Surface Areas and Volumes Ex.16.3 Q12

Answer :

Let the depth of the bucket is h cm. The radii of the top and bottom circles of the frustum bucket are r_1 =20cm and r_2 =12cm respectively.

The volume/capacity of the bucket is

$$V = \frac{1}{3}\pi(r_1^2 + r_1 r_2 + r_2^2) \times h$$
$$= \frac{1}{3}\pi(20^2 + 20 \times 12 + 12^2) \times h$$
$$= \frac{1}{3} \times \frac{22}{7} \times 784 \times h$$
$$= \frac{1}{3} \times 22 \times 112 \times h \text{ cm}^3$$

Given that the capacity of the bucket is 12308.8 Cubic cm. Thus, we have

$$\frac{1}{3} \times 22 \times 112 \times h = 12308.8$$
$$\Rightarrow h = \frac{12308.8 \times 3}{22 \times 112}$$
$$\Rightarrow h = 15$$

Hence, the height of the bucket is $\boxed{15 \text{ cm}}$

The slant height of the bucket is

$$l = \sqrt{(r_1 - r_2)^2 + h^2}$$
$$= \sqrt{(20-12)^2 + 15^2}$$
$$= \sqrt{289}$$
$$= 17 \text{ cm}$$

The surface area of the used metal sheet to make the bucket is

$$S_1 = \pi(r_1 + r_2) \times l + \pi r_2^2$$
$$= \pi \times (20+12) \times 17 + \pi \times 12^2$$
$$= \pi \times 32 \times 17 + 144\pi$$
$$= 2160.32 \text{ cm}^2$$

Hence $\boxed{\text{Surface area of the metal} = 2160.32 \text{ cm}^2}$

Surface Areas and Volumes Ex.16.3 Q13

Answer :

The height of the bucket is 20cm. The radii of the upper and lower circles of the bucket are r_1 =25cm and r_2 =10cm respectively.

The slant height of the bucket is

$$l = \sqrt{(r_1 - r_2)^2 + h^2}$$
$$= \sqrt{(25-10)^2 + 20^2}$$
$$= \sqrt{625}$$
$$= 25 \text{ cm}$$

The surface area of the used aluminium sheet to make the bucket is

$$S_1 = \pi(r_1 + r_2) \times l + \pi r_2^2$$
$$= \pi \times (25+10) \times 25 + \pi \times 10^2$$
$$= \pi \times 35 \times 25 + 100\pi$$
$$= 3061.5 \text{ cm}^2$$

Therefore, the total cost of making the bucket is

$$= \frac{3061.5}{100} \times 70$$
$$= 2143.05$$

Hence the total cost is $\boxed{\text{Rs.2143.05}}$

Surface Areas and Volumes Ex.16.3 Q14

Answer :

The slant height of the frustum of a cone is l=10cm. The radii of the upper and lower circles of the bucket are r_1 =33cm and r_2 =27cm respectively.

The total surface area of the frustum of the cone is

$$\begin{aligned} S_1 &= \pi(r_1+r_2)\times l+\pi r_1^2+\pi r_2^2 \\ &= \pi\times(33+27)\times 10+\pi\times 33^2+\pi\times 27^2 \\ &= 600\pi+1089\pi+729\pi \\ &= 7599.42\ \text{cm}^2 \end{aligned}$$

Hence total surface area is $\boxed{7599.42\ \text{cm}^2}$

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