

CLASS IX: MATHS
Chapter 11: Surface Areas and Volume

Questions and Solutions | Exercise 11.2 - NCERT Books

Q1. Find the surface area of a sphere of radius :

(i) 10.5cm (ii) 5.6 cm (iii) 14 cm

Sol. (i) Surface area $= 4 \times \frac{22}{7} \times (10.5)^2 \text{ cm}^2$
 $= 1386 \text{ cm}^2$

(ii) Surface area $= 4 \times \frac{22}{7} \times 5.6 \times 5.6 \text{ cm}^2$
 $= 394.24 \text{ cm}^2$

(iii) Surface area $= 4 \times \frac{22}{7} \times 14 \times 14 \text{ cm}^2$
 $= 2464 \text{ cm}^2$

Q2. Find the surface area of a sphere of diameter

(i) 14 cm.

(ii) 21 cm

(iii) 3.5 m

Sol. (i) Diameter = 14 cm

$$\therefore \text{Radius (r)} = \frac{14}{2} \text{ cm} = 7 \text{ cm}$$

$$\therefore \text{Surface area} = 4\pi r^2 = 4 \times \frac{22}{7} \times (7)^2 = 616 \text{ cm}^2.$$

(ii) Diameter = 21 cm

$$\therefore \text{Radius (r)} = \frac{21}{2} \text{ cm} = 10.5 \text{ cm}$$

$$\therefore \text{Surface area} = 4\pi r^2 = 4 \times \frac{22}{7} \times (10.5)^2 = 1385.4 \text{ cm}^2.$$

(ii) Diameter = 3.5 m

$$\therefore \text{Radius (r)} = \frac{3.5}{2} \text{ cm} = 1.75 \text{ cm}$$



$$\therefore \text{Surface area} = 4\pi r^2 = 4 \times \frac{22}{7} \times (1.75)^2 = 38.4 \text{ m}^2$$

Q3. Find the total surface area of a hemisphere of radius 10 cm. (Use $\pi = 3.14$)

Sol. $r = 10 \text{ cm}$.

$$\therefore \text{Total surface area of the hemisphere} = 3\pi r^2 = 3 \times 3.14 \times (10)^2 = 942 \text{ cm}^2.$$

Q4. 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.

Sol. $r_1 = 7 \text{ cm}$ & $r_2 = 14 \text{ cm}$ and let S_1 and S_2 be the surface areas of respective spheres.

$$\frac{S_1}{S_2} = \frac{4\pi r_1^2}{4\pi r_2^2} = \frac{r_1^2}{r_2^2} = \left(\frac{r_1}{r_2}\right)^2$$

Ans. 1 : 4

Q5. 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 cm^2 .

Sol. Inner diameter = 10.5 cm, Radius = $\frac{105}{20} \text{ cm}$

Curved surface area of a hemisphere = $2\pi r^2$

\therefore Inner curved surface area of hemispherical bowl

$$= 2 \times \frac{22}{7} \times \frac{105}{20} \times \frac{105}{20} \text{ cm}^2 = \frac{17325}{100} \text{ cm}^2$$

Cost of tinplating for 100 cm^2 = Rs 16

\therefore Cost of tinplating for $\frac{17325}{100} \text{ cm}^2$

$$= \text{Rs } \frac{16}{100} \times \frac{17325}{100}$$

$$= \text{Rs } \frac{277200}{100 \times 100} = \text{Rs } 27.72$$



Q6. Find the radius of a sphere whose surface area is 154 cm^2

Sol. $4\pi r^2 = 154 \Rightarrow 4 \times \frac{22}{7} \times r^2 = 154$

$$\Rightarrow r^2 = \frac{7 \times 7}{4} \Rightarrow r = \frac{7}{2} \text{ cm, i.e., } r = 3.5 \text{ cm}$$

Q7. The diameter of the moon is approximately one fourth of the diameter of the earth. Find the ratio of their surface areas.

Sol. Let d_1 and d_2 be the diameters of the moon and the earth respectively and S_1 and S_2 be their respective surface areas.

$$d_1 = \frac{1}{4} d_2 \Rightarrow \frac{d_1}{d_2} = \frac{1}{4} \Rightarrow \frac{2r_1}{2r_2} = \frac{1}{4} \Rightarrow \frac{r_1}{r_2} = \frac{1}{4}]$$

Ans. 1 : 16.

Q8. 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.

Sol. $r = 5 \text{ cm}$, thickness of steel sheet = 0.25 cm

$$\Rightarrow R = 5 \text{ cm} + 0.25 \text{ cm} = 5.25 \text{ cm}$$

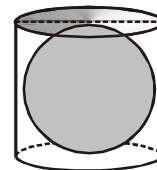
Outer curved surface area of the bowl = $2 \pi R^2$

$$= 2 \times \frac{22}{7} \times \frac{525}{100} \times \frac{525}{100} \text{ cm}^2$$

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

Q9. A right circular cylinder just encloses a sphere of radius r . Find

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



Sol. Radius of cylinder = radius of sphere = r
 Height of cylinder = $2 \times$ radius of sphere = $2r$

Ans. (i) $4 \pi r^2$ (ii) $4 \pi r^2$ (iii) 1 : 1.