SECOND MIDTERM EXAMINATION NOVEMBER-2024

CLASS :10 **MATHEMATICS**

MARKS : 50 TIME :1.30 HRS

Part-I 7X1=7

i) Answer all the questions.

1. A graph of quadratic equation is
   A) parabola B) straight line C) circle D) rectangular hyperbola
2. If A is a 2 X 3 matrix and B is a 3 X 4 matrix, how many columns does AB have
   A) 3 B) 4 C) 2 D) 5
3. A tangent is perpendicular to the radius at the
   A) centre B) point of contact C) infinity D) chord
4. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?
   A) 13 m B) 14 m C) 15 m D) 12.8 m
5. A tower is 60m height. Its shadow reduces by x meters when the angle of elevation of the sun increases from 30^0 to 45^0 the x is equal to
   A) 41.92 m B) 43.92 m C) 43 m D) 45.6 m
6. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be
   A) 12 cm B) 10 cm C) 13 cm D) 5 cm
7. The ratio of the volume of a cylinder, a cone and a sphere, if each has the same diameter and same height is
   A) 1:2:3 B) 2:1:3 C) 1:3:2 D) 3:1:2

Part-II 5X2=10

i) Answer any five questions only. Ii) Question number 14 is compulsory.

8. Define Diagonal matrix.
9. If $A = \begin{bmatrix} 5 & -4 \\ 6 & -5 \end{bmatrix}$ then verify $A^2 = I$
10. If radii of two concentric circles are 4 cm and 5 cm then find the length of the chord of one circle which is tangent to other circle.
11. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point?

12. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height $10\sqrt{3}$ m
13. The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. Find the diameter of a cylinder.
14. The ratio of the volumes of two cones are 2 : 3. Find the ratio of their radii if the height of second cone is double the height of the first.

Part-III

5X5=25

i) Answer any five questions only. Ii) Question number 21 is compulsory

15. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then prove that; $A^2 - 5A + 7I_2 = 0$
16. State and prove Pythagoras theorem.
17. Show that in a triangle medians are concurrent.
18. From the top of a tower 50 m height, the angle of depression of the top and bottom of a tree are observed to be 30^0 and 45^0 respectively. Find the height of the tree.
    ($\sqrt{3} = 1.732$)
19. A girl wishes to prepare birthday caps in the form of right circular cones for her birthday party , using a sheet of paper area is 5720 cm^2 , how many caps can made with radius 5 cm and height 12 cm.
20. If the radii of the circular ends of a frustum which is 45 cm height are 28 cm and 7cm, Find the volume of the frustum.
21. If $A = \begin{bmatrix} 1 & 1 \\ -1 & 3 \end{bmatrix}$. $B = \begin{bmatrix} 1 & 2 \\ -4 & 2 \end{bmatrix}$, then prove that $(AB)^T = B^T A^T$

Part-IV

1x8=8

i) Answer any one of the following.

22. a) Draw the two tangent from a point which is 5 cm away from the centre of a circle of diameter 6cm. Also measure the lengths of the tangents.

    (OR)

    b) $x^2 - 8x + 16 = 0$. Find the nature of solutions.