



Exercise 13.4

$$= 10449.92 \text{ cm}^3 = 10.44992 \text{ liters}$$

$$\therefore \text{Cost of the milk} = 10.44992 \times 20$$

$$= \text{Rs. } 208.8894 = \text{Rs. } 209$$

$$\text{Now, surface area} = \pi(r_1 + r_2)l + \pi r_2^2$$

$$= \pi(r_1 + r_2)\sqrt{h^2 + (r_1 - r_2)^2} + \pi r_2^2$$

$$= 3.14(20 + 8)\sqrt{(16)^2 + (20 - 8)^2} + 3.14(8)^2$$

$$= 3.14 \times 28\sqrt{256 + 144} + 3.14 \times 64$$

$$= 1158.4 + 200.96$$

$$= 1959.36 \text{ cm}^2$$

$$\therefore \text{Area of the metal sheet used} = 1959.36 \text{ cm}^2$$

$$\therefore \text{Cost of metal sheet} = 1959.36 \times \frac{8}{100}$$

$$= 156.7488 = \text{Rs. } 156.75$$

5. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire.

Ans. $\tan 30^\circ = \frac{r_2}{10}$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{r_2}{10}$$

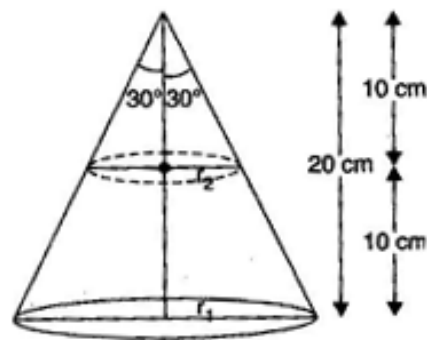
$$\Rightarrow r_2 = \frac{10}{\sqrt{3}} \text{ cm}$$

$$\tan 30^\circ = \frac{r_1}{20}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{r_1}{20}$$

$$\Rightarrow r_1 = \frac{20}{\sqrt{3}} \text{ cm}$$

$$h = 10 \text{ cm}$$



$$\begin{aligned}
\therefore \text{Volume} &= \frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2) \\
&= \frac{1}{3} \times \frac{22}{7} \times 10 \left\{ \left(\frac{20}{\sqrt{3}} \right)^2 + \left(\frac{10}{\sqrt{3}} \right)^2 + \left(\frac{20}{\sqrt{3}} \right) \left(\frac{10}{\sqrt{3}} \right) \right\} \\
&= \frac{1}{3} \times \frac{22}{7} \times 10 \times \left(\frac{400}{3} + \frac{100}{3} + \frac{200}{3} \right) \\
&= \frac{1}{3} \times \frac{22}{7} \times 10 \times \frac{700}{3} = \frac{22000}{9} \text{ cm}^3
\end{aligned}$$

$$\text{Diameter of the wire} = \frac{1}{16} \text{ cm}$$

$$\therefore \text{Radius of the wire} = \frac{1}{32} \text{ cm}$$

Let the length of the wire be l cm.

$$\begin{aligned}
\text{Then, Volume of the wire} &= \pi r^2 l = \frac{22}{7} \left(\frac{1}{32} \right)^2 l = \\
&\frac{11l}{3584} \text{ cm}^3
\end{aligned}$$

According to the question,

$$\begin{aligned}
\frac{11l}{3584} &= \frac{22000}{9} \\
\Rightarrow l &= \frac{22000 \times 3584}{11 \times 9} \\
\Rightarrow l &= \frac{2000 \times 3584}{9}
\end{aligned}$$

$$\Rightarrow l = 796444.44 \text{ cm} = 7964.4 \text{ m}$$

***** END *****