Surface Areas and Volumes Ex.16.2 Q9

Answer :

To find the total capacity of the tank, we have to add the volume of the cylinder and cone.

Diameter of the cylinder, $d = 21\ \text{cm}$

Radius of the cylinder, $r = \frac{d}{2} = \frac{21}{2}\ \text{cm}$

Height of the cylinder, $h_1 = 18\,\text{cm}$

Also, radius of cone, $r = \frac{21}{2}\,\text{cm}$

Height of the cone, $h_2 = 9\,\text{cm}$

Now,

Total capacity of the tank

= Volume of the cylinder + Volume of 2 cones

$$= \pi r^2 h_1 + 2 \times \frac{1}{3}\pi r^2 h_2$$

$$= \pi r^2 \left(h_1 + \frac{2}{3}h_2\right)$$

$$= \frac{22}{7} \times \left(\frac{21}{2}\right)^2 \times \left(18 + \frac{2}{3} \times 9\right)$$

$$= \frac{22}{7} \times \left(\frac{21}{2}\right)^2 \times 24$$

$$= 8316\ \text{cm}^3$$

Hence the total capacity of the tank is 8316 cm^3.

Surface Areas and Volumes Ex.16.2 Q10

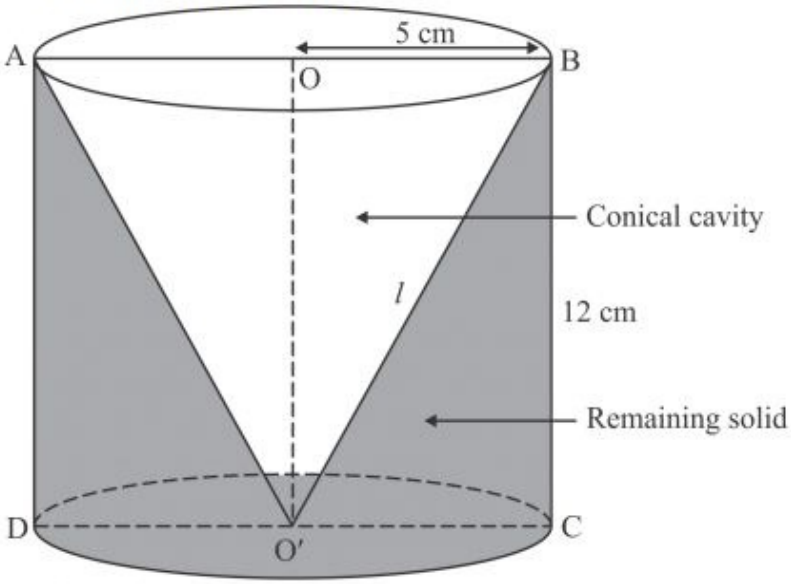
Answer :

Given that:

$r = 5 \text{ cm}$

$h = 12 \text{ cm}$

We have the following diagram



Slant height of cone is given by

$$l = \sqrt{r^2 + h^2}$$
$$= \sqrt{5^2 + 12^2}$$
$$= 13 \text{ cm}$$

The total surface area of the remaining part is given by

$$S = 2\pi rh + \pi r^2 + \pi rl$$
$$= 2 \times \pi \times 5 \times 12 + \pi \times 5^2 + \pi \times 5 \times 13$$
$$= 120\pi + 25\pi + 65\pi$$
$$= 210\pi \text{ cm}^2$$

The volume of the remaining part is given by

$$V = \pi r^2 h - \frac{1}{3}\pi r^2 h$$
$$= \frac{2}{3}\pi r^2 h$$
$$= \frac{2}{3} \times \pi \times 5^2 \times 12$$
$$= 200\pi \text{ cm}^3$$

Hence, $\boxed{S = 210\pi \text{ cm}^2,\ V = 200\pi \text{ cm}^3}$

Surface Areas and Volumes Ex.16.2 Q11

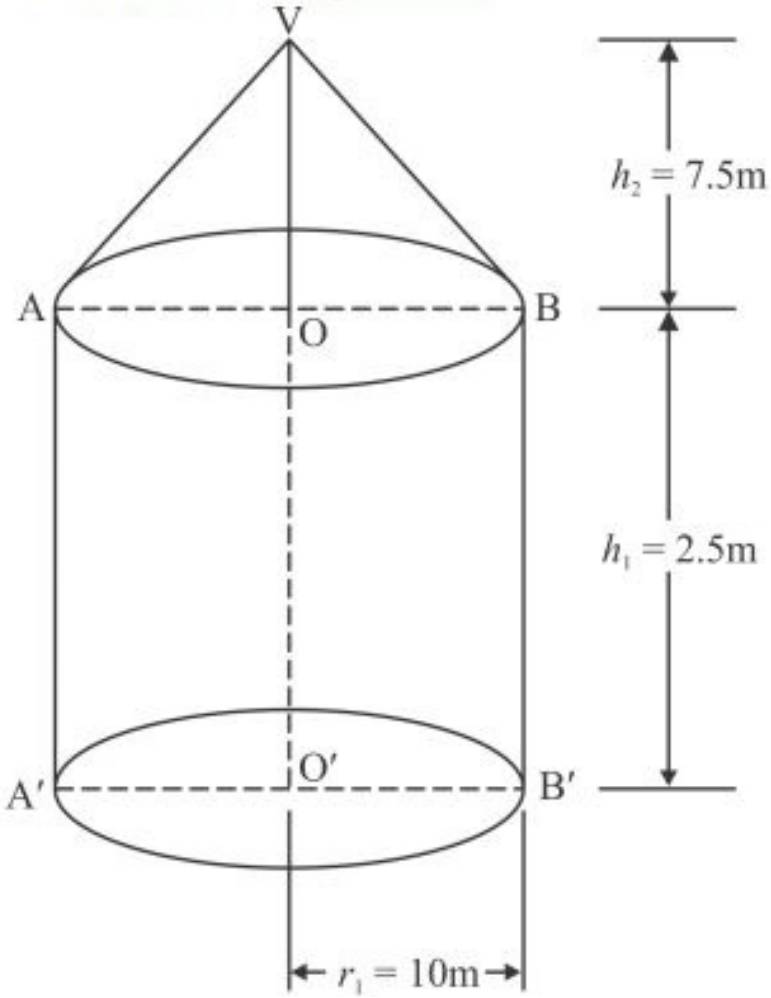
Answer :

Given that:

Radius of the base $r = \frac{d}{2} = \frac{20}{2} = 10 \text{ m}$

Height of the cylinder $h_1 = 2.5 \text{ m}$

Height of the cone $h_2 = 7.5 \text{ m}$



Slant height of the cone

$$l = \sqrt{r^2 + h^2}$$
$$= \sqrt{10^2 + 7.5^2}$$
$$= 12.5 \text{ m}$$

The total capacity of the tent is given by

$$V = \pi r^2 h_1 + \frac{1}{3}\pi r^2 h_2$$
$$= \pi \times 10^2 \times 2.5 + \frac{1}{3} \times \pi \times 10^2 \times 7.5$$
$$= \pi \times 250 + \pi \times 250$$
$$= 500\pi \text{ m}^3$$

The total area of canvas required for the tent is

$$S = 2\pi r h_1 + \pi r l$$
$$= 2 \times 3.14 \times 10 \times 2.5 + 3.14 \times 10 \times 12.5$$
$$= \pi\left(2 \times 10 \times 2.5 + 10 \times 12.5\right)$$
$$= \pi\left(50 + 125\right)$$
$$= \frac{22}{7} \times 175$$
$$= 550 \text{ m}^2$$

Therefore, the total cost of the canvas is

$$= 100 \times 550$$
$$= \text{Rs. } 55000$$

Hence, the total capacity and cost is $\boxed{V = 500\pi \text{ m}^3, \text{ and Rs. } 55000}$

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