



Exercise 13D

Question 22:

Here, internal radius of hemisphere bowl (R) = 9 cm

Diameter of bottle = 3 cm

$$\Rightarrow \text{radius } (r) = \left(\frac{3}{2}\right) \text{ cm}$$

and, height of bottle = 4 cm

$$\therefore \text{Number of bottles} = \frac{\text{Volume of the bowl}}{\text{Volume of each bottle}}$$

$$= \frac{\left\{ \frac{2}{3} \pi \times R^3 \right\}}{\left\{ \pi \times (r)^2 \times h \right\}}$$

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

$$= \frac{\left\{ \frac{2}{3} \times 9 \times 9 \times 9 \right\}}{\frac{9}{4} \times 4}$$

$$= \frac{2 \times 3 \times 81}{9} = 54$$

\therefore the number of bottle required = 54.

Question 23:

Internal radius(r) = 8 cm

External radius(R) = 9 cm

Density of metal = 4.5 g per cm^3

$$\therefore \text{weight of the shell} = \left[\frac{4}{3} \pi \times \{(R)^3 - (r)^3\} \times \text{density} \right]$$

$$= \left[\frac{4}{3} \times \frac{22}{7} \times \{(9)^3 - (8)^3\} \times \frac{4.5}{1000} \right] \text{ kg}$$

$$= \left[\frac{4}{3} \times \frac{22}{7} \times \{729 - 512\} \times \frac{4.5}{1000} \right] \text{ kg}$$

$$= \left[\frac{4}{3} \times \frac{22}{7} \times 217 \times \frac{4.5}{1000} \right] \text{ kg}$$

$$= \left(\frac{85932}{21000} \right) \text{ kg} = 4.092 \text{ kg}$$

\therefore weight of the shell = 4.092 kg.

***** END *****