Exercise 20A

Q1.

Answer :

Volume of a cuboid $= (Length \times Breadth \times Height)$ cubic units
Total surface area $= 2(lb + bh + lh)$ sq units
Lateral surface area $= [2(l + b) \times h]$ sq units

(i) Length = 22 cm, breadth = 12 cm, height = 7.5 cm
Volume $= (Length \times Breadth \times Height) = (22 \times 12 \times 7.5) = 1980\ cm^3$
Total surface area
$= 2(lb + bh + lh) = 2[(22 \times 12) + (22 \times 7.5) + (12 \times 7.5)] = 2[264 + 165 + 90] = 1038\ cm^2$
Lateral surface area $= [2(l + b) \times h] = 2(22 + 12) \times 7.5 = 510\ cm^2$

(ii) Length = 15 m, breadth = 6 m, height = 9 dm = 0.9 m
Volume $= (Length \times Breadth \times Height) = (15 \times 6 \times 0.9) = 81\ m^3$
Total surface area $= 2(lb + bh + lh)$
$= 2[(15 \times 6) + (15 \times 0.9) + (6 \times 0.9)] = 2[90 + 13.5 + 5.4] = 217.8\ m^2$
Lateral surface area $= [2(l + b) \times h] = 2(15 + 6) \times 0.9 = 37.8\ m^2$

(iii) Length = 24 m, breadth = 25 cm = 0.25 m, height = 6 m
Volume $= (Length \times Breadth \times Height) = (24 \times 0.25 \times 6) = 36\ m^3$
Total surface area $= 2(lb + bh + lh)$
$= 2[(24 \times 0.25) + (24 \times 6) + (0.25 \times 6)] = 2[6 + 144 + 1.5] = 303\ m^2$
Lateral surface area $= [2(l + b) \times h] = 2(24 + 0.25) \times 6 = 291\ m^2$

(iv) Length = 48 cm = 0.48 m, breadth = 6 dm = 0.6 m, height = 1 m
Volume $= (Length \times Breadth \times Height) = (0.48 \times 0.6 \times 1) = 0.288\ m^3$
Total surface area
$= 2(lb + bh + lh) = 2[(0.48 \times 0.6) + (0.48 \times 1) + (0.6 \times 1)] = 2[0.288 + 0.48 + 0.6] = 2.736$
Lateral surface area $= [2(l + b) \times h] = 2(0.48 + 0.6) \times 1 = 2.16\ m^2$

Q2.

Answer :

$1\ m = 100\ cm$
Therefore, dimensions of the tank are:
$2\ m\ 75\ cm \times 1\ m\ 80\ cm \times 1\ m\ 40\ cm = 275\ cm \times 180\ cm \times 140\ cm$
∴ Volume = $\text{Length} \times \text{Breadth} \times \text{Height} = 275 \times 180 \times 140 = 6930000\ \text{cm}^3$

Also, $1000 cm^3 = 1L$

∴ Volume $= \frac{6930000}{1000} = 6930\ L$

Q3.

Answer :

$1m = 100cm$
∴ Dimensions of the iron piece = $105\ \text{cm} \times 70\ \text{cm} \times 1.5\ \text{cm}$
Total volume of the piece of iron $= (105 \times 70 \times 1.5) = 11025\ cm^3$
1 cm^3 measures 8 gms.
∴Weight of the piece
$= 11025 \times 8 = 88200\ g = \frac{88200}{1000} = 88.2\ kg$ $\quad (because\ 1\ kg = 1000\ g)$

Q4.

Answer :

$1\,cm = 0.01\,m$

Volume of the gravel used $= \textbf{Area} \times \textit{Height} = (3750 \times 0.01) = 37.5\,\text{m}^3$

Cost of the gravel is Rs 6.40 per cubic meter.

$\therefore$ Total cost $= (37.5 \times 6.4) =$ Rs 240

Q5.

Answer :

Total volume of the hall$= (16 \times 12.5 \times 4.5) = 900\,m^3$

It is given that $3.6\,m^3$ of air is required for each person.

The total number of persons that can be accommodated in that hall

$= \frac{\text{Total volume}}{\text{Volume required by each person}} = \frac{900}{3.6}$

$= 250$ people

Q6.

Answer :

Volume of the cardboard box $= (120 \times 72 \times 54) = 466560\,cm^3$

Volume of each bar of soap$= (6 \times 4.5 \times 4) = 108\,cm^3$

Total number of bars of soap that can be accommodated in that box

$= \frac{\text{Volume of the box}}{\text{Volume of each soap}} = \frac{466560}{108} = 4320$ bars

Q7.

Answer :

Volume occupied by a single matchbox$= (4 \times 2.5 \times 1.5) = 15\,cm^3$

Volume of a packet containing 144 matchboxes $= (15 \times 144) = 2160\,cm^3$

Volume of the carton$= (150 \times 84 \times 60) = 756000\,cm^3$

Total number of packets is a carton$= \frac{\text{Volume of the carton}}{\text{Volume of a packet}} = \frac{75600}{2160} = 350$ packets

Q8.

Answer :

Total volume of the block $= (500 \times 70 \times 32) = 1120000\,cm^3$

Total volume of each plank $= 200 \times 25 \times 8 = 40000\,cm^3 = 200 \times 25 \times 8 = 40000\,cm^3$

$\therefore$ Total number of planks that can be made$= \frac{\text{Total volume of the block}}{\text{Volume of each plank}} = \frac{1120000}{40000} = 28$ planks

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