Exercise 13D

Question 19:

Let the radius of ball be r cm and R be the radius of the cylindrical tub.

Then,

$$\frac{4}{3} \times \pi \times (r)^3 = \pi \times R^2 \times h$$

$$\Rightarrow \quad \frac{4}{3} \times \pi \times (r)^3 = \pi \times (12)^2 \times 6.75$$

$$\Rightarrow \quad (r)^3 = \frac{\pi \times 144 \times 6.75}{\frac{4}{3} \times \pi} = \frac{144 \times 6.75}{\frac{4}{3}}$$

$$r^3 = \frac{972 \times 3}{4} = \frac{2916}{4} = 729$$

$$\Rightarrow \quad r = 9 \, cm$$

∴ the radius of the ball = 9 cm.

Question 20:

Radius of the cylindrical bucket = 15 cm

Height of the cylindrical bucket = 20 cm

Volume of the water in the bucket = $\pi \times 15 \times 15 \times 20$ cm³

Radius of spherical ball = 9 cm

Volume of the spherical ball = $\frac{4}{3} \times \pi \times 9 \times 9 \times 9$ cm³.....(1)

Increase in the water level = h cm

Volume of the increased water level = $\pi \times 15 \times 15 \times h$ cm³.....(2)

Equating (1) and (2),
we have

$$\pi \times 15 \times 15 \times h = \frac{4}{3} \times \pi \times 9 \times 9 \times 9$$

$$h = \frac{\frac{4}{3} \times \pi \times 9 \times 9 \times 9}{\pi \times 15 \times 15}$$

$$h = 4.32 cm$$

Question 21:

Radius of hemisphere = 9 cm

Height of cone = 72 cm

Let the radius of the base of cone be r cm.

Then,

$$\frac{1}{3} \times \pi \times r^2 \times h = \frac{2}{3} \times \pi \times R^3$$

$$\Rightarrow \quad \frac{1}{3}\pi \times r^2 \times 72 = \frac{2}{3} \times \pi \times (9)^3$$

$$\Rightarrow \quad r^2 = \frac{\frac{2}{3} \times \pi \times 729}{\frac{1}{3} \times \pi \times 72} = \frac{2 \times 729}{72}$$

$$r^2 = \frac{1458}{72} = 20.25$$

$$\Rightarrow \quad r = 4.5 \, cm$$

∴ the radius of the base of the cone = 4.5 cm.

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