Surface Areas and Volumes Ex.16.3 Q7

Answer :

The height of the conical bucket is h = 24 cm. The radii of the bottom and top circles are r_1 = 15cm and r_2 = 5cm respectively.

The slant height of the bucket is

$$l = \sqrt{(r_1 - r_2)^2 + h^2}$$
$$= \sqrt{(15-5)^2 + 24^2}$$
$$= \sqrt{676}$$
$$= 26 \text{ cm}$$

The curved surface area of the bucket is

$$= \pi(r_1 + r_2) \times l + \pi r_2^2$$
$$= \frac{22}{7} \times (15+5) \times 26 + \pi \times 5^2$$
$$= \pi \times 20 \times 26 + 25\pi$$
$$= 545\pi \text{ cm}^2$$

Hence the curved surface area of the bucket is $\boxed{545\pi \text{ cm}^2}$

Surface Areas and Volumes Ex.16.3 Q8

Answer :

The height of the frustum cone is h = 12 cm. The radii of the bottom and top circles are r_1 = 12cm and r_2 = 3cm respectively.

The slant height of the frustum cone is

$$l = \sqrt{(r_1 - r_2)^2 + h^2}$$
$$= \sqrt{(12-3)^2 + 12^2}$$
$$= \sqrt{225}$$
$$= 15 \text{ cm}$$

The total surface area of the frustum cone is

$$= \pi(r_1 + r_2) \times l + \pi r_2^2 + \pi r_2^2$$
$$= \pi \times (12+3) \times 15 + \pi \times 12^2 + \pi \times 3^2$$
$$= \pi \times 225 \times 26 + 144\pi + 9\pi$$
$$= 378\pi \text{ cm}^2$$

Hence $\boxed{\text{Total surface area} = 378\pi \text{ cm}^2}$

The volume of the frustum cone is

$$V = \frac{1}{3}\pi(r_1^2 + r_1 r_2 + r_2^2) \times h$$
$$= \frac{1}{3}\pi(12^2 + 12 \times 3 + 3^2) \times 12$$
$$= \frac{1}{3} \times \pi \times 189 \times 12$$
$$= 756\pi \text{ cm}^3$$

Hence $\boxed{\text{Volume of frustum} = 756\pi \text{ cm}^3}$

Surface Areas and Volumes Ex.16.3 Q9

Answer :

The height of the frustum cone is h = 8 m. The radii of the end circles of the frustum are r_1 = 13m and r_2 =7m.

The slant height of the frustum cone is

$$\begin{aligned} l &= \sqrt{(r_1 - r_2)^2 + h^2} \\ &= \sqrt{(13-7)^2 + 8^2} \\ &= \sqrt{100} \\ &= 10 \text{ meter} \end{aligned}$$

The curved surface area of the frustum is

$$\begin{aligned} S_1 &= \pi(r_1 + r_2) \times l \\ &= \pi \times (13+7) \times 10 \\ &= \pi \times 20 \times 10 \\ &= 200\pi \text{ m}^2 \end{aligned}$$

The base-radius of the upper cap cone is 7m and the slant height is 12m. Therefore, the curved surface area of the upper cap cone is

$$\begin{aligned} S_2 &= \pi \times 7 \times 12 \\ &= \frac{22}{7} \times 7 \times 12 \\ &= 22 \times 12 \\ &= 264 \text{ m}^2 \end{aligned}$$

Hence, the total canvas required for the tent is

$$\begin{aligned} S_1 + S_2 &= 200\pi + 264 \\ &= 892.57 \text{ m}^2 \end{aligned}$$

Hence total canvas is $\boxed{892.57 \text{ m}^2}$

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