Exercise 19B

Question 4:

Radius of the sphere = $\frac{21}{2}$ cm

Volume of the sphere = $\left(\frac{4}{3}\pi r^3\right) = \left[\frac{4}{3}\pi \times \left(\frac{21}{2}\right)^3\right] cm^3$

Radius of cone = $\frac{7}{4}$ cm and height 3 cm

Volume of cone = $\frac{1}{3}\pi r^2 h = \left(\frac{1}{3} \times \pi \times \left(\frac{7}{4}\right)^2 \times 3\right) cm^3$

Let the number of cones formed be n, then

$$n \times \frac{1}{3}\pi \times \left(\frac{7}{4}\right)^2 \times 3 = \frac{4}{3}\pi \times \left(\frac{21}{2}\right)^3$$

$$n = \frac{4}{3}\pi \times \frac{21}{2} \times \frac{21}{2} \times \frac{21}{2} \times \frac{3}{\pi} \times \frac{4}{7} \times \frac{4}{7} \times \frac{1}{3}$$

$$n = 504$$

Hence, number of cones formed = 504

Question 5:

Radius of the cannon ball = 14 cm

Volume of cannon ball = $\frac{4}{3}\pi r^3 = \left[\frac{4}{3}\pi \times (14)^3\right] cm^3$

Radius of the cone = $\frac{35}{2}$ cm,

Let the height of cone be h cm

$\therefore$ Volume of cone = $\left[\frac{1}{3}\pi \times \left(\frac{35}{2}\right)^2 \times h\right] cm^3$

$$\therefore \frac{4}{3}\pi \times (14)^3 = \frac{1}{3}\pi \times \left(\frac{35}{2}\right)^2 \times h$$

$$h = \frac{4}{3}\pi \times 14 \times 14 \times 14 \times \frac{3}{\pi} \times \frac{2}{35} \times \frac{2}{35}$$

$$= 35.84 \text{ cm}$$

Hence, height of the cone = 35.84 cm

Question 6:

Let the radius of the third ball be r cm, then,

Volume of third ball = Volume of spherical ball - volume of 2 small balls

$$\text{Volume of third ball} = \left[\frac{4}{3}\pi(3)^3 - \left\{\frac{4}{3}\pi\left(\frac{3}{2}\right)^3 + \frac{4}{3}\pi(2)^3\right\}\right]$$

$$= \left[36\pi - \left(\frac{9\pi}{2} + \frac{32\pi}{3}\right)\right] cm^3 = \frac{125\pi}{6} cm^3$$

$$\therefore \quad \frac{4}{3}\pi r^3 = \frac{125\pi}{6}$$

$$r^3 = \frac{125\pi \times 3}{6 \times 4 \times \pi} = \frac{125}{8}$$

$$r = \left(\frac{5}{2}\right) cm = 2.5 \text{ cm}$$

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