Surface Areas and Volumes Ex.16.2 Q12

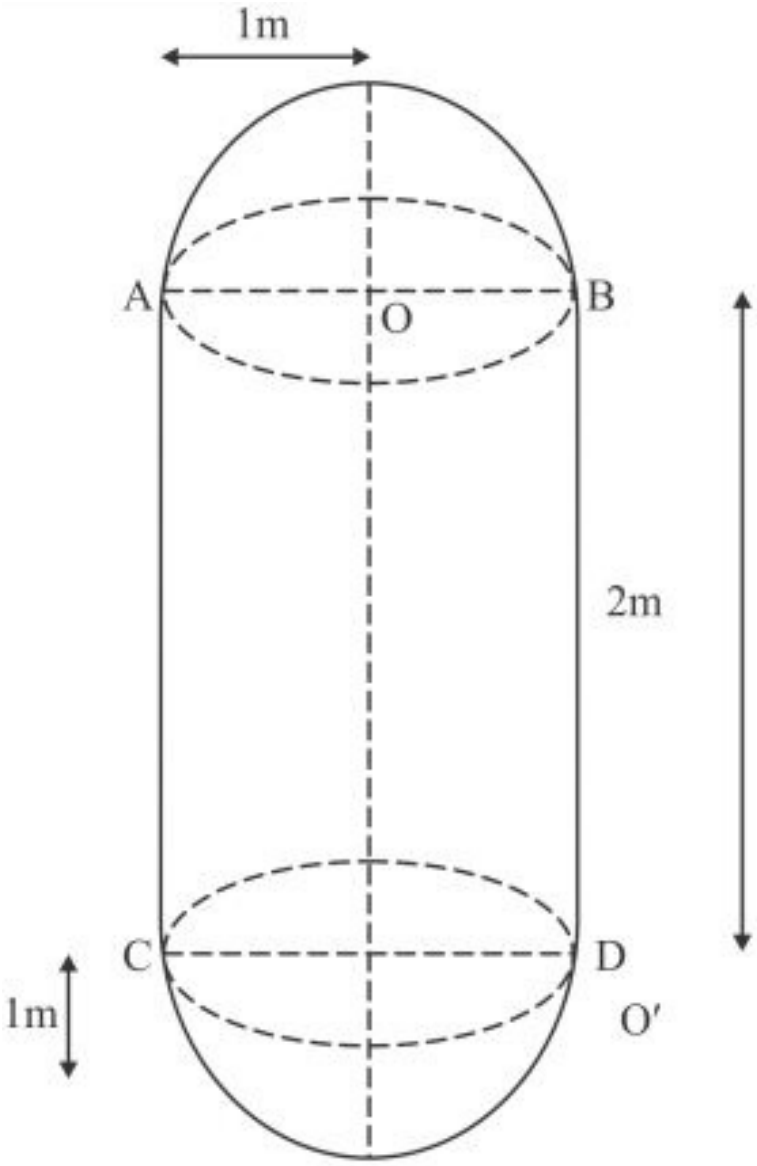
Answer :

Given that:

Height of the cylinder $h = 2$ m

Radius of the cylinder and hemisphere are same and is given by

$r = \frac{d}{2} = \frac{2}{2} = 1$ m



The volume of the cylinder is cylinder is

$V_1 = \pi r^2 h$

$$= \frac{22}{7} \times 1^2 \times 2$$

$$= \frac{22}{7} \times 2 \text{ m}^3$$

There are two hemispheres at each ends of the cylinder, therefore the volume of the two hemispheres is

$$V_2 = \frac{2}{3}\pi r^3 + \frac{2}{3}\pi r^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times 1^3$$

$$= \frac{22}{7} \times \frac{4}{3} \text{ m}^3$$

Therefore, the total volume of the boiler is given by

$$V = V_1 + V_2$$

$$= \left(\frac{22}{7} \times 2 + \frac{22}{7} \times \frac{4}{3} \right) \text{m}^3$$

$$= \frac{22}{7} \times \frac{10}{3} \text{ m}^3$$

$$= \frac{220}{21} \text{ m}^3$$

Hence the volume of the boiler is $\boxed{V = \frac{220}{21} \text{ m}^3}$

Surface Areas and Volumes Ex.16.2 Q13

Answer :

Given that:

Radius of the same base $r = \frac{3.5}{2} = 1.75 \text{ m}$

Height of the cylinder $h = \frac{14}{3} \text{ m}$

The volume of the vessel is given by

$$V = \pi r^2 h + \frac{2}{3}\pi r^3$$

$$= 3.14 \times 1.75^2 \times \frac{14}{3} + \frac{2}{3} \times 3.14 \times 1.75^3$$

$$= 56 \text{ m}^3$$

The internal surface area of the solid is

$$S = 2\pi r^2 + 2\pi rh$$

$$= 2 \times 3.14 \times 1.75^2 + 2 \times 3.14 \times 1.75 \times \frac{14}{3}$$

$$= 70.51 \text{ m}^2$$

Hence, the volume of the vessel and internal surface area of the solid is $\boxed{V = 56 \text{ m}^3, S = 70.51 \text{ m}^2}$

Surface Areas and Volumes Ex.16.2 Q14

Answer :

We have a solid composed of cylinder with hemispherical ends.

Radius of the two curved surfaces $(r) = 7$ cm

Height of cylinder is *h*.

Total height of the body $(h + 2r) = 104$ cm

So, total surface area is given by,

$$\begin{aligned}\text{Total surface area} &= \text{Curved surface area of cylinder} + \\ &\quad +2(\text{Curves surface area of hemisphere}) \\ &= 2\pi rh + 2(2\pi r^2) \\ &= 2\pi r(h + 2r) \\ &= 2(3.14)(7)(104)\ \text{cm}^2 \\ &= 4571.84\ \text{cm}^2\end{aligned}$$

Change the units of curved surface area as,

$$\begin{aligned}\text{Total surface area} &= \frac{4571.84}{100}\ \text{dm}^2 \\ &= 45.7184\ \text{dm}^2\end{aligned}$$

Cost of polishing the surface is Rs 10 per dm^2.

So total cost,

$$= \text{Rs}(45.7184)(10)$$

$$= \boxed{\text{Rs } 457.18}$$

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