

RIYALUR DISTRICT

Registor Number :

010301

## SECOND MID TERM EXAMINATION - 2024

Std: 10

MATHEMATICS

Marks : 50

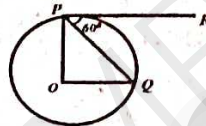
Time : 1.30 hr

## PART - A

## I. Choose the best answer

7x1=7

- If number of columns and rows are not equal in a matrix then it is said to be a
  - diagonal matrix
  - rectangular matrix
  - square matrix
  - identity matrix
- If A is a  $2 \times 3$  matrix and B is a  $3 \times 4$  matrix how many columns does AB have.
  - 3
  - 4
  - 2
  - 5
- A tangent is perpendicular to the radius at the
  - centre
  - point of contact
  - infinity
  - chord
- In figure if PR is tangent to the circle at P and O is the centre of the circle, then  $\angle POQ$  is
  - $120^\circ$
  - $100^\circ$
  - $110^\circ$
  - $90^\circ$



- A tower is 60m high. Its shadow reduces by x meters when the angle of elevation of the sun increases from  $30^\circ$  to  $45^\circ$  then x is equal to
  - 41.92m
  - 43.92m
  - 43m
  - 45.6m
- If the radius of the base of a cone is tripled and the height is doubled then the volume is
  - made 6 times
  - made 18 times
  - made 12 times
  - unchanged
- The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is
  - 1 : 2 : 3
  - 2 : 1 : 3
  - 1 : 3 : 2
  - 3 : 1 : 2

## PART - B

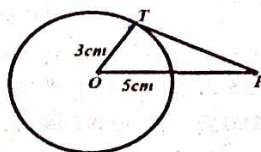
## II. Answer any five questions only [Q. No. 14 is compulsory]

5x2=10

8. If  $A = \begin{bmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{bmatrix}$ ,  $B = \begin{bmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{bmatrix}$  find the value of  $B-5A$ .

9. If  $A = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$  then verify  $(A^T)^T = A$

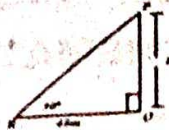
10. Find the length of the tangent drawn from a point whose distance from the centre of a circle is 5cm and radius of the circle is 3 cm.



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11. A tower stands vertically on the ground. From a point on the ground, which is 48 cm away from the foot of the tower, the angle of elevation of the top of the tower is  $30^\circ$ . Find the height of the tower.



12. If the base area of a hemispherical solid is 1386 sq. Meters then find its total surface area?
13. The volume of a solid right circular cone is  $11088\text{cm}^3$ . If its height is 14cm then find the radius of the cone.
14. Find the angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of a tower of height  $10\sqrt{3}\text{m}$

**PART - C**

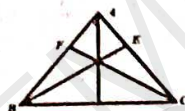
III. Answer any five questions [Q. No. 21 is compulsory]

5x5=25

15. Find X and Y if and  $X + Y = \begin{bmatrix} 7 & 0 \\ 3 & 5 \end{bmatrix}$  and  $X - Y = \begin{bmatrix} 3 & 0 \\ 0 & 4 \end{bmatrix}$

16. Given that  $A = \begin{bmatrix} 1 & 3 \\ 5 & -1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 5 & 2 \end{bmatrix}$ ,  $C = \begin{bmatrix} 1 & 3 & 2 \\ -4 & 1 & 3 \end{bmatrix}$  verify that  $A(B+C) = AB+AC$

17. Show that in a triangle, the medians are concurrent.



18. Two ships are sailing in the sea on either sides of a light house. The angle of elevation of the top of the lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are  $30^\circ$  and  $45^\circ$  respectively. If the lighthouse is 200m high. Find the distance between the hero ships. ( $\sqrt{3} = 1.732$ ).



19. From a window (h metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are  $\theta_1$  and  $\theta_2$  respectively show that the height of the opposite house is  $h \left( 1 + \frac{\cot \theta_2}{\cot \theta_1} \right)$

20. The internal and external diameter of a hallow hemispherical shell are 6cm and 10cm respectively. If it is melted and recast into solid cylinder of diameter 14cm, then find the height of the cylinder.

21. If  $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{bmatrix}$  show that  $(AB)^T = B^T A^T$

**PART - D**

IV. Answer any one :

1x8=8

22. a) Draw the two tangents from a point which is 5cm away from the centre of a circle of diameter 6 cm Also measure the lengths of the tangents. (OR)
- b) Discuss the nature of solutions of the following quadrate equation.  
 $x^2+x-12=0$

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