

T COMMON SECOND MID TERM TEST - 2023

Standard - X
MATHEMATICS

Reg.No.

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Time: 1.30 hrs.

Marks:50

PART - I

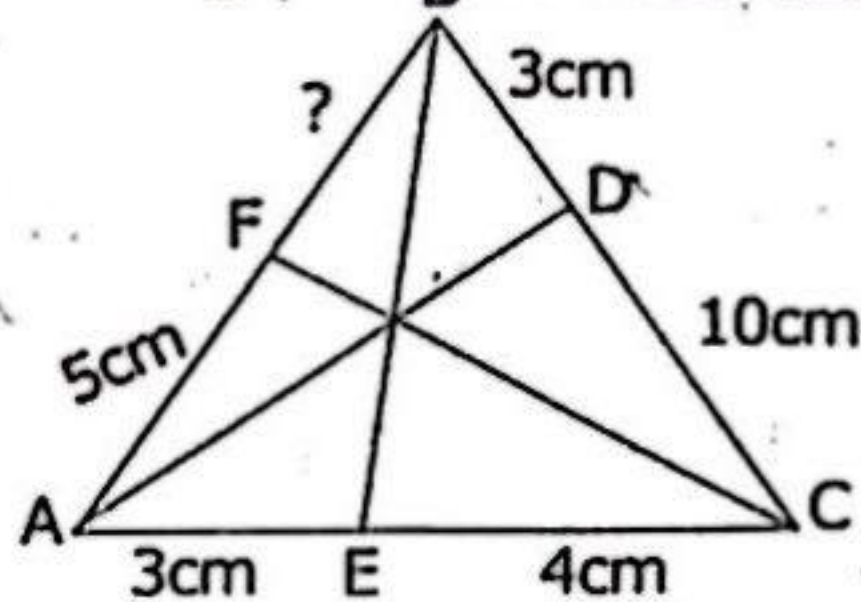
I. Choose the correct Answer, and write the option code and the corresponding answer: 4×1=4

- Graph of the quadratic equation is a _____.
a) circle b) hyperbola c) straight line d) parabola
- Find the length of the tangent drawn from a point whose distance from the centre of the circle is 5cm and radius of the circle is 3cm.
a) 6cm b) 5cm c) 8cm d) 4cm
- The total surface area of a hemisphere is how much times the square of its radius.
a) π b) 4π c) 2π d) 3π
- If the ratio of the height of the 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°

PART - II

II. Answer any 5 questions. Question No.11 is compulsory: 5×2=10

- Find the value of x, y and z from the following equations.
$$\begin{pmatrix} 12 & \frac{3}{2} \\ x & 5 \end{pmatrix} = \begin{pmatrix} y & z \\ 3 & 5 \end{pmatrix}$$
- If the total surface area of cone of radius 7cm is 704cm^2 , then find its slant height.
- A kite is flying at a height of 75m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string, assuming that there is no slack in the string.
- An artist has created a triangular stained glass window and has one strip of small length left before completing the window. She needs to figure out the length of left out portion based on the lengths of the other sides as shown in the figure.



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- If radii of two concentric circles are 4cm and 5cm then find the length of the chord of one circle which is a tangent to the other circle.
- A sphere, a cylinder and a cone are the same height which is equal to its radius, where as cone and cylinder are of same height. Find the ratio of their curved surface areas.
- If A is of order $p \times q$ and B is of order $q \times r$. What is the order of AB and BA?

PART - III

III. Answer any 4 questions. Questions No.18 is compulsory: 4×5=20

12. An aeroplane at an altitude of 1800m finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are 60° and 30° respectively. Find the distance between two boats. ($\sqrt{3} = 1.732$)
13. Given that $A = \begin{pmatrix} 1 & 3 \\ 5 & -1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & -1 & 2 \\ 3 & 5 & 2 \end{pmatrix}$, $C = \begin{pmatrix} 1 & 3 & 2 \\ -4 & 1 & 3 \end{pmatrix}$
Verify that $A(B + C) = AB + AC$
14. State and prove Pythagoras theorem.
15. A girl wishes to prepare birthday caps in the form of right circular cones for her birthday party, using a sheet of paper whose area is 5720 cm^2 . How many caps can be made with radius 5cm and height 12cm.
16. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, show that $A^2 - 5A + 7I_2 = 0$
17. If the radii of the circular ends of a frustum which is 45cm high are 28cm and 7cm. find the volume of the frustum.
18. The angle of elevation and depression of the top and bottom of a lamp post from the top of a 66m high apartment are 60° and 30° respectively Find
i) The height of the lamp post
ii) The difference between height of the lamp post and the apartment
iii) The distance between the lamp post and the apartment ($\sqrt{3} = 1.732$)

PART - IV**2×8=16**

19. a) Draw a circle of radius 4.5cm. Take a point on the circle. Draw the tangent at that point using the alternate segment theorem.
(OR)
b) Draw a circle of diameter 6cm from a point P, which is 8cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths.
20. a) Draw the Graph of $Y = x^2 + x - 2$ and hence solve $x^2 + x - 2 = 0$
(OR)
b) Graph the quadratic equation $x^2 - 9x + 20 = 0$ and state the nature of their solution.

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