3959

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.

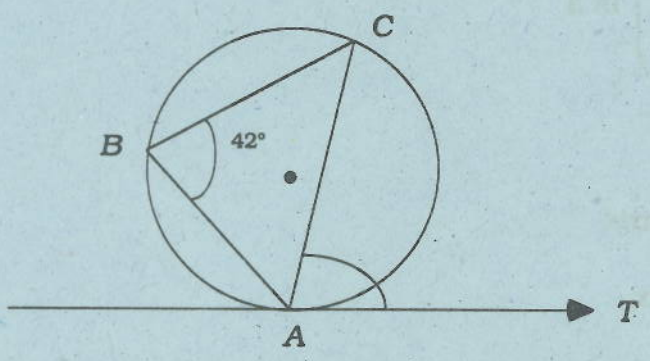
iv) Rough work and calculations should be shown legibly at the bottom of the pages in the answer-book.

SECTION – A

Note : i) Answer *all* the *ten* questions.

ii) Each question carries *one* mark. $10 \times 1 = 10$

1. In the diagram AT is a tangent to the circle at A. If $\angle ABC = 42°$, then $\angle CAT$ is equal to



a) 48° b) 42° c) 138°.

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2. The areas of two similar triangles are in the ratio 16 : 9. Then the ratio of their sides is equal to

a) 256 : 81 b) 16 : 9 c) 4 : 3.

3. The equation of the line with slope $-\frac{4}{3}$ and y-intercept $\frac{5}{3}$ is

a) $4x + 3y - 5 = 0$

b) $4x + 3y + 5 = 0$

c) $4x - 3y + 5 = 0$.

4. The equation of the line parallel to and 3 units below the x-axis, is

a) $y = 0$ b) $y - 3 = 0$ c) $y + 3 = 0$.

5. If $\tan 50° = \cot x$, then x is equal to

a) 50° b) 90° c) 40°.

6. $\sin x \times \cos (90° - x) + \cos x \times \sin (90° - x)$ is equal to

a) 0

b) 1

c) – 1.

7. $\begin{pmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{pmatrix}$ is a

a) unit matrix

b) diagonal matrix

c) scalar matrix.

8. The range of the first twenty odd natural numbers is

a) 38 b) 19 c) 20.

9. The probability of getting a king of spades is

a) $\frac{1}{4}$

b) $\frac{1}{52}$

c) $\frac{1}{13}$.

10. Which is the cause for Syntax error ?

a) Invalid Statement Number

b) Zero

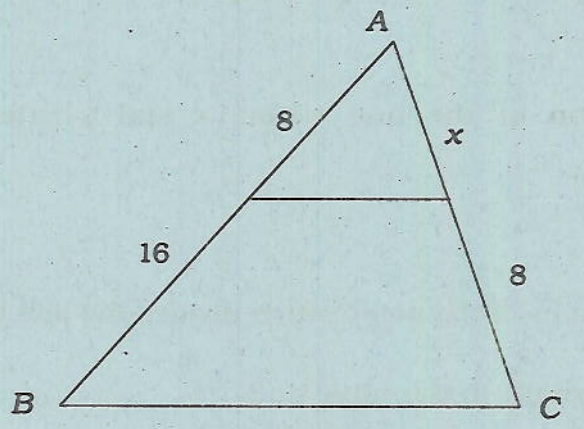
c) Misspell of keyword.

SECTION – B

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

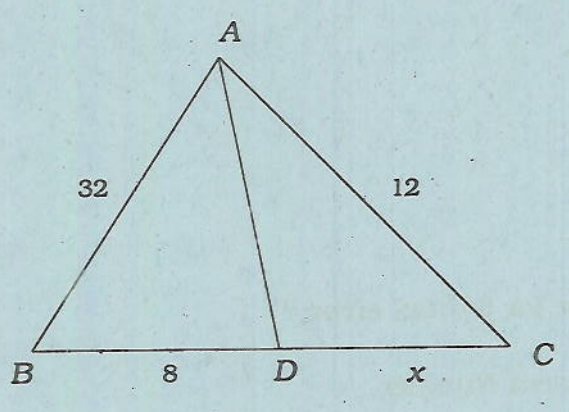
ii) Each question carries *three* marks. $10 \times 3 = 30$

11. Find the value of x in the following figure :



12. A chord of a circle of radius 17 cm is of length 30 cm. Find the distance of the chord from the centre.

13. In the figure, AD is the bisector of $\angle BAC$. Find x.



14. Prove that $\frac{\cot x}{\cos x} + \frac{\sec x}{\cot x} = \text{cosec } x \sec^2 x$.

15. Show that $\frac{\sin 39°}{\cos 51°} = \frac{\cos 51°}{\sin 39°}$.

16. At a distance of 80 m from the foot of a tower, the angle of elevation of its top is 60°. Find the height of the tower.

17. Find the equation of straight line passing through $(-2, -3)$ making an angle 30° with the x-axis.

18. Find the equation of the line whose x and y intercepts are 4 and -5 respectively.

19. Find the co-ordinates of the point which divides the line joining the points $(2, 3)$ and $(-2, 5)$ externally in the ratio 1 : 3.

20. If $A = \begin{pmatrix} 7 & 2 \\ 8 & 6 \\ 9 & -6 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & -7 \\ 3 & 1 \\ -8 & 5 \end{pmatrix}$, then find $2A - 3B$.

21. Solve $\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$.

22. Find the standard deviation of 4 and 6.

23. Three coins are tossed together. Find the probability of getting at least one head.

24. A card is drawn from a well shuffled pack of 52 playing cards. What is the probability that the card drawn is a picture card ?

25. Find the output of the following expression :

($A + B * * 3$) / C, where $A = 5$, $B = 3$, $C = 4$.

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 SAS Similarity theorem.

27. a) In a quadrilateral $PQRS$, the bisectors of $\angle Q$ and $\angle S$ intersect on PR at O. Prove that $\frac{PQ}{QR} = \frac{PS}{SR}$.

OR

b) Prove that the altitude on the hypotenuse of a right triangle is equal to the product of the sides containing the right angle divided by the hypotenuse.

28. a) Find the equation of the line through (1, – 3) and (3, 4). Also find the equation of the line, perpendicular to the above line and passing through (– 5, – 1).

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

OR

b) The centroid of a triangle is (0, 3) and two of its vertices are (– 4, 6) and (2, – 2). Find the area of the triangle.

SECTION – D

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

ii) Each question carries *five* marks. $4 \times 5 = 20$

30. a) Prove that :

$$\frac{\cos \theta}{1 - \tan \theta} + \frac{\sin \theta}{1 - \cot \theta} = \sin \theta + \cos \theta.$$

OR

b) The peak of a mountain was observed from the top and bottom of a hillock of height 200 m at angles of elevation 45° and 60° respectively. Find the height of the mountain.

31. a) Solve : $3X + Y = \begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix}$, $X - Y = \begin{pmatrix} 6 & 1 \\ 9 & -12 \end{pmatrix}$.

OR

b) If $A = \begin{pmatrix} 2 & 4 & 1 \\ 3 & 2 & 1 \\ 1 & -1 & 2 \end{pmatrix}$, find $f(A)$ where $f(x) = x^2 - 5x + 7$.

32. a) Find the Standard deviation of the following data :

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

OR

b) A problem in Mathematics is given to three students A, B and C whose chances of solving it are $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{5}$ respectively. Find the probability that the problem would be solved.

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

OR

b) Write a BASIC program to find the area of a rectangle.

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 triangle ABC such that base $AB = 6$ cm, vertical angle $\angle C = 50°$ and the median through C is of length 5·2 cm.

OR

b) Construct a quadrilateral $PQRS$ with $PQ = 3{\cdot}5$ cm, $\angle QPS = 100°$, $PS = 4$ cm and $QR = RS = 4{\cdot}5$ cm and enlarge it so that the ratio of the areas is 1 : 4.

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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 'greater than ogive' and find the median for the following data :

Class :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency :	12	23	34	20	11

OR

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

Class :	0 – 50	50 – 100	100 – 150	150 – 200	200 – 250	250 – 300
Frequency :	2	8	15	24	10	4