SpeedLabs

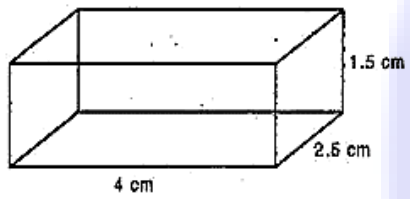
MATHS

CBSE 9th

TEEVRA EDUTECH PVT. LTD.

SURFACE AREAS AND VOLUMES
Exercise- 13.5

Q.1 A matchbox 4 cm x 2.5 cm x 1.5 cm. What will be the volume a packet containing 12 such boxes?



Ans - Given: Length (l), = 4 cm, Breadth (b), = 2.5 cm, Height (h) = 1.5 cm

Volume of a matchbox = $l \times b \times h$

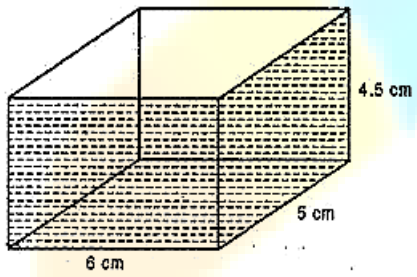
$= 4 \times 2.5 \times 1.5$

$= 15\ cm^3$

∴ Volume of a packet containing 12

such matchboxes $= 12 \times 15 = 180\ cm^3$

Q.2 A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litres of water can it hold? ($1\ m^3 = 1000l$)



Ans - The given cuboidal water tank has its length (l) as 6 m, breadth (b) as 5 m, and height (h) as 4.5 m.

Volume of tank = $l \times b \times h$

$= (6 \times 5 \times 4.5)\ m^3 = 135\ m^3$

Amount of water that 1 m3 volume can hold = 1000 litres

Amount of water that 135 m^3 volume can hold = (135×1000) litres

= 135000 litres

Therefore, such tank can hold up to 135000 litres of water.

Q.3 A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380 cubic metres of a liquid?

Ans - Let the height of the cuboidal vessel be h.

Length (l) of vessel = 10 m

Width (b) of vessel = 8 m

Volume of vessel = 380 m^3

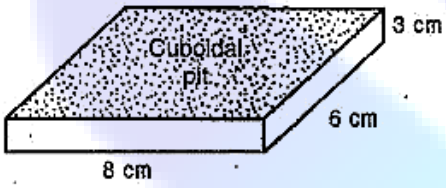
$\therefore l \times b \times h = 380$

$[(10)\ (8)\ h]\ m^2 = 380\ m^3$

h = 4.75 m

Therefore, the height of the vessel should be 4.75 m.

Q.4 Find the cost of digging a cuboidal pit 8 m long. 6 m broad and 3 m deep at the rate of Rs. 30 per m^3.



Ans - The given cuboidal pit has its length (l) as 8 m, width (b) as 6 m, and depth (h)as 3 m.

Volume of pit = $l \times b \times h$

= $(8 \times 6 \times 3)\ m^3 = 144\ m^3$

Cost of digging per m^3 volume = Rs 30

Cost of digging 144 m^3 volume = Rs (144×30) = Rs 4320

Q.5 The capacity of a cuboidal tank is 50000 litres of water. Find the breadth of the tank, if its length and depth are respectively 2.5 m and 10 m.

Ans - Let the breadth of the tank be b m.

Length (l) and depth (h) of tank is 2.5 m and 10 m respectively.

Volume of tank = $l \times b \times h$

= $(2.5 \times b \times 10)\ m^3$

= $25b\ m^3$

Capacity of tank = $25b\ m^3 = 25000\ b$ litres

$\therefore 25000\ b = 50000$

$\Rightarrow b = 2$

Therefore, the breadth of the tank is 2 m.

Q.6 A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring 20 m × 15 m × 6 m. For how many days will the water of this tank last?

Ans - The given tank is cuboidal in shape having its length (l) as 20 m, breadth (b) as 15 m, and height (h) as 6 m.

Capacity of tank = l × b× h

= (20 × 15 × 6) m^3 = 1800 m^3 = 1800000 litres

Water consumed by the people of the village in 1 day = (4000 × 150) litres

= 600000 litres

Let water in this tank last for n days.

Water consumed by all people of village in n days = Capacity of tank

n × 600000 = 1800000

n = 3

Therefore, the water of this tank will last for 3 days.

Q.7 A godown measures 60 m × 25 m × 10 m. Find the maximum number of wooden crates each measuring 1.5 m × 1.25 m × 0.5 m that can be stored in the godown.

Ans - Capacity of cuboidal godown

= 40 m x 25 m x 15 m = 15000 m^3

Capacity of wooden crate = 1.5 m x 1.25 m x 0.5 m = 0.9375 m^3

Maximum number of crates that can be stored in the godown

$$\frac{\text{Volume of godown}}{\text{Volume of one crate}}$$

$$= \frac{15000}{0.9375} = 16000$$

Hence maximum 16000 crates can be stored in the godown.

Q.8 A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube? Also, find the ratio between their surface areas.

Ans - Side (a) of cube = 12 cm

Volume of cube = $(a)^3 = (12\ cm)^3 = 1728\ cm^3$

Let the side of the smaller cube be a^1.

Volume of 1 smaller cube = $\left(\frac{1728}{8}\right)\ cm^3 = 216\ cm^3$

$(a_1)^3 = 216 cm^3$

$\Rightarrow a_1 = 6cm$

Therefore, the side of the smaller cubes will be 6 cm.

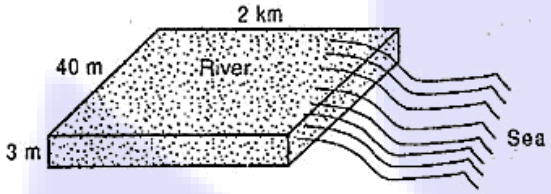
Ratio between surface areas of cubes = $\frac{\text{Surface area of bigger cube}}{\text{Surface area of smaller cubu}}$

$$= \frac{6a^2}{6a_1^2} = \frac{(12)^2}{(6)^2}$$

$$= \frac{4}{1}$$

Therefore, the ratio between the surface areas of these cubes is 4:1.

Q.9 A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?



Ans - Rate of water flow = 2 km per hour

$$= \left(\frac{2000}{60}\right) \text{m/min}$$

$$= \left(\frac{100}{3}\right) \text{ m/min}$$

Depth (h) of river = 3 m

Width (b) of river = 40 m

Volume of water flowed in 1 min = $\left(\frac{100}{3} \times 40 \times 3\right)$ m3 =4000 m^3

Therefore, in 1 minute, 4000 m^3 water will fall in the sea.