Class 10– CBSE– Math– Chapter – Area Related to Circles

Max Marks – 20 Time: 40 minutes

S.No.	Questions/Problems	Marks
1.	The area of a sector of a circle of radius 10 cm is $50\pi cm^2$. The angle subtended by the sector at the center is: (a) 90^o (b) 180^o Answer (c) 270^o (d) 360^o	1
2.	**Assertion (A):** The area of a circle is $38.5cm^2$. The circumference of the circle is 22 cm. **Reason (R):** The circumference (C) and area (A) of a circle are related by the formula: $A=\frac{C^2}{4\pi}$. (a) Both A and R are true and R is the correct explanation of A. (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. Answer (d) A is false but R is true.	1
3.	Find the area of a sector of a circle with radius 6 cm if the angle of the sector is 60^o Ans: Radius $r = 6cm$ Angle $\theta = 60°$ $$\text{Area} = \frac{60}{360} \times \pi \times 6^2 = 6\pi \text{ cm}^2$$ $6\pi \text{ cm}^2$	2
4.	The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes. Ans: Radius $r = 14cm$ Time = 5 minutes Angle swept in 5 minutes:	2

	$\text{Area} = \frac{30}{360} \times \pi \times 14^2 = \frac{49\pi}{3} \approx 51.3 \text{ cm}^2$ **= 51.3 cm²**	
5.	A chord of a circle of radius 12 cm subtends an angle of 120° at the center. Find the area of the corresponding segment of the circle. (Use π=3.14 and $\sqrt{3} = 1.73$) Ans: Radius $r = 12\text{cm}$ Angle $\theta = 120°$ **Area of sector** $= \frac{120}{360} \times \pi \times 12^2 = 150.72 \text{ cm}^2$ **Area of triangle** $= \frac{1}{2} r^2 \sin 120° = 36\sqrt{3} \approx 62.35 \text{ cm}^2$ **Area of segment** $= 150.72 - 62.35 = 88.37 \text{ cm}^2$ **≈ 88.4 cm²**	3
6.	A horse is tied to a peg at one corner of a square-shaped grass field of side 15 m by means of a 5 m long rope. Find: (i) The area of that part of the field in which the horse can graze. (ii) The increase in the grazing area if the rope were 10 m long instead of 5 m. (Use π=3.14) Ans: Side of square = 15 m (i) Rope = 5 m Grazing area = quarter circle $= \frac{1}{4} \times \pi \times 5^2 = 19.625 \text{ m}^2$ (ii) Rope = 10 m	3

	$= \frac{1}{4} \times \pi \times 10^2 = 78.5 \text{ m}^2$ Increase in area $= 78.5 - 19.625 = 58.875 \text{ m}^2$ **Answers:** (i) **19.63 m²** (ii) **58.88 m²**	
7.	In a circle of radius 21 cm, an arc subtends an angle of 60° at the center. Find: (i) The length of the arc. (ii) The area of the sector formed by the arc. (iii) The area of the segment formed by the corresponding chord. (Use $\sqrt{3} = 1.73$) Ans: Radius $r = 21\text{cm}$ Angle $\theta = 60°$ **(i) Length of arc** $= \frac{60}{360} \times 2\pi r = 7\pi = 22 \text{ cm}$ **(ii) Area of sector** $= \frac{60}{360} \times \pi \times 21^2 = 231 \text{ cm}^2$ **(iii) Area of segment** Triangle area: $= \frac{1}{2} r^2 \sin 60° = \frac{441\sqrt{3}}{4} \approx 190.96$ Segment area $= 231 - 190.96 = 40.04 \text{ cm}^2$ **Answers:** (i) **22 cm** (ii) **231 cm²** (iii) **≈ 40.0 cm²**	4

8.	A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters that divide the circle into 10 equal sectors. Find: (i) The total length of the silver wire required. (ii) The area of each sector of the brooch. **Q8.** Diameter = 35 mm ⇒ Radius = 17.5 mm **(i) Total wire length** Circumference: $= \pi d = \frac{22}{7} \times 35 = 110$ mm 5 diameters: $= 5 \times 35 = 175$ mm **Total length** $= 110 + 175 = 285$ mm **(ii) Area of each sector** Total area: $= \pi r^2 = \frac{22}{7} \times (17.5)^2 = 962.5$ mm^2 Each sector: $= \frac{962.5}{10} = 96.25$ mm^2 **Answers:** (i) **285 mm** (ii) **96.25 mm²**	4