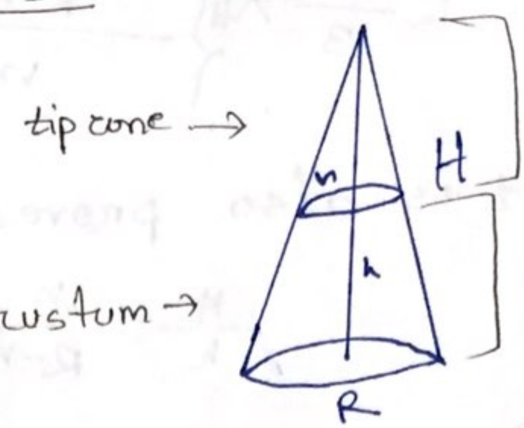
Formulas



- Volume of the entire cone,

$$V = \frac{1}{3}\pi R^2 (H+h)$$

- volume of the tip cone,

$$V = \frac{1}{3}\pi r^2 H$$

- volume of Frustum,

$$V = \frac{1}{3}\pi \left\{ R^2 (H+h) - r^2 H \right\} \quad \text{—— (*)}$$

We know, that,

$$\frac{R}{r} = \frac{H+h}{H} \quad \text{—— (*)}$$

$$\Rightarrow H+h = \frac{RH}{r}$$

so, $$V = \frac{1}{3}\pi \left\{ R^2 \frac{RH}{r} - r^2 H \right\}$$

$$= \frac{1}{3}\pi H\left\{\frac{R^3 - r^3}{r}\right\} \quad \text{—— (iii)}$$

It is also proved that,

$$\frac{H}{h} = \frac{r}{R-r} \quad (A)$$

$$\frac{H+h}{H} = \frac{R}{r}$$

$$\Rightarrow Hr + hr = RH$$

$$\Rightarrow H(R-r) = hr$$

$$\Rightarrow \frac{H}{h} = \frac{r}{R-r}$$

So, $$\frac{1}{3}\pi \cdot \frac{hr}{R-r}\left(\frac{R^3 - r^3}{r}\right)$$

$$\frac{1}{3}\pi h \frac{(R-r)(R^2+Rr+r^2)}{(R-r)}$$

$$\frac{1}{3}\pi h(R^2+Rr+r^2) \quad \text{—— (iiii)} \quad (A)$$