



NCERT Solutions for Class 10 Maths Chapter 13 Surface Areas and Volumes Exercise 13.1

Exercise 13.1

Unless stated otherwise, take $\pi = \frac{22}{7}$.

1. 2 cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid.

Ans. Volume of cube = $(\text{Side})^3$

According to question, $(\text{Side})^3 = 64$

$$\Rightarrow (\text{Side})^3 = 4^3$$

$$\Rightarrow \text{Side} = 4 \text{ cm}$$

For the resulting cuboid, length $(l) = 4 + 4 = 8 \text{ cm}$,
breadth $(b) = 4 \text{ cm}$ and height $(h) = 4 \text{ cm}$

$$\text{Surface area of resulting cuboid} = 2(lb + bh + hl)$$

$$= 2(8 \times 4 + 4 \times 4 + 4 \times 8)$$

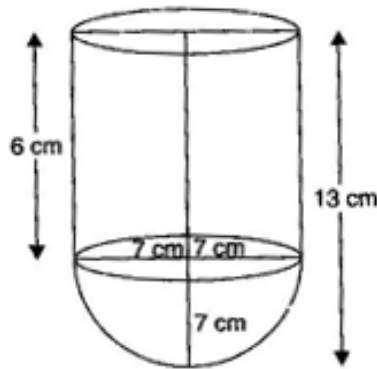
$$= 2(32 + 16 + 32)$$

$$= 2 \times 80 = 160 \text{ cm}^2$$

2. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel.

Ans. \because Diameter of the hollow hemisphere = 14 cm

$$\therefore \text{Radius of the hollow hemisphere} = \frac{14}{2} = 7 \text{ cm}$$



Total height of the vessel = 13 cm

$$\therefore \text{Height of the hollow cylinder} = 13 - 7 = 6 \text{ cm}$$

\therefore Inner surface area of the vessel

= Inner surface area of the hollow hemisphere + Inner surface area of the hollow cylinder

$$= 2\pi(7)^2 + 2\pi(7)(6)$$

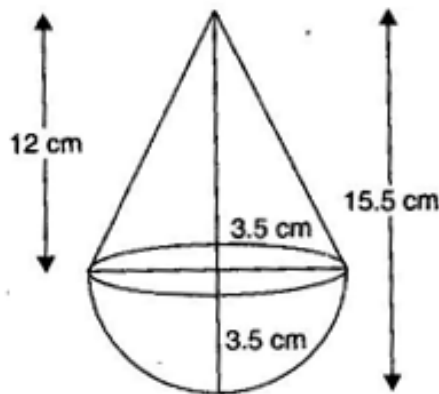
$$= 98\pi + 84\pi = 182\pi$$

$$= 182 \times \frac{22}{7} = 26 \times 22 = 572 \text{ cm}^2$$

3. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

Ans. Radius of the cone = 3.5 cm

\therefore Radius of the hemisphere = 3.5 cm



Total height of the toy = 15.5 cm

\therefore Height of the cone = $15.5 - 3.5 = 12$ cm

Slant height of the cone = $\sqrt{(3.5)^2 + (12)^2}$

$$= \sqrt{12.25 + 144}$$

$$= \sqrt{156.25} = 12.5 \text{ cm}$$

\therefore TSA of the toy = CSA of hemisphere + CSA of cone

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

$$= 2\pi(3.5)^2 + \pi(3.5)(12.5)$$

$$= 24.5\pi + 43.75\pi = 68.25\pi$$

$$= 68.25 \times \frac{22}{7} = 214.5 \text{ cm}^2$$

4. A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have? Find the surface area of the solid.

Ans. Greatest diameter of the hemisphere = Side of the cubical block = 7 cm

\therefore TSA of the solid = External surface area of the cubical block + CSA of hemisphere

$$\begin{aligned} &= \left\{ 6(7)^2 - \pi \left(\frac{7}{2} \right)^2 \right\} + 2\pi \left(\frac{7}{2} \right)^2 \\ &= \left\{ 294 + \frac{49}{4} \pi \right\} + \frac{49}{2} \pi \\ &= 294 + \frac{49}{4} \pi = 294 + \frac{49}{2} \times \frac{22}{7} \\ &= 294 + \frac{77}{2} = 294 + 38.5 = 332.5 \text{ cm}^2 \end{aligned}$$

5. A hemispherical depression is cut out from one face of a cubical wooden block such that the diameter l of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid.

Ans. \because Diameter of the hemisphere = l , therefore radius of the hemisphere = $\frac{l}{2}$

Also, length of the edge of the cube = l

\therefore Surface area of the remaining solid

$$\begin{aligned} &= 2\pi \left(\frac{l}{2} \right)^2 + 6l^2 - \pi \left(\frac{l}{2} \right)^2 \\ &= \pi \left(\frac{l}{2} \right)^2 + 6l^2 \\ &= \frac{\pi l^2}{4} + 6l^2 \\ &= \frac{1}{4} l^2 (\pi + 24) \end{aligned}$$

***** END *****

