External volume of the box $= 60 \times 45 \times 32 = 86400\ \mathrm{cm}^3$

Thickness of wood = 2.5 cm

$\therefore$ Internal length $= 60 - (2.5 \times 2) = 55$ cm
Internal width $= 45 - (2.5 \times 2) = 40$ cm
Internal height $= 32 - (2.5 \times 2) = 27$ cm

Internal volume of the box $= 55 \times 40 \times 27 = 59400\ \mathrm{cm}^3$

Volume of wood = External volume - Internal volume $= 86400 - 59400 = 27000\ \mathrm{cm}^3$

Q21.

Answer :

External length = 36 cm
External width = 25 cm
External height = 16.5 cm

External volume of the box $= 36 \times 25 \times 16.5 = 14850\ \mathrm{cm}^3$

Thickness of iron = 1.5 cm

$\therefore$ Internal length $= 36 - (1.5 \times 2) = 33$ cm
Internal width $= 25 - (1.5 \times 2) = 22$ cm
Internal height $= 16.5 - 1.5 = 15$ cm (as the box is open)

Internal volume of the box $= 33 \times 22 \times 15 = 10890\ \mathrm{cm}^3$

Volume of iron = External volume − Internal volume $= 14850 - 10890 = 3960\ \mathrm{cm}^3$

Given:
$1\ \mathrm{cm}^3$ of iron $= 8.5$ grams

Total weight of the box $= 3960 \times 8.5 = 33660$ **grams** $= 33.66$ **kilograms**

Q22.

Answer :

External length = 56 cm
External width = 39 cm
External height = 30 cm

External volume of the box $= 56 \times 39 \times 30 = 65520\ \mathrm{cm}^3$

Thickness of wood = 3 cm

∴ Internal length $= 56-(3\times 2)=50$ cm
Internal width $= 39-(3\times 2)=33$ cm
Internal height $= 30-(3\times 2)=24$ cm

Capacity of the box = Internal volume of the box$=\ 50\ \times\ 33\ \times\ 24\ =\ 39600\ \mathrm{cm}^3$

Volume of wood = External volume − Internal volume$=\ 65520\ -\ 39600\ =\ 25920\ \mathrm{cm}^3$

Q23.
Answer :

External length = 62 cm
External width = 30 cm
External height = 18 cm

∴ External volume of the box$= 62\times 30\times 18=33480\ cm^3$

Thickness of the wood = 2 cm

Now, internal length $= 62-(2\times 2)=58$ cm
Internal width $= 30-(2\times 2)=26$ cm
Internal height $= 18-(2\times 2)=14$ cm

∴ Capacity of the box = internal volume of the box$=\left(58\times 26\times 14\right)\ cm^3=21112\ cm^3$

Q24.
Answer :

External length = 80 cm
External width = 65 cm
External height = 45 cm

∴ External volume of the box$= 80\times 65\times 45=234000\ cm^3$

Thickness of the wood = 2.5 cm

Then internal length$= 80-(2.5\times 2)=75$ cm
Internal width $= 65-(2.5\times 2)=60$ cm
Internal height $= 45-(2.5\times 2)=40$ cm

Capacity of the box = internal volume of the box$=\left(75\times 60\times 40\right)\ cm^3=180000\ cm^3$

Volume of the wood = external volume − internal volume$=\left(234000-180000\right)\ cm^3=54000\ cm^3$

It is given that $100\ \mathrm{cm}^3\ \ \mathbf{of\ \ wood\ \ \ weighs}\ 8\ \mathrm{g}.$

∴ Weight of the wood $= \frac{54000}{100}\times 8\ \mathrm{g}=4320\ \mathrm{g}=4.32\ \mathbf{kg}$

Q25.

Answer :

(i) Length of the edge of the cube = a = 7 m

Now, we have the following:

Volume$= a^3 = 7^3 = 343\ m^3$

Lateral surface area $= 4a^2 = 4 \times 7 \times 7 = 196\ m^2$

Total Surface area$= 6a^2 = 6 \times 7 \times 7 = 294\ m^2$

(ii) Length of the edge of the cube = a = 5.6 cm

Now, we have the following:

Volume$= a^3 = 5.6^3 = 175.616\ cm^3$

Lateral surface area $= 4a^2 = 4 \times 5.6 \times 5.6 = 125.44\ cm^2$

Total Surface area$= 6a^2 = 6 \times 5.6 \times 5.6 = 188.16\ cm^2$

(iii) Length of the edge of the cube = a = 8 dm 5 cm = 85 cm

Now, we have the following:

Volume$= a^3 = 85^3 = 614125\ cm^3$

Lateral surface area $= 4a^2 = 4 \times 85 \times 85 = 28900\ cm^2$

Total Surface area$= 6a^2 = 6 \times 85 \times 85 = 43350\ cm^2$

Q26.

Answer :

Let a be the length of the edge of the cube.

Total surface area$= 6a^2 = 1176\ cm^2$

$\Rightarrow a = \sqrt{\frac{1176}{6}} = \sqrt{196} = 14\ cm$

$\therefore$ Volume$= a^3 = 14^3 = 2744\ cm^3$

Q27.

Answer :

Let a be the length of the edge of the cube.

Then volume $= a^3 = 729\ cm^3$

Also, $a = \sqrt[3]{729} = 9\ cm$

$\therefore$ Surface area$= 6a^2 = 6 \times 9 \times 9 = 486\ cm^2$

Q28.

Answer :

1 m = 100 cm

Volume of the original block $= 225 \times 150 \times 27 = 911250\ cm^3$

Length of the edge of one cube = 45 cm
Then volume of one cube $= 45^3 = 91125\ cm^3$

$\therefore$ Total number of blocks that can be cast $= \frac{\text{volume of the block}}{\text{volume of one cube}} = \frac{911250}{91125} = 10$

Q29.
Answer :

Let *a* be the length of the edge of a cube.
Volume of the cube $= a^3$
Total surface area $= 6a^2$

If the length is doubled, then the new length becomes 2*a*.
Now, new volume $= (2a)^3 = 8a^3$
Also, new surface area= $= 6(2a)^2 = 6 \times 4a^2 = 24a^2$
$\therefore$ The volume is increased by a factor of 8, while the surface area increases by a factor of 4.

Q30.

Answer :

Cost of wood = Rs $500/\mathrm{m}^3$

Cost of the given block = Rs 256

$\therefore$ Volume of the given block $= \mathrm{a}^3 = \frac{256}{500} = 0.512\ \mathrm{m}^3 = 512000\ \mathrm{cm}^3$

Also, length of its edge = a $= \sqrt[3]{0.512} = 0.8\ m$ = 80 cm

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