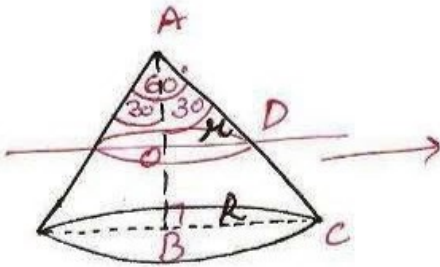


5



$$AB = 20 \text{ cm}$$

$$AO = OB = \frac{20}{2} = 10 \text{ cm}$$

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

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

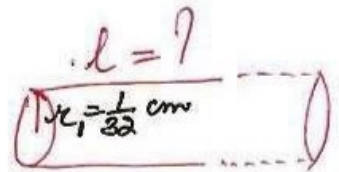
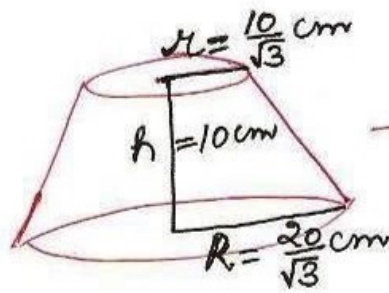
$$\frac{1}{3} \times 10 \left[\left(\frac{20}{\sqrt{3}} \right)^2 + \left(\frac{10}{\sqrt{3}} \right)^2 + \frac{20}{\sqrt{3}} \times \frac{10}{\sqrt{3}} \right] = \frac{1}{32} \times \frac{1}{32} \times l$$

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

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

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

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



$$\Rightarrow l = 7964.4 \text{ m}$$