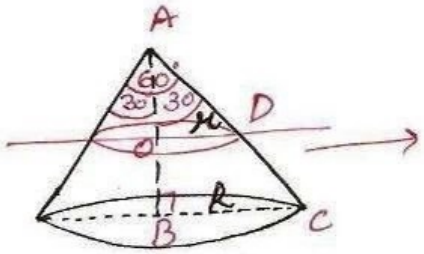
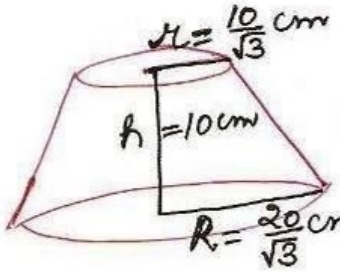
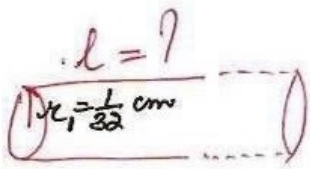
ex 13.4

(5)







$AB = 20\,cm$

$AO = OB = \frac{20}{2}$

$= 10\,cm$

In rt ΔABC

$\tan 30^\circ = \frac{BC}{AB}$

$\frac{1}{\sqrt{3}} = \frac{R}{20}$

$R = \frac{20}{\sqrt{3}}$

In rt ΔAOD

$\tan 30^\circ = \frac{OD}{AO}$

$\frac{1}{\sqrt{3}} = \frac{r}{10}$

$\Rightarrow r = \frac{10}{\sqrt{3}}$

volume of frustum = vol of wire

$\frac{1}{3}\pi h(R^2 + r^2 + Rr) = \pi r_1^2 l$

$\frac{1}{3} \times 10\left[\left(\frac{20}{\sqrt{3}}\right)^2 + \left(\frac{10}{\sqrt{3}}\right)^2 + \frac{20}{\sqrt{3}} \times \frac{10}{\sqrt{3}}\right] = \frac{1}{32} \times \frac{1}{32} \times l$

$\Rightarrow \frac{1}{3} \times 10\left[\frac{400}{3} + \frac{100}{3} + \frac{200}{3}\right] = \frac{1}{32} \times \frac{1}{32} \times l$

$\Rightarrow \frac{1}{3} \times 10 \times \frac{700}{3} = \frac{1}{32} \times \frac{1}{32} \times l$

$\Rightarrow \frac{7000}{9} \times 32 \times 32 = l$

$\Rightarrow l = \frac{7168000}{9}\,cm$

$\Rightarrow l = 7964.4\,m$