Surface Areas and Volumes Ex.16.1 Q44

Answer :

The height of the hollow cylinder is 14 cm. Let the inner and outer radii of the hollow cylinder are r cm and R cm respectively. The difference between the outer and inner surface area of the hollow cylinder is

$$= 2\pi R \times 14 - 2\pi r \times 14$$
$$= 28\pi(R - r) \text{ cm}^2$$

By the given condition, this difference is 88 square cm. Hence, we have

$$28\pi(R - r) = 88$$
$$\Rightarrow R - r = \frac{44 \times 7}{14 \times 22}$$
$$\Rightarrow R - r = \frac{4 \times 7}{14 \times 2}$$
$$\Rightarrow R - r = 1$$

The volume of the metal used in making the cylinder is

$$V_1 = \pi\{(R)^2 - (r)^2\} \times 14 \text{ cm}^3$$

By the given condition, the volume of the metal is 176 cubic cm. Hence, we have

$$\pi\{(R)^2 - (r)^2\} \times 14 = 176$$
$$\Rightarrow R^2 - r^2 = \frac{176 \times 7}{14 \times 22}$$
$$\Rightarrow R^2 - r^2 = 4$$
$$\Rightarrow (R - r)(R + r) = 4$$
$$\Rightarrow 1 \times (R + r) = 4$$
$$\Rightarrow R + r = 4$$

Hence, we have two equations with unknowns R and r

$$R - r = 1,$$
$$R + r = 4$$

Adding the two equations, we have

$$(R - r) + (R + r) = 1 + 4$$
$$\Rightarrow 2R = 5$$
$$\Rightarrow R = 2.5$$

Then from the second equation, we have

$$r = 4 - 2.5 = 1.5$$

Therefore, the outer and inner diameters of the hollow cylinder are 5cm and 3cm respectively.

Surface Areas and Volumes Ex.16.1 Q45

Answer :

Let the radius of the hemisphere be *r* cm.

Volume of hemisphere = $2425\frac{1}{2}\ \text{cm}^3$

$\Rightarrow \frac{2}{3}\pi r^3 = \frac{4851}{2}$

$\Rightarrow \frac{2}{3} \times \frac{22}{7} r^3 = \frac{4851}{2}$

$\Rightarrow r^3 = \frac{4851 \times 3 \times 7}{2 \times 2 \times 22}$

$\Rightarrow r^3 = \frac{441 \times 21}{2 \times 2 \times 2}$

$\Rightarrow r^3 = \left(\frac{21}{2}\right)^3$

$\Rightarrow r = \frac{21}{2}\ \text{cm}$

Now, the curved surface area of hemisphere is given by

$2\pi r^2$

$= 2 \times \frac{22}{7} \times \left(\frac{21}{2}\right)^2$

$= 693\ \text{cm}^2$

Surface Areas and Volumes Ex.16.1 Q46

Answer :

Let the radius of the cone by *r*

Now, Volume cylindrical bucket = Volume of conical heap of sand

$\Rightarrow \pi(18)^2(32) = \frac{1}{3}\pi r^2(24)$

$\Rightarrow (18)^2(32) = 8r^2$

$\Rightarrow r^2 = 18 \times 18 \times 4$

$\Rightarrow r^2 = 1296$

$\Rightarrow r = 36\ \text{cm}$

Let the slant height of the cone be *l*.

Thus , the slant height is given by

$l = \sqrt{(24)^2 + (36)^2}$

$= \sqrt{576 + 1296}$

$= \sqrt{1872}$

$= 12\sqrt{13}\ \text{cm}$

Disclaimer: The answer given in the book for the slant height is not correct.

********** END **********