



### 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

$$\begin{aligned} \frac{V}{V_1} &= \frac{\frac{2}{3} \pi \times (9)^3}{\pi \times \left(\frac{3}{2}\right)^2 \times 4} \\ &= \frac{2 \times (9)^3 \times (2)^2}{3 \times (3)^2 \times 4} \\ &= 54 \end{aligned}$$

Hence **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

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

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

$$\begin{aligned} V_1 &= V \\ \Rightarrow \pi \times (7)^2 \times h &= \frac{4}{3} \pi \times \{(5)^3 - (3)^3\} \\ \Rightarrow 49 \times h &= \frac{4}{3} \times 98 \\ \Rightarrow h &= \frac{4 \times 98}{3 \times 49} \\ \Rightarrow h &= \frac{8}{3} \end{aligned}$$

Therefore, the height of the solid cylinder is  **$\frac{8}{3}$  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

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

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

$$\begin{aligned} V_1 &= V \\ \Rightarrow \frac{1}{3} \pi \times (4)^2 \times h &= \frac{4}{3} \pi \times \{(4)^3 - (2)^3\} \\ \Rightarrow 16 \times h &= 4 \times 56 \\ \Rightarrow h &= \frac{4 \times 56}{16} \\ \Rightarrow h &= 14 \end{aligned}$$

Therefore, the height of the cone is **14 cm**

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