Surface Areas and Volumes Ex.16.1 Q17

Answer :

The internal radius of the hemispherical bowl is 9cm. Therefore, the volume of the water in the hemispherical bowl is

$$V = \frac{2}{3}\pi \times (9)^3 \text{ cm}^3$$

The water in the hemispherical bowl is required to transfer into the cylindrical bottles each of radius $\frac{3}{2}$ cm and height 4cm. Therefore, the volume of each of the cylindrical bottle is

$$V_1 = \pi \times \left(\frac{3}{2}\right)^2 \times 4 \text{ cm}^3$$

Therefore, the required number of cylindrical bottles is

$$\frac{V}{V_1} = \frac{\frac{2}{3}\pi \times (9)^3}{\pi \times \left(\frac{3}{2}\right)^2 \times 4}$$

$$= \frac{2 \times (9)^3 \times (2)^2}{3 \times (3)^2 \times 4}$$

$$= 54$$

Hence $\boxed{\text{No. of bottles} = 54}$

Surface Areas and Volumes Ex.16.1 Q18

Answer :

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

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

The hollow spherical shell is melted to recast a cylinder of radius 7cm. Let, the height of the solid cylinder is h. Therefore, the volume of the solid cylinder is

$$V_1 = \pi \times (7)^2 \times h \text{ cm}^3$$

Since, the volume of the solid cylinder is same as the volume of the hollow spherical shell, we have

$$V_1 = V$$

$$\Rightarrow \pi \times (7)^2 \times h = \frac{4}{3}\pi \times \left\{(5)^3 - (3)^3\right\}$$

$$\Rightarrow \quad 49 \times h = \frac{4}{3} \times 98$$

$$\Rightarrow \quad h = \frac{4 \times 98}{3 \times 49}$$

$$\Rightarrow \quad = \frac{8}{3}$$

Therefore, the height of the solid cylinder is $\boxed{\frac{8}{3} \text{ cm}}$

Surface Areas and Volumes Ex.16.1 Q19

Answer :

The internal and external radii of the hollow sphere are 2cm and 4cm respectively. Therefore, the volume of the hollow sphere is

$$V = \frac{4}{3}\pi \times \left\{(4)^3 - (2)^3\right\} \text{ cm}^3$$

The hollow spherical shell is melted to recast a cone of base- radius 4cm. Let, the height of the cone is h. Therefore, the volume of the cone is

$$V_1 = \frac{1}{3}\pi \times (4)^2 \times h \text{ cm}^3$$

Since, the volume of the cone is same as the volume of the hollow sphere, we have

$$V_1 = V$$

$$\Rightarrow \frac{1}{3}\pi \times (4)^2 \times h = \frac{4}{3}\pi \times \left\{(4)^3 - (2)^3\right\}$$

$$\Rightarrow \quad 16 \times h = 4 \times 56$$

$$\Rightarrow \quad h = \frac{4 \times 56}{16}$$

$$\Rightarrow \quad = 14$$

Therefore, the height of the cone is $\boxed{14 \text{ cm}}$

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