, TPT' is a tangent to the circle. PA, PB and AB are chords. If $\angle TPA = 70°$ and $\angle PAB = 60°$, then $\angle APB$ is equal to
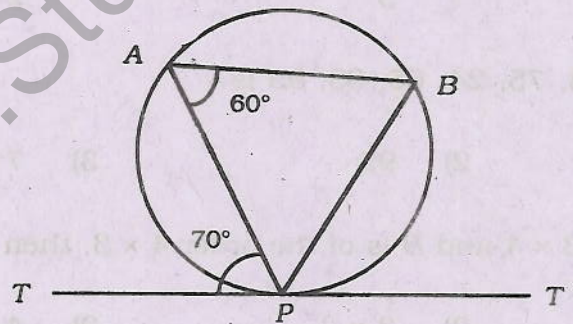
   1) 50°   2) 60°   3) 70°.

[Turn over

2. Tangents at the extremities of a diameter of a circle are

     1)   perpendicular to each other

     2)   parallel to each other

     3)   not perpendicular to each other.

3. The slope of a line parallel to y-axis is

     1)   – 1   2)   infinity   3)   0.

4. The angle of inclination of a line whose slope is $\frac{1}{\sqrt{3}}$ is

     1)   30°   2)   45°   3)   60°.

5. If $\sin x = \cos y$, then the value of $x + y$ is

     1)   45°   2)   30°   3)   90°.

6. If the angle of elevation of the top of a tower from a point on the ground 100 m away from the foot of the tower is 60°, then the height of the tower is

     1) $100\sqrt{3}$ m   2) $\frac{100}{\sqrt{3}}$ m   3) $10\sqrt{3}$ m.

7. If a dice is rolled the probability of getting a number greater than 3 is

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

8. The range of 55, 74, 75, 24, 65, 83, 95 is

     1)   24   2)   95   3)   71.

9. If A is of the order 3×4 and B is of the order 4×3, then BA is of the order

     1) 4×4 2) 3×3 3) 4×3.

10. Which one of the following is an Assignment statement ?

     1)   REM   2)   LET   3)   END.

SECTION – B

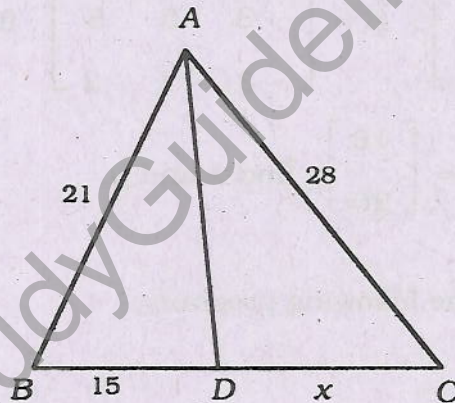*Note :* Answer any *ten* of the following questions. 10 × 3 = 30

11. In the figure, $PQ \parallel BC$. If $AP = 3$, $PB = 6$ and $AQ = 2$, then find QC.
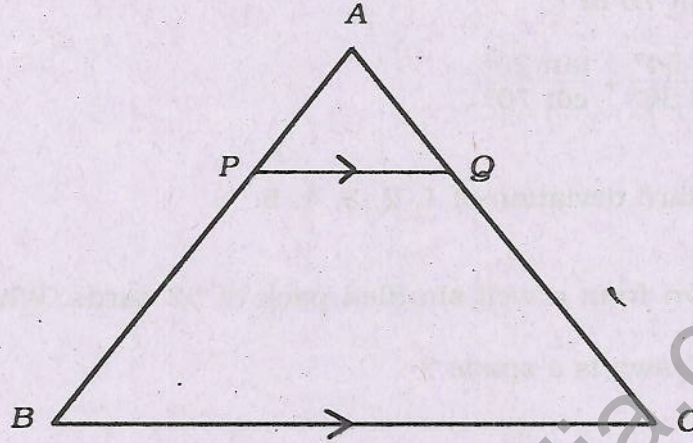
12. In the figure, AD bisects $\angle BAC$, find x.

13. If a circle touches the sides of a quadrilateral $ABCD$, prove that

$AB + CD = BC + AD$.

14. Find the equation of a straight line through $(-3, 4)$ with the slope $\frac{3}{2}$.

15. If $(x, -5)$, $(-5, 1)$ and $(-1, 2)$ are collinear, find x.

16. Find the equation of a line passing through $(-3, 1)$ and $(2, -4)$.

[Turn over

17. Prove that $\dfrac{1}{1 - \sin\theta} + \dfrac{1}{1 + \sin\theta} = 2\sec^2\theta$.

18. When the sun is at an altitude of 30°, what is the length of the shadow of a hillock of height 70 m ?

19. Evaluate : $\dfrac{\cot 54°}{\tan 36°} + \dfrac{\tan 20°}{\cot 70°}$.

20. Find the standard deviation of 1, 2, 3, 4, 5.

21. A card is drawn from a well shuffled pack of 52 cards. What is the probability that the card drawn is a spade ?

22. In tossing a coin twice, find the probability of getting only one head and one tail.

23. If $A = \begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 0 \\ 0 & 3 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 2 & 1 \\ 3 & 5 & 6 \\ -3 & -1 & 2 \end{bmatrix}$, find $3A - 2B$.

24. If $\begin{bmatrix} 0 & 4 \\ -2 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 16 \\ 20 \end{bmatrix}$, find x and y.

25. Write the output for the following program :

```
10 READ    A, B, C

20 LET     D = A – B

30 LET     E = D * C

40 PRINT   E

50 DATA    7, 3, 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 the Tangent Chord theorem.

OR

    b) State and prove *SAS* similarity theorem.

27. a) In a quadrilateral *PQRS*, the bisectors of $\angle Q$ and $\angle S$ intersect on *PR* at *O*.

    Prove that $\dfrac{PQ}{QR} = \dfrac{PS}{SR}$.

OR

    b) In ΔABC, $AB = AC$. From the *P* on *BC* the line *PQ* and *PR* are drawn

    perpendicular to *AC* and *AB* respectively. Prove that $BR \cdot PQ = PR \cdot CQ$.

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) Prove that (2, – 4), (– 2, 8), (10, 16) and (14, 4) form a parallelogram.

[Turn over

29. a) Find the area of a rectangle whose vertices are

(1, 2), (– 2, 5), (0, 7) and (3, 4).

OR

b) 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).

SECTION – D

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

$4 \times 5 = 20$

30. a) Prove that $\dfrac{\sin \theta}{1 + \cos \theta} + \dfrac{1 + \cos \theta}{\sin \theta} = 2 \csc \theta$.

OR

b) The angles of depression of two buoys from either side of the top of a hill

100 m high are 30° and 45°. Find the distance between the two buoys if the

buoys are in a straight line with the foot of the hill.

31. a) A number is chosen from the first fifteen even natural numbers. What is

the probability that the number chosen is divisible by 4 or 6 ?

OR

b) Find the standard deviation for the following frequency distribution :

x :	4	5	6	7	8
f :	5	6	7	8	4

32. a) Find x and y, if $3x - 2y = \begin{bmatrix} 2 & -6 \\ 9 & -2 \\ -5 & 5 \end{bmatrix}$ and $3y = \begin{bmatrix} -3 & 0 \\ 9 & 3 \\ 3 & -3 \end{bmatrix}$.

OR

b) If $A = \begin{pmatrix} 1 & 3 \\ -2 & 4 \end{pmatrix}$ find $A^2 - 5A + 6I$.

33. a) Write a Basic program to find the volume of a sphere given radius r.

OR

b) Draw a flow chart to find the area of a rectangle.

SECTION – E

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

10

34. a) Construct a pair of tangents to a circle of radius 5 cm from a point 13 cm away from the centre of the circle and verify the length of the tangents arithmetically.

OR

b) Draw a triangle ABC with sides 3·5 cm, 4 cm, 5·5 cm and enlarge it such that the areas are in the ratio 1 : 4.

[Turn over

SECTION – F

Note : Answer the question, choosing *one* of the alternatives *(a)* or *(b)*. 10

35. a) Find the median using 'less than ogive' for the following data :

Marks :	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
No. of Students :	5	12	25	18	5

OR

b) Draw the median graphically using 'greater than ogive' for the following distribution :

Class-Interval :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency :	3	7	12	15	9	4