Exercise 13.5

Question :1 A matchbox measures 4 cm × 2.5 cm × 1.5 cm. What will be the volume of a packet containing 12 such boxes?

Answer:

Matchbox is a cuboid having its length (l), breadth (b), height (h) as 4 cm, 2.5 cm and 1.5 cm respectively

Volume of 1 match box = l × b × h

= (4 × 2.5 × 1.5) cm^3

= 15 cm^3

Volume of 12 such matchboxes = (15 × 12) cm^3

= 180 cm^3

Therefore, the volume of 12 match boxes is 180 cm^3

Question :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 m3 = 1000 l)

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 respectively

Volume of tank = l × b × h

= (6 × 5 × 4.5) m^3

= 135 m^3

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

Amount of water that 135 m3 volume can hold = (135 × 1000) litres

= 135000 litres

Question :3 A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380cubic 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

The volume of vessel = 380 m^3

$l \times b \times h = 380$

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

$= \frac{380}{80}$

$= \frac{38}{8}$

= 4.75 m

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

Question :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 respectively

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

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

$= 144\ m^3$

Cost of digging per m3 volume = Rs 30

Cost of digging 144 m3 volume = Rs (144 × 30)

= Rs 4320

Question :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 × b × h

= (2.5 × b × 10) m^3

= 25 b m^3

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

[As 1 m^3 = 1000 litres]

25000 b = 50000

$b = \frac{50000}{25000}$

b = 2

Therefore, the breadth of the tank is 2 m

Question :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?

Answer:

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 respectively

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.

Question :7 A go down measures 40 m × 25 m × 15 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 go down.

Answer:

The dimensions of go down are:

length (l_1) as 40 m, breadth (b_1) as 25 m, height (h_1) as 15 m,

while the wooden crate has the dimensions:

length (l_2) as 1.5 m, breadth (b_2) as 1.25 m, and height (h_2) as 0.5 m respectively

Therefore,

Volume of go down = $l_1 \times b_1 \times h_1$= (40m × 25m × 15m)

= 15000 m^3

Volume of 1 wooden crate = $l_2 \times b_2 \times h_2$

= (1.5 m × 1.25m × 0.5m)

= 0.9375 m^3

Let n wooden crates can be stored in the go down

Therefore, volume of n wooden crates = Volume of go down

0.9375 × n = 15000

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

∴ The maximum number of wooden crates will be 16000.

Question :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

Answer: 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 a1

Volume = $(\frac{1728}{8})$

= 216 cm^3

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

a_1 = 6cm

Ratio = $\frac{Surface\ area\ of\ bigger\ cube}{smaller\ area\ of\ small\ cube}$

Ratio = $\frac{6 \times 12 \times 12}{6 \times 6 \times 6}$

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

Ratio = 4 :1

Question :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

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

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

Depth (h) of river = 3 m

Width (b) of river = 40 m

The volume of water flowed in 1 min = ($\frac{100}{3}$× 40 × 3)

= 4000 m^3

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