## 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 1:
Length of matchbox $l$ = 4 cm, breadth $b$ = 2.5 cm and height $h$ = 1.5 cm

Volume of matchbox = $lbh = 4 \times 2.5 \times 1.5 = 15$ cm$^3$

Therefore, volume of 12 matchbox $=12 \times 15 = 180$ cm$^3$

Hence, the volume of a packet containing 12 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 m$^3$ = 1000$l$)

### Answer 2:
Length of water tank $l$ = 6 m, breadth $b$ = 5 m and height $h$ = 4.5 m

Volume of water tank = $lbh = 6 \times 5 \times 4.5 = 135$ cm$^3$ $= 135 \times 1000\ l = 135000\ l$

Hence, the water tank can hold 135000 litres of water.

### Question 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?

### Answer 3:
Length of cuboidal vessel $l$ = 10 m, breadth $b$ = 8 m and volume $V$ = 380 m$^3$

Let, the height of cuboidal vessel = $h$ m

Volume of cuboidal vessel = $lbh$

$\Rightarrow 380 = 10 \times 8 \times h$

$\Rightarrow h = \frac{380}{10 \times 8} = 4.75$ m

Hence, the height of cuboidal vessel 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 ₹ 30 per m$^3$.

### Answer 4:
Length of cuboidal pit $l$ = 8 m, breadth $b$ = 6 m and height $h$ = 3 m.

Volume of cuboidal pit = $lbh = 8 \times 6 \times 3 = 144$ m$^3$

Cost of digging at the rate of ₹ 30 per m$^3$ = ₹ $144 \times 30$ = ₹ 4320

Hence, the cost of digging the cuboidal pit is ₹ 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.

### Answer 5:
Length of cuboidal tank $l$ = 2.5 m, depth $h$ = 10 m and volume $V$ = 50000 litres = 50 m$^3$

Let, the breadth of cuboidal tank = $b$ m

Volume of cuboidal tank = $lbh$

$\Rightarrow 50 = 2.5 \times b \times 10$

$\Rightarrow b = \frac{50}{2.5 \times 10} = 2$ m

Hence, the breadth of cuboidal 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 6:

Length of tank $l$ = 20 m, breadth $b$ = 15 m and height $h$ = 6 m
Volume of tank = $lbh = 20 \times 15 \times 6 = 1800\ \text{m}^3 = 1800 \times 1000 = 1800000$ litres
Daily requirement of water = 150 litres
Therefore, the requirement of 4000 person for one day = $150 \times 4000 = 600000$ litres
Hence, the number of days to consume all water of tank

$$= \frac{\text{Volume of tank}}{\text{Volume of water for 4000 person for one day}} = \frac{1800000\ \text{litres}}{600000\ \text{litres}} = 3$$

## Question 7:

A godown measures 40 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.

### Answer 7:

Length of godown $L$ = 40 m, breadth $B$ = 25 m and height $H$ = 15 m
Volume of godown = $LBH = 40 \times 25 \times 15 = 15000\ \text{m}^3$
Length of crate $l$ = 1.5 m, breadth $b$ = 1.25 m and height $h$ = 0.5 m
Volume of crate = $lbh = 1.5 \times 1.25 \times 0.5 = 0.9375\ \text{m}^3$
Now,

$$\text{Number of crates to be stored in godown} = \frac{\text{Volume of godown}}{\text{Volume of 1 crate}} = \frac{15000\ \text{m}^3}{0.9375\ \text{m}^3} = 10666.67$$

Hence, maximum of 10666 crates can be placed in the godown.

## 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 8:

Side of larger cube $A$ = 12 cm. Therefore, volume = $A^3 = 12 \times 12 \times 12 = 1728\ \text{cm}^3$
According to question, volume of smaller cube

$$a^3 = \frac{\text{Volume of larger cube}}{8} = \frac{1728\ \text{cm}^3}{8} = 216\ \text{cm}^3$$

$\Rightarrow a^3 = 216\ \text{cm}^3 \Rightarrow a = \sqrt{216} = 6$ cm
Hence, the side of new cube is 6 cm.
Now,

$$\text{Ratio of surface areas of two cubes } = \frac{\text{Surface area of larger cube}}{\text{Surface area of smaller cube}} = \frac{6A^2}{6a^2} = \frac{A^2}{a^2} = \frac{12^2}{6^2} = \frac{144}{36} = 4:1$$

## 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?

### Answer 9:

Speed of river $l$ = 2 km/h = 2000 m/h, breadth $b$ = 40 m and height $h$ = 15 m
Volume of water fall into the sea in 1 hour = $lbh = 2000 \times 40 \times 3 = 240000\ \text{m}^3$
So, volume of water fall into the sea in 1 minute = $\frac{240000\ \text{m}^3}{60} = 4000\ \text{m}^3$
Hence, in 1 minute, 4000 $\text{m}^3$ will fall into the sea.