



Exercise 20B

Q1.

Answer :

Volume of a cylinder = $\pi r^2 h$

Lateral surface = $2\pi rh$

Total surface area = $2\pi r(h + r)$

(i) Base radius = 7 cm; height = 50 cm

Now, we have the following:

Volume = $\frac{22}{7} \times 7 \times 7 \times 50 = 7700 \text{ cm}^3$

Lateral surface area = $2\pi rh = 2 \times \frac{22}{7} \times 7 \times 50 = 2200 \text{ cm}^2$

Total surface area = $2\pi r(h + r) = 2 \times \frac{22}{7} \times 7(50 + 7) = 2508 \text{ cm}^2$

(ii) Base radius = 5.6 m; height = 1.25 m

Now, we have the following:

Volume = $\frac{22}{7} \times 5.6 \times 5.6 \times 1.25 = 123.2 \text{ m}^3$

Lateral surface area = $2\pi rh = 2 \times \frac{22}{7} \times 5.6 \times 1.25 = 44 \text{ m}^2$

Total surface area = $2\pi r(h + r) = 2 \times \frac{22}{7} \times 5.6(1.25 + 5.6) = 241.12 \text{ m}^2$

(iii) Base radius = 14 dm = 1.4 m, height = 15 m

Now, we have the following:

Volume = $\frac{22}{7} \times 1.4 \times 1.4 \times 15 = 92.4 \text{ m}^3$

Lateral surface area = $2\pi rh = 2 \times \frac{22}{7} \times 1.4 \times 15 = 132 \text{ m}^2$

Total surface area = $2\pi r(h + r) = 2 \times \frac{22}{7} \times 1.4(15 + 1.4) = 144.32 \text{ cm}^2$

Q2.

Answer :

$r = 1.5 \text{ m}$

$h = 10.5 \text{ m}$

Capacity of the tank = volume of the tank = $\pi r^2 h = \frac{22}{7} \times 1.5 \times 1.5 \times 10.5 = 74.25 \text{ m}^3$

We know that $1 \text{ m}^3 = 1000 \text{ L}$

$\therefore 74.25 \text{ m}^3 = 74250 \text{ L}$

Q3.

Answer :

Height = 7 m

Radius = 10 cm = 0.1 m

$$\text{Volume} = \pi r^2 h = \frac{22}{7} \times 0.1 \times 0.1 \times 7 = 0.22 \text{ m}^3$$

Weight of wood = 225 kg/m³

$$\therefore \text{Weight of the pole} = 0.22 \times 225 = 49.5 \text{ kg}$$

Q4.

Answer :

Diameter = $2r = 140$ cm

i.e., radius, $r = 70$ cm = 0.7 m

$$\text{Now, volume} = \pi r^2 h = 1.54 \text{ m}^3$$

$$\Rightarrow \frac{22}{7} \times 0.7 \times 0.7 \times h = 1.54$$

$$\therefore h = \frac{1.54 \times 7}{0.7 \times 0.7 \times 22} = \frac{154 \times 7}{154 \times 7} = 1 \text{ m}$$

Q5.

Answer :

$$\text{Volume} = \pi r^2 h = 3850 \text{ cm}^3$$

Height = 1 m = 100 cm

$$\text{Now, radius, } r = \sqrt{\frac{3850}{\pi \times h}} = \sqrt{\frac{3850 \times 7}{22 \times 100}} = 1.75 \times 7 = 3.5 \text{ cm}$$

$$\therefore \text{Diameter} = 2(\text{radius}) = 2 \times 3.5 = 7 \text{ cm}$$

Q6.

Answer :

Diameter = 14 m

$$\text{Radius} = \frac{14}{2} = 7 \text{ m}$$

Height = 5 m

\therefore Area of the metal sheet required = total surface area

$$\begin{aligned} &= 2\pi r(h + r) \\ &= 2 \times \frac{22}{7} \times 7(5 + 7) \text{ m}^2 \\ &= 44 \times 12 \text{ m}^2 \\ &= 528 \text{ m}^2 \end{aligned}$$

Q7.

Answer :

Circumference of the base = 88 cm

Height = 60 cm

Area of the curved surface = *circumference* \times *height* = $88 \times 60 = 5280 \text{ cm}^2$

Circumference = $2\pi r = 88 \text{ cm}$

Then radius = $r = \frac{88}{2\pi} = \frac{88 \times 7}{2 \times 22} = 14 \text{ cm}$

\therefore Volume = $\pi r^2 h = \frac{22}{7} \times 14 \times 14 \times 60 = 36960 \text{ cm}^3$

Q8.

Answer :

Length = height = 14 m

Lateral surface area = $2\pi rh = 220 \text{ m}^2$

Radius = $r = \frac{220}{2\pi h} = \frac{220 \times 7}{2 \times 22 \times 14} = \frac{10}{4} = 2.5 \text{ m}$

\therefore Volume = $\pi r^2 h = \frac{22}{7} \times 2.5 \times 2.5 \times 14 = 275 \text{ m}^3$

Q9.

Answer :

Height = 8 cm

Volume = $\pi r^2 h = 1232 \text{ cm}^3$

Now, radius = $r = \sqrt{\frac{1232}{\pi h}} = \sqrt{\frac{1232 \times 7}{22 \times 8}} = \sqrt{49} = 7 \text{ cm}$

Also, curved surface area = $2\pi rh = 2 \times \frac{22}{7} \times 7 \times 8 = 352 \text{ cm}^2$

\therefore Total surface area

$= 2\pi r(h + r) = \left(2 \times \frac{22}{7} \times 7 \times 8\right) + \left(2 \times \frac{22}{7} \times (7)^2\right) = 352 + 308 = 660 \text{ cm}^2$

Q10.

Answer :

We have: $\frac{\text{radius}}{\text{height}} = \frac{7}{2}$

i.e., $r = \frac{7}{2} h$

Now, volume = $\pi r^2 h = \pi \left(\frac{7}{2} h\right)^2 h = 8316 \text{ cm}^3$

$\Rightarrow \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times h^3 = 8316$

$\Rightarrow h^3 = \frac{8316 \times 2}{11 \times 7} = 108 \times 2 = 216$

$\Rightarrow h = \sqrt[3]{216} = 6 \text{ cm}$

Then $r = \frac{7}{2} h = \frac{7}{2} \times 6 = 21 \text{ cm}$

\therefore Total surface area = $2\pi r(h + r) = 2 \times \frac{22}{7} \times 21 \times (6 + 21) = 3564 \text{ cm}^2$

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