



Standard 10 MATHEMATICS

Time: 1.30 Hrs.

Marks: 50

Part - I

Answer the following questions:

7×1=7

- 1) Transpose of a column matrix is
 - a) unit matrix
 - b) diagonal matrix
 - c) column matrix
 - d) row matrix
- 2) A tangent is perpendicular to the radius at the
 - a) centre
 - b) point of contact
 - c) infinity
 - d) chord
- 3) If A is a 3×2 matrix and B is a 4×3 matrix, how many columns does BA have
 - a) 3
 - b) 4
 - c) 2
 - d) 5
- 4) If the ratio of the height of a tower and the length of its shadow is $\sqrt{3} : 1$, then the angle of elevation of the sun has measure
 - a) 45°
 - b) 30°
 - c) 90°
 - d) 60°
- 5) The total surface area of a hemisphere is how much times the square of its radius
 - a) π
 - b) 4π
 - c) 3π
 - d) 2π
- 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) In a triangle which Cevian that divides the angle, into two equal halves
 - a) median
 - b) altitude
 - c) angle bisector
 - d) line segment

Part - II

Answer ANY FIVE of the following questions:

5×2=10

(Q.No. 14 is compulsory)

- 8) If $A = \begin{bmatrix} 5 & 4 & 3 \\ 1 & -7 & 9 \\ 3 & 8 & 2 \end{bmatrix}$ then find the transpose of A.
- 9) Find X and Y if $X + Y = \begin{bmatrix} 7 & 0 \\ 3 & 5 \end{bmatrix}$ and $X - Y = \begin{bmatrix} 3 & 0 \\ 0 & 4 \end{bmatrix}$.
- 10) Find the length of the tangent drawn from a point whose distance from the centre of a circle is 5 cm and radius of the circle is 3 cm.
- 11) 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 $10\sqrt{3}$ m.
- 12) The volume of a solid right circular cone is 11088 cm^3 . If its height is 24 cm then find the radius of the cone.
- 13) A bird is sitting on the top of a 45m high tree. From a prey on the ground, the angle of elevation of the bird is 60° . Find the distance between the foot of the prey and the tree.

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- 14) The radius of a sphere increases by 25%. Find the percentage increase in its surface area.

Part - III

Answer ANY FIVE of the following questions:

5×5=25

(Q.No. 21 is compulsory)

15) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I_2 = 0$.

16) State and prove - Pythagoras Theorem.

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

18) From the top of a tree of height 13m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree. ($\sqrt{3} = 1.732$)

19) A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12mm and the diameter of the capsule is 3mm, how much medicine it can hold?

20) A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm, having a hemispherical cap. Find the number of cones needed to empty the container.

21) From the top of a light house, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m.

Part - IV

Answer ANY ONE of the following:

1×8=8

22) Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths.

(OR)

Draw the graph of $x^2 + x + 7 = 0$ and state their nature of solutions.
