



13. Find the diameter of a sphere whose surface area is  $154 \text{ cm}^2$ .

14. If  $A = \begin{pmatrix} 1 & 4 & 9 \\ 4 & 16 & 36 \\ 9 & 36 & 81 \end{pmatrix}$ , show that  $(A^T)^T = A$

## Part - III

5 x 5 = 25

III. Answer any 5 questions. (Q.No.21 is compulsory)

15. Define the following matrices with examples.

- Diagonal matrix of  $3 \times 3$  order. (2 marks)
- Scalar matrix of  $4 \times 4$  order. (2 marks)
- Identity matrix of  $3 \times 3$  order. (1 mark)

16. If  $A = \begin{pmatrix} 7 & 8 & 6 \\ 1 & 3 & 9 \\ -4 & 3 & -1 \end{pmatrix}$ ,  $B = \begin{pmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{pmatrix}$ , then find  $2A + B$ .

17. If  $A = \begin{pmatrix} 1 & 1 \\ -1 & 3 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & 2 \\ -4 & 2 \end{pmatrix}$ ,  $C = \begin{pmatrix} -7 & 6 \\ 3 & 2 \end{pmatrix}$ , verify that  $A(B + C) = AB + AC$

18. Two ships are sailing in the sea, on either sides of a 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 200 m height, find the distance between the two ships. ( $\sqrt{3} = 1.732$ )

19. A statue 1.6 m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is  $60^\circ$  and from the same point the angle of elevation of the top of the pedestal is  $40^\circ$ . Find the height of the pedestal.

( $\tan 40^\circ = 0.8391$ ,  $\sqrt{3} = 1.732$ )

20. The radius and height of a cylinder are in the ratio 5:7 and its curved surface area is  $5500 \text{ cm}^2$ . Find its radius and height.

21. a) If the radii of a circular ends of a frustum which is 45 cm high are 28 cm and 7 cm. Find the volume of a frustum.

(OR)

b) State and prove Pythagoras Theorem.

## Part - IV

IV. Answer any one of the following.

1 x 8 = 8

22. a) Draw the graph of  $x^2 - 9x + 20 = 0$  and state the nature of their solutions.

(OR)

b) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw two tangents to the circle from that point.

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