Exercise 13D

Question 22:
Here, internal radius of hemisphere bowl (R) = 9 cm

Diameter of bottle = 3 cm

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

and, height of bottle = 4 cm

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

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

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

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

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

$\therefore$ the number of bottle required = 54.

Question 23:
Internal radius(r) = 8cm

External radius(R) = 9cm

Density of metal = 4.5g per cm³

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

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

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

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

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

$\therefore$ weight of the shell = 4.092 kg.

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