Ex - 13.5

Q1. A match box measures 4 cm × 2.5 cm × 1.5 cm. What will be the volume of a packet containing 12 such boxes?

Sol. Volume of a matchbox
$= 4 \times 2.5 \times 1.5\ cm^3 = 15\ cm^3$
$\therefore$ Volume of a packet containing 12 such boxes
$= 15 \times 12\ cm^3 = 180\ cm^3$.

Q2. A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litres of water can it hold? $(1\ m^3 = 1000\ \ell)$

Sol. $\ell = 6m$, $b = 5m$, $h = 4.5\ m$
$\therefore$ Capacity $= \ell \times b \times h = 6 \times 5 \times 4.5\ m^3 = 135\ m^3$
$1\ m^3 = 1000\ \ell \Rightarrow 135\ m^3 = 135000\ \ell$

Q3. 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?

Sol. Height, $h = \frac{380}{10 \times 8} m = 4.75\ m$

Q4. 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.

Sol. Internal space of the pit $= 8 \times 6 \times 3m^3$
Cost = Rs. $30 \times 8 \times 6 \times 3$ = Rs. 4320

Q5. 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.

Sol. Capacity of tank = 50,000 litres

$$= \frac{50000}{1000} m^3 = 50\ m^3$$

Breadth of the tank $= \frac{50}{2.5 \times 10} m$

i.e., Breadth = 2 m.

Q6. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring 20 m × 15m × 6m. For how many days will the water of this tank last?

Sol. $\ell = 20$ m, b = 15 m, h = 6 m

$\therefore$ Volume of the tank = $\ell \times b \times h$

$= 20 \times 15 \times 6\ m^3$

$= 1800\ m^3$

Since $1\ m^3 = 1000\ \ell$

$\therefore$ Capacity of the tank = $1800 \times 1000\ \ell$

$= 1800000\ \ell$

Village population = 4000.

Amount of water required per day

$\Rightarrow 150 \times 4000\ \ell$

Let the required number of days = x.

$\therefore$ $4000 \times 150 \times x = 1800000$

$x = 3$

Q7. 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.

Sol. Volume of the godown = $40 \times 25 \times 10\ m^3$

Volume of a crate = $1.5 \times 1.25 \times 0.5\ m^3$

$$= \frac{15}{10} \times \frac{125}{100} \times \frac{5}{10}\ m^3$$

$$= \frac{3}{2} \times \frac{5}{4} \times \frac{1}{2} = \frac{15}{16} m^3$$

Let the required number of crates is "n".

$$\Rightarrow n \times \left[\frac{3}{2} \times \frac{5}{4} \times \frac{1}{2}\right] = 40 \times 25 \times 10$$

$$\Rightarrow n = \frac{32000}{3} = 10666.66$$

Q8. 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.

Sol. Let the side of new cube be a cm.

Volume of bigger cube = 8 × volume of a smaller cube]

$$\frac{123}{8} = a^3$$

a = 6 ratio of surface area = $\frac{6 \times 12^2}{6.6^2} = \frac{4}{1}$

Ans. 6 cm ; 4 : 1

Q9. 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?

Sol. Water flowing in one minute $= \frac{2000}{60} \times 40 \times 3\text{m}^3$

$= 4000\ \text{m}^3$