Surface Areas and Volumes Ex.16.3 Q4

Answer :

The height of the frustum of the cone is h = 16 cm. The perimeters of the circular ends are 44 cm and 33 cm. Let the radii of the bottom and top circles are r_1 cm and r_2 cm respectively. Then, we have

$$2\pi r_1 = 44$$
$$\Rightarrow \pi r_1 = 22$$
$$\Rightarrow r_1 = \frac{22\times 7}{22}$$
$$\Rightarrow r_1 = 7$$
$$2\pi r_2 = 33$$
$$\Rightarrow \pi r_2 = \frac{33}{2}$$
$$\Rightarrow r_2 = \frac{33}{2}\times\frac{7}{22}$$
$$\Rightarrow r_2 = \frac{21}{4}$$

The slant height of the bucket is

$$l = \sqrt{(r_1 - r_2)^2 + h^2}$$
$$= \sqrt{(7-\frac{21}{4})^2 + 16^2}$$
$$= 16.1 \text{ cm}$$

The curved/slant surface area of the frustum cone is

$$= \pi(r_1 + r_2)\times l$$
$$= (\pi r_1 + \pi r_2)\times l$$
$$= (22 + 16.5)\times 16.1$$
$$= 619.85 \text{ cm}^2$$

Hence $\boxed{\text{Curved surface area} = 619.85 \text{ cm}^2}$

The volume of the frustum of the cone is

$$V = \frac{1}{3}\pi(r_1^2 + r_1 r_2 + r_2^2)\times h$$
$$= \frac{1}{3}\pi(7^2 + 7\times 5.25 + 5.25^2)\times 16$$
$$= 1900 \text{ cm}^3$$

Hence $\boxed{\text{Volume of frustum} = 1900 \text{ cm}^3}$

The total surface area of the frustum cone is

$$= \pi(r_1 + r_2)\times l + \pi r_1^2 + \pi r_2^2$$
$$= 619.85 + \frac{22}{7}\times 7^2 + \frac{22}{7}\times 5.25^2$$

= 860.25 Square cm

Hence $\boxed{\text{Total surface area} = 860.25 \text{ cm}^2}$

Surface Areas and Volumes Ex.16.3 Q5

Answer :

The height of the conical bucket is h = 45 cm. The radii of the bottom and top circles are r_1 = 28cm and r_2 =7cm respectively.

The volume/capacity of the conical bucket is

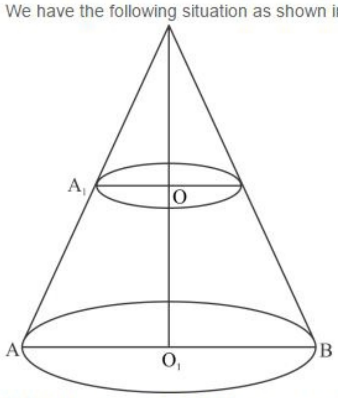
$$
\begin{aligned}
V &= \frac{1}{3}\pi(r_1^2 + r_1 r_2 + r_2^2)\times h \\
&= \frac{1}{3}\pi(28^2 + 28\times 7 + 7^2)\times 45 \\
&= \frac{1}{3}\times\frac{22}{7}\times 1029\times 45 \\
&= 22\times 147\times 15 \\
&= 48510 \text{ cm}^3
\end{aligned}
$$

Hence $\boxed{\text{volume} = 48510 \text{ cm}^3}$

Surface Areas and Volumes Ex.16.3 Q6

Answer :

We have the following situation as shown in the figure



Let VAB be a cone of height $h_1 = VO_1$ =20cm. Then from the symmetric triangles VO_1A and VOA_1, we have

$$\frac{VO_1}{VO} = \frac{O_1A}{OA_1}$$

$$\Rightarrow \frac{20}{VO} = \frac{O_1A}{OA_1}$$

It is given that, volume of the cone VA_1O is $\frac{1}{125}$ times the volume of the cone VAB. Hence, we have

$$\frac{1}{3}\pi OA_1^2\times VO = \frac{1}{125}\times\frac{1}{3}\pi O_1A^2\times 20$$

$$\Rightarrow \left(\frac{OA_1}{O_1A}\right)^2\times VO = \frac{4}{25}$$

$$\Rightarrow \left(\frac{VO}{20}\right)^2\times VO = \frac{4}{25}$$

$$\Rightarrow \quad VO^3 = \frac{400\times 4}{25}$$

$$\Rightarrow \quad VO^3 = 16\times 4$$

$$\Rightarrow \quad VO = 4$$

Hence, the height at which the section is made is 20 − 4 = 16 cm.

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