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(Affiliated to CBSE up to +2 Level)

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Exercise 12.2

Q.9. 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 which divide the circle into 10 equal sectors as shown in Fig. Find:

- the total length of the silver wire required.
- the area of each sector of the brooch.

Sol. Diameter of the circle = 35 mm

$$\therefore \text{Radius } (r) = \frac{35}{2} \text{ mm}$$

$$(i) \text{ Circumference} = 2\pi r = 2 \times \frac{22}{7} \times \frac{35}{2} \text{ mm} = 22 \times 5 = 110 \text{ mm}$$

Length of 1 piece of wire used to make diameter to divide the circle into 10 equal sectors = 35 mm

$$\therefore \text{Length of 5 pieces} = 5 \times 35 = 175 \text{ mm}$$

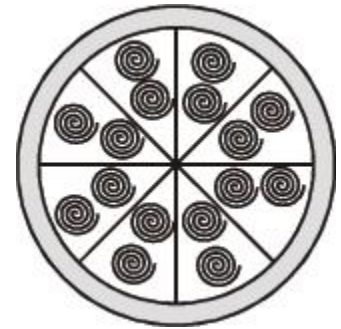
$$\therefore \text{Total length of the silver wire} = 110 + 175 \text{ mm} = 285 \text{ mm}$$

(ii) Since the circle is divided into 10 equal sectors,

$$\therefore \text{Sector angle } \theta = \frac{360^\circ}{10} = 36^\circ$$

$$\Rightarrow \text{Area of each sector} = \frac{\theta}{360} \times \pi r^2 = \frac{36}{360} \times \frac{22}{7} \times \frac{35}{2} \times \frac{35}{2} \text{ mm}^2$$

$$= \frac{11 \times 35}{4} \text{ mm}^2 = \frac{385}{4} \text{ mm}^2.$$

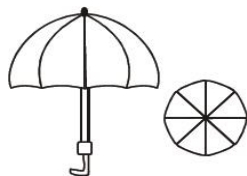


Q.10. An umbrella has 8 ribs which are equally spaced (see figure).

Assuming umbrella to be a flat circle of radius 45 cm, find the area between the two consecutive ribs of the umbrella.

Sol. Here, radius (r) = 45 cm

Since circle is divided in 8 equal parts,



\therefore Sector angle corresponding to each part

$$\theta = \frac{360^\circ}{8} = 45^\circ$$

⇒ Area of a sector (part)

$$\begin{aligned} &= \frac{\theta}{360^\circ} \times \pi r^2 = \frac{45}{360} \times \frac{22}{7} \times 45 \times 45 \text{ cm}^2 \\ &= \frac{11 \times 45 \times 45}{4 \times 7} \text{ cm}^2 = \frac{22275}{28} \text{ cm}^2 \end{aligned}$$

∴ The required area between the two ribs = $\frac{22275}{28} \text{ cm}^2$.

Q.11. A car has two wipers which do not overlap. Each wiper has a blade of length 25 cm sweeping through an angle of 115° . Find the total area cleaned at each sweep of the blades.

Sol. Here, radius (r) = 25 cm

Sector angle (θ) = 115°

∴ Area cleaned by each sweep of the blades

$$\begin{aligned} &= \left[\frac{\theta}{360} \times \pi r^2 \right] \times 2 \quad [\because \text{Each sweep will have to and fro movement}] \\ &= \left[\frac{115}{360} \times \frac{22}{7} \times 25 \times 25 \right] \times 2 \text{ cm}^2 \\ &= \frac{23 \times 11 \times 25 \times 25}{18 \times 7} \text{ cm}^2 = \frac{158125}{126} \text{ cm}^2. \end{aligned}$$