Surface Areas and Volume of a Cuboid and Cube Ex 18.2 Q19

Answer :

"When an object is completely immersed in a liquid, the volume of the liquid displaced is equal to the volume of the object"

Using this principle, we shall now solve this problem.

We have,

Edge of the immersed cube $(a) = 9\,\text{cm}$

Length of the rectangular container $(l) = 15\,\text{cm}$

Breadth of the rectangular container $(b) = 12\,\text{cm}$

Let,

$h \rightarrow$ The rise in water level

Volume of the immersed cube $(v) = a^3$

$= 9^3\,\text{cm}^3$

As per the above mentioned principle,

$lbh = v$

$$h = \frac{v}{lb}$$

$$= \frac{9^3}{15 \times 12}$$

$$= \frac{9 \times 9 \times 9}{15 \times 12}$$

$$= \frac{3 \times 3 \times 9}{5 \times 4}$$

$$= \frac{81}{20}$$

$$= 4.05\,\text{cm}$$

The rise in water level is $\boxed{4.05\,\text{cm}}$.

Surface Areas and Volume of a Cuboid and Cube Ex 18.2 Q20

Answer :

"When an object is completely immersed in a liquid, the volume of the liquid displaced is equal to the volume of the object"

Using this principle, we shall now solve this problem.

We have,

Length of the container $(l) = 5\,\text{cm}$

Breadth of the container $(b) = 5\,\text{cm}$

Height to which the water raised $(h) = 1\,\text{cm}$

Volume of the water displaced,

V = volume of the water raised + volume of the water over flown

$= (lbh + 2)\,\text{cm}^3$

$= 5 \times 5 \times 1 + 2\,\text{cm}^3$

$= 27\,\text{cm}^3$

We need to calculate the volume and edge of the cube

Let,

$v \rightarrow$ Volume of the cube submerged

$a \rightarrow$ Edge of the cube submerged

According to the principle mentioned above,

$$v = V$$

$$a^3 = 27$$

$$a = 3\,\text{cm}$$

Volume of the cube is $\boxed{27\text{cm}^3}$ and edge of the cube is $\boxed{3\,\text{cm}}$.

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