AREAS RELATED TO CIRCLES

CLASS X   **Time : 2 hrs.**

Mark : 60

SECTION - A OBJECTIVE TYPE   **12 × 1 = 12**

1. The area of the sector of a circle of radius r and central angle θ, is

   a) $\dfrac{\pi r}{2}$ b) $\dfrac{2\pi r^2 \theta}{720^0}$ c) $\dfrac{2\pi r\theta}{360^0}$ d) $\dfrac{\pi r\theta}{360^0}$

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

   a) 1 cm   b) 5 cm   c) 8 cm   d) 10 cm

3. A sector is cut from a circle of radius 21 cm. The angle of sector is 60^0. The area of sector is

   a) 577.5 cm²   b) 231 m²   c) 152 m²   d) 231 cm²

4. A chord AB of a circle of radius 10 cm makes a right angle at the centre of the circle. The area of major segment is

   a) 210 cm²   b) 285.5 cm²   c) 285.7 cm²   d) 258.1 cm²

5. The circumferences of two circles are in the ratio 2 : 3. The ratio of their areas is

   a) 4 : 9   b) 2 : 3   c) 7 : 9   d) 4 : 10

6. Area enclosed between two concentric circles is 770 cm². If the radius of outer circle is 21 cm, then the radius of inner circle is

   a) 12 cm   b) 13 cm   c) 14 cm   d) 15 cm

7. The perimeter of a semi-circular protractor is 72 cm. Its diameter is

   a) 14 cm   b) 28 cm   c) 36 cm   d) 24 m

8. The area of a circle circumscribing a square of area 64 cm² is

   a) 50.28 cm²   b) 25.5 cm²   c) 100.48 cm²   d) 75.48 cm²

9. The length of an arc of a circle of radius 'r' subtending angle θ at the centre is :

   a) $\dfrac{\pi r\theta}{360^0}$ b) $\dfrac{4\pi r\theta}{360^0}$ c) $\dfrac{2\pi r\theta}{720^0}$ d) $\dfrac{2\pi r\theta}{360^0}$

10. Area of a sector of angle 'k' (in degrees) of a circle with radius R is

    a) $\dfrac{k}{360^0}\,2\pi R$ b) $\dfrac{k}{180^0}\,\pi R^2$ c) $\dfrac{k}{720^0}\,2\pi R^2$ d) $\dfrac{k}{360^0}\,2\pi R^2$

11. The perimeter of sector of a circle of radius 'r' and central angle θ is ....

    a) $\dfrac{\theta}{360^0}2\pi r$
    b) $\dfrac{\theta}{360^0}2\pi r + 2r$
    c) $\dfrac{\theta}{360^0}2\pi r^2$
    d) $\dfrac{\theta}{180^0}2\pi r^2 + 2r$

12. The distance travelled by a road roller of radius 'r' and length L in 20 rotations is ......

    a) $2\pi rL$
    b) $20\pi rL$
    c) $40\pi rL$
    d) $2\pi r^2 L$

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as :

a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)

c) Assertion (A) is true but Reason (R) is false.

d) Assertion (A) is false but Reason (R) is true.

13. Assertion (A) : A wire is looped in the form of a circle of radius 28 cm. It is bent into a square. Then the area of the square is 1936 cm^2.

    Reason (R) : Angle described by a minute hand in 60 minutes = 360^0.

14. Assertion (A) : If the circumference of a circle is 176 cm, then its radius is 28 cm.

    Reason (R) : Circumference = $2\pi r$

SECTION - C SHORT AND LONG ANSWER QUESTIONS

Short Answer I   **5 × 2 = 10**

15. Find the area of a sector of a circle with radius 6 cm, if angle of sector is 60^0.

16. Difference between the circumference and the radius of a circle is 74 cm. Find the area of circle.

17. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

18. The length of minute hand of a clock is 14 cm. Find the area swept by the minute hand in one minute.

19. If the area of a semi circular field is 30800 sq.m then find the perimeter of the field.

OR

Circular footpath width 2 m is constructed at the rate of ₹ 20 per cm^2 around a circular park of radius 1500 m. Find the total cost of construction of the footpath.

SECTION - C

Short Answer II   **5 × 3 = 15**

20. The minute hand of a clock is 12 cm long. Find the area of the face of the clock described by the minute hand between 9 cm and 9.35 cm.

21. In a circle of radius 21 cm, an arc subtends an angle of 60^0 at the centre. Find

    i)   the length of the arc.

    ii)   area of the sector formed by the arc.

    iii) area of the segment formed by the corresponding chord.

22. A wire when bent in the form of a square enclosed an area 121 sq. cm. If the wire was bent in the form of a circle, then find the area enclosed by the circle. $\left[\text{Take, } \pi = \dfrac{22}{7} \right]$

23. A bicycle wheel makes 75 revolutions per minute to maintain at a speed of 8.91 km/h. Find the diameter of the wheel.

24. Area of a sector of central angle 200^0 of a circle is 770 cm^2. Find the length of the corresponding arc of this sector.

<div align="center">OR</div>

The wheel of a motor cycle is of radius 35 cm. How many revolutions per minute must the wheel make, so as to keep a speed of 66 km/h?

SECTION - D

Long Answer   **3 × 5 = 15**

25. The area of a circular playground is 22176 m^2. Find the cost of fencing this ground at the rate of ₹ 50 per m.

26. An archery target has three regions formed by three concentric circles as shown in the figure. If the diameters of the concentric circles are in the ratio 1 : 2 : 3, then find the ratio of the areas of three regions.
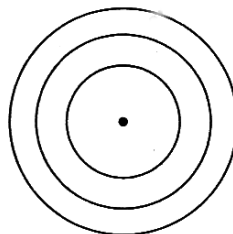
27. Find the area of the segment of a circle of radius 12 cm, whose corresponding sector has a central angle of 60^0.

<div align="center">OR</div>

Find the difference of the areas of a sector of angle 120^0 and its corresponding major sector of a circle of radius 21 cm.

M-Areas related

SECTION - E - (COMPETING BASED QUESTIONS)

28. **Read the following passage and answer the questions.**

Principle of a school decided to give badges to students who are chosen for the post Head boy, Head girl. Two coloured area Red in 22 cm and Silver in 10.5 cm.
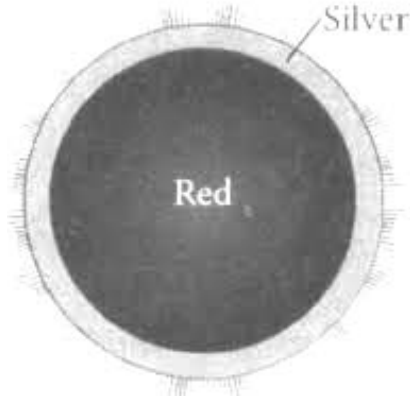

i) Find the radius of the red region and also find the area of the red region. **2**

ii) Find the radius of the circle formed by combining silver and red region also find the area of silver region. **2**

29. **Read the following passage and answer the questions.**

A brooch is a small piece of jewellery which has a pin at the back so it can be fastened on a dress, blouse or coat.

Designs of some brooch are shown below. Observe them carefully.
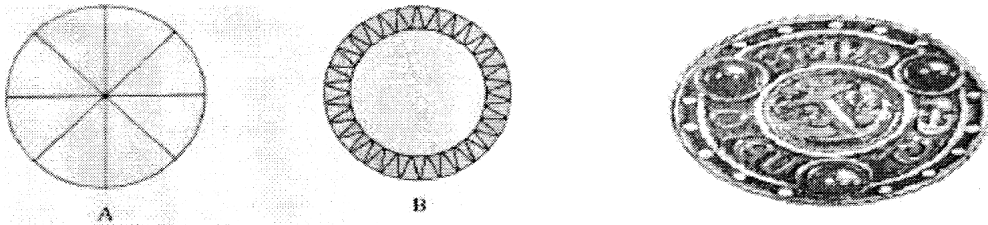
Design A : Brooch A is made with silver wire in the form of a circle with diameter 28 mm. The wire used for making 4 diameters which divide the circle into 8 equal parts.

Design B : Brooch is made two colours. Gold and silver. Outer part is made with Gold. The circumference of silver part is 44 mm and the gold part is 3 mm wide everywhere.

Refer to Design A.

i) Find the total length of silver wire required for design A. **1**

ii) Find the circumference of outer part (golden) for design B. **1**

iii) Find the difference between the areas of golden and silver part. **2**

OR

M-Areas related

30. **Read the following passage and answer the questions.**

Pookalam is the flower bed or flower pattern designed during Onam in Kerala. It is similar as Rangoli in North India and Kolam in Tamil Nadu.

During the festival of Onam, your school is planning to conduct a Pookalam competition.

Your friend who is a partner in competition, suggests two designs given below.

Observe these carefully.
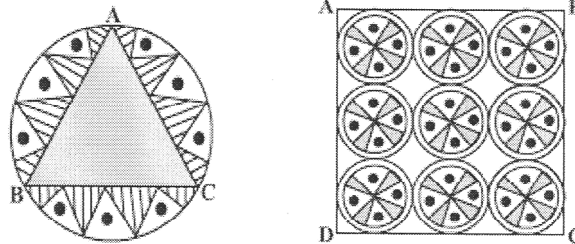
Design I : This design is made with a circle of radius 32 cm leaving equilateral triangle ABC in the middle as shown in the given figure.

Design II : This Pookalam is made with 9 circular design each of radius 7 cm.

Refer Design I :

i) Find the side of equilateral triangle. **1**

ii) Find the altitude of the equilateral triangle. **1**

iii) Find the area of the square. **2**

OR

Find area of each circular design.

M-Areas related