Surface Areas and Volumes Ex.16.1 Q35

Answer :

The radius of the copper rod is 0.5 cm and length is 8 cm. Therefore, the volume of the copper rod is

$V = \pi \times (0.5)^2 \times 8 \text{ cm}^3$

Let the radius of the wire is *r* cm. The length of the wire is 18 m=1800 cm. Therefore, the volume of the wire is

$V_1 = \pi \times (r)^2 \times 1800 \text{ cm}^3$

Since, the volume of the copper rod is equal to the volume of the wire; we have

$$V_1 = V$$
$$\Rightarrow \pi r^2 \times 1800 = \pi \times (0.5)^2 \times 8$$
$$\Rightarrow r^2 = \frac{0.25\times 8}{1800} = \frac{1}{900}$$
$$\Rightarrow r = \frac{1}{30} = 0.033 \text{ cm}$$

Hence, the radius of the wire is 0.033 cm = 0.33 mm.

Surface Areas and Volumes Ex.16.1 Q36

Answer :

The internal and external radii of the hollow sphere are 3cm and 5cm respectively. Therefore, the volume of the spherical shell is

$$V = \frac{4}{3}\pi \times \left\{(5)^3 - (3)^3\right\}$$
$$= \frac{4}{3}\pi \times 98 \text{ cm}^3$$

The spherical shell is melted to recast a solid cylinder of length $\frac{8}{3}$ cm. Let the radius of the solid cylinder is *r* cm. Therefore, the volume of the solid cylinder is

$$V_1 = \pi \times (r)^2 \times \frac{8}{3} \text{ cm}^3$$

Since, the volume of the hollow spherical shell is equal to the volume of the solid cylinder; we have

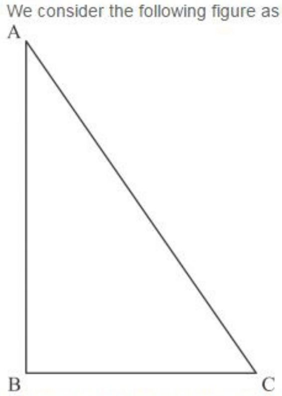
$$V_1 = V$$
$$\Rightarrow \pi \times (r)^2 \times \frac{8}{3} = \frac{4}{3}\pi \times 98$$
$$\Rightarrow \quad r^2 = 49$$
$$\Rightarrow \quad r = 7$$

Hence, the diameter of the solid cylinder is two times its radius, which is 14 cm.

Surface Areas and Volumes Ex.16.1 Q37

Answer :

We consider the following figure as follows



Let the angle B is right angle and the sides of the triangle are AB = 4cm, BC = 3cm, AC = 5cm.

When the triangle is revolved about the side AB, then the base-radius, height and slant height of the produced cone becomes BC, AB and AC respectively. Therefore, the volume of the produced cone is

$$V_1 = \frac{1}{3}\pi \times BC^2 \times AB$$

$$= \frac{1}{3}\pi \times (3)^2 \times 4$$
$$= 12\pi \text{ cubic cm}$$

In this case, the curved surface area of the cone is

$$S_1 = \pi \times \mathrm{BC} \times \mathrm{AC}$$
$$= \pi \times 3 \times 5$$
$$= 15\pi \text{ square cm}$$

When the triangle is revolved about the side BC, then the base-radius, height and slant height of the produced cone becomes AB, BC and AC respectively. Therefore, the volume of the produced cone is

$$V_2 = \frac{1}{3}\pi \times \mathrm{AB}^2 \times \mathrm{BC}$$
$$= \frac{1}{3}\pi \times (4)^2 \times 3$$
$$= 16\pi \text{ cubic cm}$$

In this case, the curved surface area of the cone is

$$S_2 = \pi \times \mathrm{AB} \times \mathrm{AC}$$
$$= \pi \times 4 \times 5$$
$$= 20\pi \text{ square cm}$$

Therefore, the difference between the volumes of the two cones so formed is

$$V_2 - V_1 = 16\pi - 12\pi$$
$$= 4\pi \text{ cm}^3$$

Hence the difference between the volumes is $\boxed{4\pi \text{ cm}^3}$

And surface areas are $\boxed{15\pi \text{ cm}^2 \text{ and } 20\pi \text{ cm}^2}$

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