

NCERT Solutions for Class 9 Maths Chapter 11 Surface Areas and Volumes Ex 11.4

Question 1.

Find the surface area of a sphere of radius:

(i) 10.5 cm (ii) 5.6 cm

(iii) 14 cm

Solution.

(i) Radius (r) of sphere = 10.5 cm

Surface area of sphere = $4\pi r^2$

$$= 4 * \frac{22}{7} * 10.5 * 10.5$$

$$= 88 * 1.5 * 10.5$$

$$= 1386 \text{ cm}^2$$

(ii) Radius(r) of sphere = 5.6 cm

Surface area of sphere = $4\pi r^2$

$$= 4 * \frac{22}{7} * 5.6 * 5.6$$

$$= 88 * 0.8 * 5.6$$

$$= 394.24 \text{ cm}^2$$

(iii) Radius (r) of sphere = 14 cm

Surface area of sphere = $4\pi r^2$

$$= 4 * \frac{22}{7} * 14 * 14$$

$$= 4 * 44 * 14$$

$$= 2464 \text{ cm}^2$$

Question 2.

Find the surface area of a sphere of diameter:

(i) 14 cm

(ii) 21 cm

(iii) 3.5 m

Solution.

$$(i) \text{ Radius (r) of sphere} = \frac{\text{Diameter}}{2}$$

$$= \frac{14}{2}$$

$$= 7 \text{ cm}$$

$$\text{Surface area of sphere} = 4\pi r^2$$

$$= 4 * \frac{22}{7} * 7 * 7$$

$$= 88 * 7$$

$$= 616 \text{ cm}^2$$

$$(ii) \text{ Radius (r) of sphere} = \frac{\text{Diameter}}{2}$$

$$= \frac{21}{2}$$

$$= 10.5 \text{ cm}$$

$$\text{Surface area of sphere} = 4\pi r^2$$

$$= 4 * \frac{22}{7} * 10.5 * 10.5$$

$$= 1386 \text{ cm}^2$$

$$(iii) \text{ Radius (r) of sphere} = \frac{\text{Diameter}}{2}$$

$$= \frac{3.5}{2}$$

$$= 1.75 \text{ m}$$

$$\text{Surface area of sphere} = 4\pi r^2$$

$$= 4 * \frac{22}{7} * 1.75 * 1.75$$

$$= 38.5 \text{ cm}^2$$

Question 3.

Find the total surface area of a hemisphere of radius 10 cm. (Use $\pi = 3.14$)

Solution.

Radius (r) of hemisphere = 10 cm

Total surface area of hemisphere = CSA of hemisphere + Area of circular end of hemisphere

$$= 2\pi r^2 + \pi r^2$$

$$= 3\pi r^2$$

$$= [3 * 3.14 * 10 * 10]$$

$$= 942 \text{ cm}^2$$

Question 4.

The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. Find the ratio of surface areas of the balloon in the two cases

Solution.

Radius (r₁) of spherical balloon = 7 cm

Radius (r₂) of spherical balloon, when air is pumped into it = 14 cm

$$\text{Ratio} = \frac{\text{Initial surface area}}{\text{Surface area after pumping balloon}}$$

$$= \frac{4\pi r_1^2}{4\pi r_2^2}$$

$$= \left(\frac{r_1}{r_2}\right)^2$$

$$= \left(\frac{7}{14}\right)^2 = \frac{1}{4}$$

Therefore, the ratio between the surface areas is 1:4

Question 5.

A hemispherical bowl made of brass has inner diameter 10.5 cm. Find the cost of tin-plating it on the inside at the rate of Rs 16 per 100 cm²

Solution.

$$\text{Inner radius (r)} = \frac{10.5}{2} = 5.25 \text{ cm}$$

$$\text{Surface area of hemispherical bowl} = 2\pi r^2$$

$$= 2 * \frac{22}{7} * 5.25 * 5.25$$

$$= 173.25 \text{ cm}^2$$

Cost of tin-plating 100 cm^2 area = Rs 16

$$\text{Cost of tin-plating } 173.25 \text{ cm}^2 \text{ area} = \left(\frac{16 * 173.25}{100} \right)$$

$$= \text{Rs } 27.72$$

Question 6.

Find the radius of a sphere whose surface area is 154 cm^2

Solution.

Let the radius of the sphere be r

Surface area of sphere = 154 cm^2

$$4\pi r^2 = 154$$

$$r^2 = \left(\frac{154 * 7}{4 * 22} \right) \text{ cm}^2$$

$$= \left(\frac{7 * 7}{2 * 2} \right) \text{ cm}^2$$

$$r = \left(\frac{7}{2} \right) \text{ cm}$$

$$= 3.5 \text{ cm}$$

Therefore, the radius of the sphere whose surface area is 154 cm^2 is 3.5 cm

Question 7.

The diameter of the moon is approximately one fourth of the diameter of the earth. Find the ratio of their surface areas

Solution.

Let the diameter of earth be d . Therefore, the diameter of moon will be $\frac{d}{4}$

$$\text{Radius (Earth)} = \frac{d}{2}$$

$$\text{Radius (Moon)} = \frac{1}{2} * \frac{d}{4} = \frac{d}{8}$$

$$\text{Surface Area of moon} = 4\pi \left(\frac{d}{8} \right)^2$$

$$\text{Surface Area of Earth} = 4\pi \left(\frac{d}{2}\right)^2$$

$$\text{Ratio} = \frac{\text{Surface Area of moon}}{\text{Surface Area of earth}}$$

$$= \frac{4}{64}$$

$$= \frac{1}{16}$$

Question 8.

A hemispherical bowl is made of steel, 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl

Solution.

Inner radius of hemispherical bowl = 5 cm

Thickness of the bowl = 0.25 cm

Outer radius (r) of hemispherical bowl = (5 + 0.25) cm

$$= 5.25 \text{ cm}$$

Outer CSA of hemispherical bowl = $2\pi r^2$

$$= 2 * \frac{22}{7} * (5.25)^2$$

$$= 173.25 \text{ cm}^2$$

Question 9.

A right circular cylinder just encloses a sphere of radius r (see Fig. 13.22). Find

- (i) Surface area of the sphere,
- (ii) Curved surface area of the cylinder
- (iii) Ratio of the areas obtained in (i) and (ii)

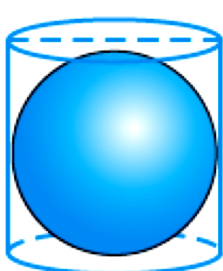


Fig. 13.22

Solution.

(i) Surface area of sphere = $4\pi r^2$

(ii) Height of cylinder = $r + r = 2r$

Radius of cylinder = r

CSA of cylinder = $2\pi rh$

= $2\pi r (2r)$

= $4\pi r^2$

(iii) Ratio = $\frac{4\pi r^2}{4\pi r^2}$

= $\frac{1}{1} = 1$

Ratio = 1: 1

