

St. Mary's Higher School, New CoochBehar

Class: X, Unit test : III

M.M. : 30 marks

Session : 2021- 2022

Time : 1 hour

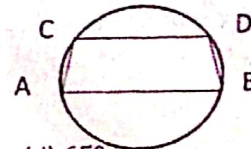
Attempt all questions.

The intended marks for questions or parts of questions are given in brackets [].

Question 1 (Choose the correct option)

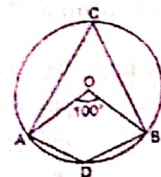
[10X1=10]

- I. In the given figure ABCD is a cyclic quadrilateral. $AB \parallel CD$. If $\angle CAB = 75^\circ$ then $\angle ABD = ?$



- (a) 35° (b) 55° (c) 75° (d) 65°

- II. In the given figure O is the centre of the circle. $\angle AOB = 100^\circ$, then $\angle ADB = \dots$



- (a) 100° (b) 130° (c) 110° (d) 120°

- III. Number of tangents that can be drawn to a circle through a point outside the circle is:

- (a) 1 (b) 2 (c) 3 (d) infinitely many

- IV. The angle between the radius and tangent of a circle is (in degrees):

- (a) 90 (b) 45 (c) 180 (d) 270

- V. The radius of a circle is 8cm. the length of tangent drawn to this circle from a point at a distance of 10cm from its centre is :

- (a) 10cm (b) 12cm (c) 15cm (d) 6cm

VI. $\left(\frac{1+\tan \theta}{1+\cot \theta}\right)^2 =$

- (a) $\sin^2 \theta$ (b) $\cos^2 \theta$ (c) $\cot^2 \theta$ (d) $\tan^2 \theta$

- VII. If $\sin \theta + \cos \theta = a$, and $\sec \theta + \operatorname{cosec} \theta = b$, then $b(a^2 - 1)$ is:

- (a) 2a (b) a + b (c) 2b (d) a - b

- VIII. The length of a shadow is equal to its height, then the angle of elevation of the sun is:

- (a) 30° (b) 40° (c) 45° (d) 60°

IX. $\frac{1}{\tan A + \cot A} = \dots$

- (a) $\cos A \sin A$ (b) $\cos A$ (c) $\sin A$ (d) $\cos A + \sin A$

- X. The height of a tree is $\sqrt{3}$ times the length of its shadow. The angle of elevation of the sun is:

- (a) 45° (b) 90° (c) 75° (d) 60°

Question 2

- I. A kite is attached to a string. Find the length of the string, when the height of the kite is 60 m and the string makes an angle 30° with the ground. [2]
- II. Prove that: $\frac{1}{1+\cos A} + \frac{1}{1-\cos A} = 2 \operatorname{cosec}^2 A$ [2]
- III. Two pillars of equal heights stand on either side of a roadway, which is 150 m wide. At a point in the roadway between the pillars the elevations of the tops of the pillars are 60° and 30° ; find the height of the pillars and the position of the point. [3]
- IV. If $x = r \cos A \cos B$, $y = r \cos A \sin B$ and $z = r \sin A$, show that: $x^2 + y^2 + z^2 = r^2$ [3]

Question 3

- I. Two circles of radii 5cm and 3cm are concentric. Calculate the length of a chord of the outer circle which touches the inner. [2]
- II. In the figure given alongside, AOB is a diameter of the circle and $\angle AOC = 110^\circ$. Find $\angle BDC$ [2]



- III. In the given figure, M is the centre of the circle. Chords AB and CD are perpendicular to each other. If $\angle MAD = x$ and $\angle BAC = y$. Then find
 - (a) $\angle AMD$ in terms of x
 - (b) $\angle ABD$ in terms of y
 - (c) prove that $x = y$
- IV. AB is the diameter and AC is the chord of the circle with centre O such that $\angle BAC = 30^\circ$. The tangent to the circle at C intersects AB produced in D. Show that $BC = BD$. [3]



END