COMMON SECOND MID-TERM TEST - 2019

K

Standard X

Reg.No. : | | | | | | |

Time: 1.30 hours. **MATHEMATICS** Marks: 50

Part - A

I. Choose the correct answer: 7 x 1 = 7

1. Transpose of a column matrix is _____.
   a) unit matrix b) diagonal matrix c) column matrix d) row matrix
2. If A is a 2 x 3 matrix and B is 3 x 4 matrix, how many columns does AB have
   a) 3 b) 4 c) 2 d) 5
3. Two poles of height 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
4. A tangent is perpendicular to the radius at the
   a) centre b) point of contact c) infinity d) chord
5. The height of a right circular cone whose radius is 5 cm and slant height 13 cm will be
   a) 12 cm b) 10 cm c) 13 cm d) 5 cm
6. A solid sphere of radius x cm is melted and cast into a shape of a solid cone of same radius. The height of the cone is _____.
   a) $3x$ cm b) x cm c) $4x$ cm d) $2x$ cm
7. The ratio of the volumes 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 - B

II. Answer any 5 questions: (Ques.No.14 is compulsory) 5 x 2 = 10

8. A cylindrical drum has a height of 20 cm and base radius of 14 cm. Find its curved surface area and the total surface area.
9. Find the maximum volume of a cone that can be carved out of a solid hemisphere of radius 'r' units.
10. If the sum of a number and its reciprocal is $65/8$, find the number.
11. Determine the nature of roots for the equation $9x^2 - 24x + 16 = 0$
12. Construct a 3 x 3 matrix whose elements are $a_{ij} = i^2 j^2$
13. What length of ladder is needed to reach a height of 7 feet along the wall when the base of the ladder is 4 feet from the wall?
14. Verify that $A^2 = I$ when $A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$

Part - C

III. Answer any 5 questions: (Ques.No.21 is compulsory) 5 x 5 = 25

15. If a,b are real then show that the roots of the equation $(a-b)x^2 - 6(a+b)x - 9(a-b) = 0$ are real and unequal.

16. If $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$, verify that $(AB)^T = B^T \times A^T$

17. State and prove Pythagoras theorem.

18. The top of a 15 m high tower makes an angle of elevation of 60° with the bottom of an electric pole and angle of elevation 30° with the top of the pole. What is the height of the electric pole?

19. if the radii of the circular ends of a frustum which is 45 cm high are 28 cm and 7 cm. Find the volume of the frustum.

20. A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter.

21. A flock of swans contained x^2 members. As the clouds gathered 10x went to a lake and one eighth of the members flew away to a garden. The remaining three pairs played about in the water. How many swans were there in total?

Part - D

IV. Answer any one of the following: 1 x 8 = 8

22. Draw a circle of radius 4 cm. At a point L on it draw a tangent to the circle using the alternate segment.

(or)

Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the two tangents P_A and P_B to the circle and measure their heights.

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