Exercise 19B

Question 1:

Radius of the cone = 12 cm and its height = 24 cm

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h = \left(\frac{1}{3} \times \pi \times 12 \times 12 \times 24\right) cm^3$$

$$= (48 \times 24)\pi \ cm^3$$

$$\text{Volume of each ball} = \frac{4}{3}\pi R^3 = \frac{4}{3}\pi \times 3 \times 3 \times 3 = (36\pi)\, cm^3$$

$$\text{Number of balls formed} = \frac{\text{Volume of solid cone}}{\text{Volume of each ball}}$$

$$= \frac{(48 \times 24\pi)}{36\pi} = 32$$

Question 2:

Internal radius = 3 cm and external radius = 5 cm

$$\text{Volume of material in the shell} = \frac{2}{3}\pi \times \left[(5)^3 - (3)^3\right] cm^2$$

$$= \frac{2}{3} \times \frac{22}{7} \times 98 = \frac{616}{3} cm^3$$

Radius of the cone = 7 cm

Let height of cone be h cm

$$\text{Volume of cone} = \left(\frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times h\right) cm^3 = \frac{154h}{3} cm^3$$

$$\therefore \frac{154h}{3} = \frac{616}{3}$$

$$\Rightarrow h = \frac{616}{154} = 4 \text{ cm}$$

Hence, height of the cone = 4 cm

Question 3:

Inner radius of the bowl = 15 cm

Volume of liquid in it = $\frac{2}{3}\pi r^3 = \left(\frac{2}{3}\pi \times (15)^3\right) cm^3$

Radius of each cylindrical bottle = 2.5 cm and its height = 6 cm

Volume of each cylindrical bottle

$$= \pi r^2 h = \left(\pi \times \left(\frac{5}{2}\right)^2 \times 6\right) cm^2$$

$$= \left(\frac{25}{4} \times 6\pi\right) = \left(\frac{75\pi}{2}\right) cm^3$$

Required number of bottles = $\frac{\text{Volume of liquid}}{\text{Volume of each cylindrical bottle}}$

$$= \frac{\frac{2}{3} \times \pi \times 15 \times 15 \times 15}{\frac{75}{2} \times \pi} = 60$$

Hence, bottles required = 60

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