Second Mid Term Test - 2023

21-11-2023.

Standard 10

MATHS

Time: 1.30 Hours Marks: 50

Part - I **7×1=7**

Note: Choose the most appropriate answer from the given four alternatives Write the option code and the corresponding answer.

1) If number of columns and rows are not equal in a matrix then it is said to be a
   a) Diagonal matrix b) Rectangular matrix
   c) square matrix d) Identity matrix

2) Find the matrix 'X' if $2X + \begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 5 & 7 \\ 9 & 5 \end{bmatrix}$

   a) $\begin{bmatrix} -2 & -2 \\ 2 & -1 \end{bmatrix}$ b) $\begin{bmatrix} 2 & 2 \\ 2 & -1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$ d) $\begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$

3) The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70^\circ$ then the value of $\angle AOB$ is
   a) 100° b) 110° c) 120° d) 130°

4) The angle between the two radii of a circle is 130°. Find the angle between the tangents which is drawn at the end of these radii .....
   a) 50° b) 90° c) 40° d) 70°

5) A tower is 60m high. Its shadow reduces by x metres when the angle of elevation of the sun increases from 30° to 45° then x is equal to
   a) 41.92m b) 43.92m c) 43m d) 45.6 m

6) If two solid hemispheres of same base radius 'r' units are joined together along their bases, then curved surface area of this new solid is ..... sq.units.
   a) $4\pi r^2$ b) $6\pi r^2$ c) $3\pi r^2$ d) $8\pi r^2$

7) A frustum of a right circular cone is of height 16cm with radii of its ends as 8cm and 20cm. Then, the volume of the frustum is
   a) 3328 πcm^3 b) 3228 πcm^3 c) 3240 πcm^3 d) 3340 πcm^3

Part - II **5×2=10**

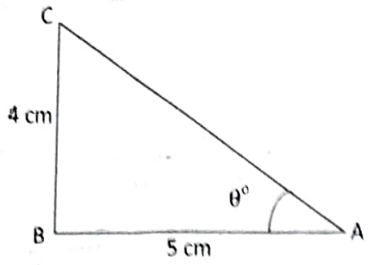
Note: Answer any 5 questions.
Question Number 14 is compulsory.

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

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

Kindly send me your answer keys to padasalai.net@gmail.com

10) Calculate $\angle BAC$ in the given triangle ABC (Note : Tan $38.7^\circ = 0.8011$)



11) From the top of a rock $50\sqrt{3}$ m high, the angle of depression of a car on the ground is observed to be 30°. Find the distance of the car from the rock.

12) Find the diameter of a sphere whose surface area is 154 m^2.

13) If the vertical angle and the radius of a right circular cone are 30° and 15cm respectively, then find its height.

14) The volumes of two cones of same base radius are 3600 cm^3 and 5040 cm^3. Find the ratio of heights.

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Part - III **5×5=25**

Note: **Do any 5 sums**

Question Number 21 is compulsory.

15) If $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{bmatrix}$ then prove that $(AB)^T = B^T A^T$

16) State and Prove the first theorem (pythagoras) in mathematics.

17) Show that the angle bisectors of a triangle are concurrent.

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

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

20) A vessel is in the form of a hemispherical bowl mounted by a hollow cylinder. The diameter is 14cm and the height of the vessel is 13cm. Find the capacity of the vessel.

21) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then prove that $A^2 - 5A + 7I_2 = 0$

Part - IV **1×8=8**

Note: **Do the following graph: (Choose any one of the alternatives)**

22) A) Graph the quadratic equation $x^2-6x+9=0$ and state their nature of solutions.

(OR)

B) Draw the graph of $Y=x^2-4x+3$ and use it to solve $x^2 - 6x + 9 = 0$.

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