विद्या सर्वार्थ साधिका

# ANANDALAYA

## PERIODIC TEST – 3

## Class: X

Subject : Mathematics (041) M.M : 40

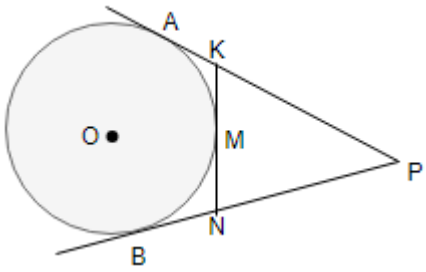
Date : 20-12-2023 Time :1 Hr. 30 min.

General Instructions:

1. The question paper consists of 21 questions divided into 4 sections A, B, C and D
2. All questions are compulsory.
3. Section A comprises of 9 questions of 1 mark each.
4. Section B comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
5. Section C comprises of 5 questions of 3 marks each. Internal choice has been provided in two questions.
6. Section D comprises of 1 case based integrated units of assessment (04 mark) with sub- parts of the values of 1, 2 and 1 marks each respectively.
7. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

### SECTION - A

1. In figure, AP and BP are tangents to a circle with centre O. at M, a tangent is drawn cutting PA at K, and PB at N. then KN = _____. (1)



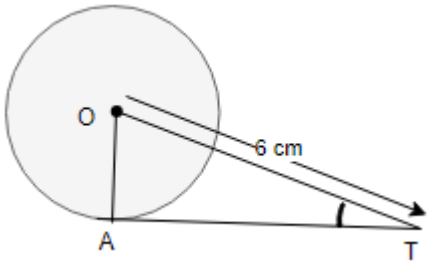

(A) KA (B) AK + BN

(C) 2 KM (D) 2 BN

2. The pair of tangents AP and AQ drawn from an external point A to a circle with centre O are perpendicular to each other and length of each tangent is 7 cm. Then the radius of the circle is _____ (1)

(A) 3.5 cm (B) 7 cm (C) 14 cm (D) 3 cm

3. AT is a tangent to the circle with centre O such that OT = 6 cm and ∠OTA = 30°. Then OA is equal to _____. (1)



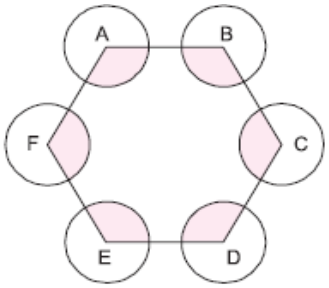

(A) 3 cm (B) $2\sqrt{3}$ cm

(C) $3\sqrt{3}$ cm (D) $3\sqrt{3}$ cm

4. An observer, 1.7 m tall, is $20\sqrt{3}$ m away from a tower. The angle of elevation from the eye of observer to the top of tower is 30°. The height of tower is _____m. (1)

(A) 20 (B) 21.7 (C) 18.3 (D) $20(\sqrt{3}+1)$

5. ABCDEF is any hexagon with different vertices A, B, C, D, E and F as the centres of circles with same radius r are drawn. The area of the shaded portion is _____. (1)




(A) $\pi r^2$ (B) $2\pi r^2$

(C) $3\pi r^2$ (D) $4\pi r^2$

6. A solid cylinder of radius r and height h is placed over other cylinder of same height and radius. The total surface area of the shape so formed is_____. (1)

(A) $4\pi rh + 2\pi r^2$ (B) $2\pi rh + \pi r^2$ (C) $4\pi rh + \pi r^2$ (D) $4\pi rh + 4\pi r^2$

7. A kite is flying at a height of 30 m from the ground. The length of the string from kite to the ground is 60 m. Assuming that there is no slack in the string, then the angle of elevation of the kite at the ground is _____. (1)

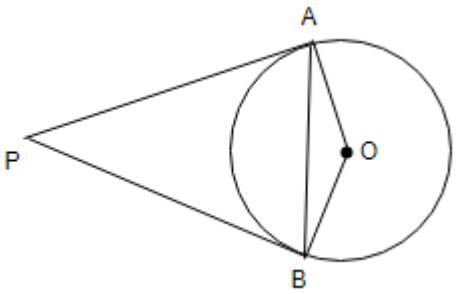
(A) 30° (B) 60° (C) 45° (D) 90°

8. A chord of a circle of radius 14 cm subtends a right angle at the centre. What is the area of the minor sector? (1)

(A) 308 $cm^2$ (B) 77 $cm^2$ (C) 154 $cm^2$ (D) 150 $cm^2$

9. If PA and PB are tangents to the circle with centre O such that ∠APB = 50°, then ∠OAB is equal to _____. (1)

(A) 25° (B) 50 °
(C) 20° (D) 40 °




**SECTION - B**

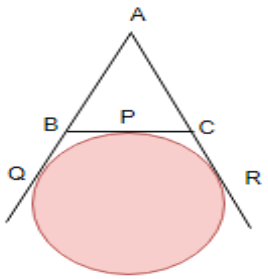
10 Find the area of the segment of a circle of radius 14 cm, if the length of the corresponding arc APB is 22 cm. $\left(use\ \pi = \frac{22}{7}\right)$ (2)

**OR**

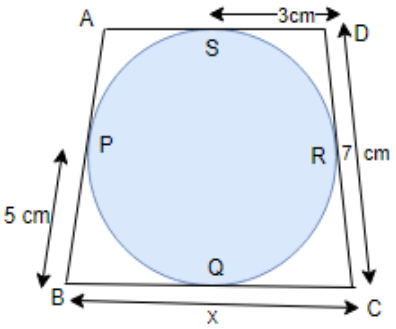
. A horse is placed for grazing inside a rectangular field 70 m by 52 m and is tethered to one corner by a rope 21 m long. On how much area can it graze? $\left(use\ \pi = \frac{22}{7}\right)$

11. An arc of a circle is of length $5\pi$ cm and the sector it bounds has an area of 20 $\pi$ $cm^2$. Find the radius of the circle. (2)

12. In figure, a circle touches the side BC of $\Delta ABC$ at P and touches AB and AC produced at Q and R respectively. (2)
If AQ = 5 cm, find the perimeter of Δ ABC.




13. In the figure, a circle touches the sides AB, BC, CD and AD at the points P, Q, R and S respectively. Find the value of x. (2)




14. Two boats approach a light house in mid-sea from opposite directions. The angles of elevations of the top of the lighthouse from two boats are 30° and 45° respectively. If the distance between two boats is 100 m, find the height of the lighthouse. (2)

15. Circumference of the edge of hemispherical bowl is 132 cm. Find the capacity of the bowl. (2)

**OR**

A tent is in the shape of a right circular cylinder up to a height of 3 m and then becomes a right circular cone with a maximum height of 13.5 m above the ground.

i) Find the surface area of the tent.

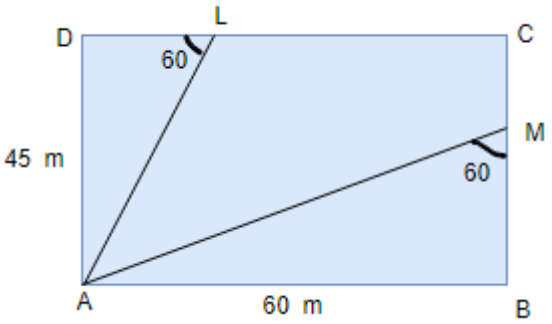
ii) Calculate the cost of painting the inner side of the tent at the rate of ₹ 2 per $m^2$, if the radius of the base is 14 m.

## SECTION - C

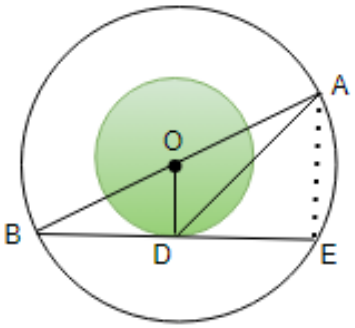
16. An aeroplane when flying at a height of 3125 m from the ground passes vertically below another plane at an instant when the angles of elevation of the two planes from the same point on the ground are 30° and 60° respectively. Find the distance between the two planes at that instant. (3)

**OR**

In the given figure, ABCD is a rectangle, AD = 45 m, AB = 60 m segments AL and AM are drawn as shown. Find the length of $(AL + AM)$.
$(\sqrt{3} = 1.732)$




17. In the figure, the radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of larger circle. BE is a tangent to the smaller circle touching it at D. Find the length of AD. (3)

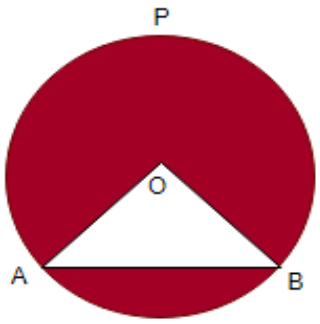



18. The sum of the radius of the base and the height of a solid cylinder is 37 cm. If the total surface area of the solid cylinder is 1628 $cm^2$, find the volume of the cylinder. $[\pi = \frac{22}{7}]$ (3)

**OR**

A cylindrical tub of radius 16 cm contains water to a depth of 30 cm. A spherical iron ball is dropped into the tub and thus level of water is raised by 9 cm. What is the radius of the ball?

19 In the figure, O is the centre of the circle. Find the area of the minor and major segments, if the radius of the circle is 35 cm and $\angle AOB = 90°$.




20 A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of base of the cone is 21 cm and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. [Take $\pi = \frac{22}{7}$]

## SECTION - D

21. A group of students of class X visited India Gate on an education trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, official name Delhi Memorial, originally called All- India War Memorial, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India Gate, which is located at the eastern end of the Kartavya path (formerly called the Kingsway), is about 138 feet (42 metres) in height.

i) What is the angle of elevation if they are standing at a distance of 42 m away from the monument? (1)

ii) They want to see the tower at an angle of 60°. So, they want to know the distance where they should stand and hence find the distance. (2)

iii) If the altitude of the Sun is at 60°, then the height of the vertical tower that will cast a shadow of length 20 m is _____ (in terms of $\sqrt{3}$ ) (1)

**OR**

iii) Angle of elevation is equal to angle of depression: true or false?