



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

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

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.

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

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

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

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

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

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

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

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 be 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.

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