Surface Areas and Volume of a Cuboid and Cube Ex 18.2 Q17

Answer :

External dimensions of the closed wooden box,

Length $(L) = 48\,\text{cm}$

Breath $(B) = 36\,\text{cm}$

Height $(H) = 30\,\text{cm}$

Thickness of the wood $(t) = 1.5\,\text{cm}$

We need to find number of bricks that can be put inside the box of dimension $6\text{ cm} \times 3\text{ cm} \times 0.75\text{ cm}$

Internal dimensions of the box,

Length $(l) = L - 2t$

$= 48 - 2 \times 1.5$

$= 48 - 3$

$= 45\,\text{cm}$

Breadth $(b) = B - 2t$

$= 36 - 2 \times 1.5$

$= 36 - 3$

$= 33\,\text{cm}$

Height $(h) = H - 2t$

$= 30 - 2 \times 1.5$

$= 30 - 3$

$= 27\,\text{cm}$

Capacity of the box,

$$V = lbh$$

$$= (45 \times 33 \times 27)\,\text{cm}^3$$

Volume of each brick,

$$v = (6 \times 3 \times 0.75)\,\text{cm}^3$$

Number of bricks that can be put in the box,

$$= \frac{45 \times 33 \times 27}{6 \times 3 \times 0.75}$$

$$= \frac{15 \times 33 \times 9}{6 \times 0.75}$$

$$= \frac{45 \times 11 \times 9}{2 \times 0.75}$$

$$= \frac{45 \times 11 \times 9}{1.5}$$

$$= 30 \times 11 \times 9$$

$$= 2970$$

The box can contain maximum $\boxed{2970}$ bricks.

Surface Areas and Volume of a Cuboid and Cube Ex 18.2 Q18

Answer :

We have,

External dimensions of the iron box are,

$\text{Length}(L) = 36\,\text{cm}$

$\text{Breadth}(B) = 25\,\text{cm}$

$\text{Height}(H) = 16.5\,\text{cm}$

$\text{Thickness of iron}(t) = 1.5\,\text{cm}$ and $1\,\text{cm}^3$ of iron weighs $15\,\text{g}$

We are asked to find the volume of the metal used in the box and weight of the empty box

Internal dimensions of the box,

$\text{Length}(l) = L - 2t$

$= 36 - 2 \times 1.5$

$= 33\,\text{cm}$

$\text{Breadth}(b) = B - 2t$

$= 25 - 2 \times 1.5$

$= 22\,\text{cm}$

$\text{Height}(h) = H - t$

$= 16.5 - 1.5$

$= 15\,\text{cm}$

Let,

$V \rightarrow$ External volume of the box

$v \rightarrow$ Internal volume of the box

$V' \rightarrow$ Volume of the iron

So,

$$V' = V - v$$
$$= (L \times B \times H) - lbh$$
$$= (36 \times 25 \times 16.5) - (33 \times 22 \times 15)$$
$$= 14850 - 10890$$
$$= 3960\,\text{cm}^3$$

We have, $1\,\text{cm}^3$ of iron weighs $15\,\text{g}$,

So, weight of $3960\,\text{cm}^3$ of iron,

$$= 3960 \times 15\,\text{g}$$
$$= 59400\,\text{g}$$
$$= 59.4\,\text{kg}$$

In that open box, there are $\boxed{3960\,\text{cm}^3}$ of iron, and weight of the empty box is $\boxed{59.4\,\text{kg}}$.

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