

Exercise 21.2

Q.1 Find the volume in cubic metre (cu.m) of each of the cuboids whose dimensions are:

- (i) length = 12m, breadth = 10m, height = 4.5m
 (ii) length = 4m, breadth = 2.5m, height = 50cm
 (iii) length = 10m, breadth = 25dm, height = 25cm.

Sol: (i) $l = 12\text{m}$, $b = 10\text{m}$, $h = 4.5\text{m}$

$$V = l \times b \times h$$

$$= 12 \times 10 \times 4.5 = 540\text{m}^3$$

(ii) $l = 4\text{m}$, $b = 2.5\text{m}$, $h = 50\text{cm} = 0.5\text{m}$

$$V = l \times b \times h$$

$$= 4 \times 2.5 \times 0.5 = 5\text{m}^3$$

(iii) $l = 10\text{m}$, $b = 25\text{dm} = 250\text{cm} = 2.5\text{m}$
 $h = 25\text{cm} = 0.25\text{m}$

$$V = l \times b \times h$$

$$= 10 \times 2.5 \times 0.25 = 6.250$$

$$= 6.25\text{m}^3$$

Q.2 Find the volume in cubic decimetre of each of the cubes whose sides is

- (a) 1.5m (i) 75cm (ii) 2dm 5cm

(19)

Sol. (i) Side of cube = 1.5 m
 $= 1.5 \times 100 \text{ cm} = 150 \text{ cm}$
 $= 15 \text{ dm}$

$$\text{Volume of cube} = a^3$$

$$= (15)^3 = 3375 \text{ dm}^3$$

(ii) Side of cube = 75 cm = 7.5 dm $\because 10 \text{ cm} = 1 \text{ dm}$

$$\text{Volume} = a^3$$

$$= (7.5)^3 = 421.875 \text{ dm}^3$$

(iii) Side of cube = 2 dm 5 cm = 2 + 0.5 dm = 2.5 dm

$$\text{Volume} = a^3 = (2.5)^3$$

$$= 15.625 \text{ dm}^3$$

Q3 How much clay is dug out in digging a well measuring 3 m by 2 m by 5 m?

Sol. Vol of clay = $l \times b \times h$

$$= 3 \times 2 \times 5$$

$$= 30 \text{ m}^3$$

$\begin{cases} l = 3 \text{ m} \\ b = 2 \text{ m} \\ h = 5 \text{ m} \end{cases}$

Q.4 What will be the height of a cuboid of volume 168 m^3 . If the area of the base is 28 m^2 ?

Sol. Vol. of cuboid = 168 m^3
 Area of base = 28 m^2

$$\therefore \text{height} = \frac{\text{Volume}}{\text{Area of base}}$$

$$= \frac{168}{28}$$

$$= 6 \text{ m}$$

Q.5 A tank is 8m long, 6m broad and 2m high.
How much water it contain?

Sol: length of tank = 8m
breadth = 6m
height = 2m

$$\therefore \text{volume of water} = l \times b \times h$$

$$= 8 \times 6 \times 2 = 96 \text{ m}^3$$

Q.6 The capacity of certain cuboidal tank is 50000 litres of water. Find the breadth of the tank, if its height and length are 10m and 2.5m respectively.

Sol: $\therefore$ volume of tank = 50000 litres

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

$$h = 10 \text{ m}$$

$$l = 2.5 \text{ m}$$

$$\therefore \text{breadth} = \frac{\text{volume}}{l \times h} = \frac{50}{10 \times 2.5}$$

$$= \frac{50}{25} = 2 \text{ m}^3$$

Q.7 A rectangular diesel tanker is 2 m long, 2 m wide and 40 cm deep. How many litres of diesel can it hold?

Sol: length = 2 m, breadth = 2 m, depth = 40 cm
 $= \frac{40}{100} = 0.4 \text{ m}$

$$\begin{aligned} \text{Vol. of diesel} &= 2 \times 2 \times 0.4 \\ &= 1.6 \text{ m}^3 \end{aligned} \quad \left\{ \because 1 \text{ m}^3 = 1000 \text{ litres} \right\}$$

$$= 1.6 \times 1000 \text{ l} = 1600 \text{ litres}$$

Q.8 The length, breadth and height of a room are 5 m, 4.5 m, and 3 m, respectively. Find the volume of the air it contains.

Sol: volume of air = $l \times b \times h$
 $= 5 \times 4.5 \times 3 = 67.5 \text{ m}^3$

Q.9 A water tank is 3 m long, 2 m broad, and 1 m deep. How many litres of water can it hold?

Sol: $l = 3 \text{ m}$, $b = 2 \text{ m}$, $h = 1 \text{ m}$.

$$\begin{aligned} v &= l \times b \times h \\ &= 3 \times 2 \times 1 = 6 \text{ m}^3 \end{aligned}$$

$$= 6 \times 1000 = 6000 \text{ litres.}$$

Q.10 How many planks each of which is 3m long ⑦
15 cm broad, and 5 cm thick can be prepared from
a wooden block 6m long, 75 cm broad, and 45 cm
thick?

Sol: Dimension of plank : $l = 3\text{m}$, $b = 15\text{cm}$
 $= 0.15\text{m}$
 $h = 5\text{cm} = 0.05\text{m}$

$$\text{Volume of plank} = 3 \times 0.15 \times 0.05 \text{ m}^3 \\ = 0.0225 \text{ m}^3$$

$$\text{Volume of wooden block} = (6 \times 0.75 \times 0.45) \text{ m}^3$$

$$\therefore \text{No. of planks} = \frac{\text{Volume of block}}{\text{Vol. of plank}} \\ = \frac{6 \times 0.75 \times 0.45}{0.0225} = 90 \text{ planks}$$

Q.11 How many bricks each of size 25 cm x 10 cm
x 8 cm will be required to build a wall 5 m
long, 3 m high, and 16 cm thick, assuming that the
volume of sand and cement used in the construction
is negligible?

Sol:

$$\text{No. of bricks needed} = \frac{\text{v. of wall}}{\text{v of one brick}}$$

$$\begin{aligned} \text{v of wall} &= 5\text{m} \times 3\text{m} \times 16\text{cm} \\ &= (5 \times 3 \times 0.16)\text{m}^3 \end{aligned}$$

$$\begin{aligned} \text{v of one brick} &= 25\text{cm} \times 10\text{cm} \times 8\text{cm} \\ &= (0.25 \times 0.1 \times 0.08)\text{m}^3 \end{aligned}$$

$$\therefore \text{No. of bricks} = \frac{5 \times 3 \times 0.16}{0.25 \times 0.1 \times 0.08} = 1200 \text{ bricks.}$$

Q.12 A village having a population of 4000, requires 150 litres water per head per day. It has a tank which is 20m long, 15m broad and 6m high. For how many days will the water of this tank last?

Sol:

$$\text{Population of Village} = 4000$$

$$\text{water required per head per day} = 150 \text{ litres}$$

$$\begin{aligned} \therefore \text{water required for village per day} &= (4000 \times 150) \\ &= 600000 \text{ litres.} \end{aligned}$$

$$\begin{aligned} \text{Now, volume of water in tank} &= 20 \times 15 \times 6 \text{ m}^3 \\ &= 1800 \text{ m}^3 \\ &= 1800 \times 1000 \text{ litres.} \end{aligned}$$

∴ No. of days, the water will last

$$= \frac{1800000}{600000}$$

$$= 3 \text{ days.}$$

Q.13 A rectangular field is 70m long and 60m broad. A well of dimensions 14m x 8m x 6m is dug outside the field and the earth dug out from this well is spread evenly on the field. How much will the earth level rise?

Sol: Length of rectangular field = 70m
breadth = 60m

$$\begin{aligned} \text{Area of rectangular field} &= 70\text{m} \times 60\text{m} \\ &= 4200\text{m}^2 \end{aligned}$$

Dimension of well, $l = 14\text{m}$, $b = 8\text{m}$, $h = 6\text{m}$.

$$\begin{aligned} \therefore \text{v. of earth dug out} &= 14 \times 8 \times 6 \\ &= 672\text{m}^3 \end{aligned}$$

Let the level of earth rise = $h\text{m}$.

$$\begin{aligned} \therefore \text{Area of rectangular field} \times h &= \frac{672}{4200} \\ &= 0.16\text{m} \\ &= 16\text{cm.} \end{aligned}$$

Q.14 A swimming pool is 250 m long and 130 m wide. 3250 cubic metres of water is pumped into it. Find the rise in the water level.

Sol: Vol. of water pumped = 3250 m^3
 let Vol. of water rise = $h \text{ m}$.

$$\therefore l \times b \times h = 3250$$

$$\Rightarrow 250 \times 130 \times h = 3250$$

$$\Rightarrow h = \frac{3250}{250 \times 130} = 0.1 \text{ m}$$

$$= 10 \text{ cm}$$

Q.15 A beam 5 m long and 40 cm wide contains 0.6 m^3 of wood. How thick is the beam.

Sol: Thickness of beam = $\frac{\text{Vol. of wood}}{l \times b}$

$$= \frac{0.6}{5 \times 0.4} \left\{ \begin{array}{l} l = 5 \text{ m} \\ b = 40 \text{ cm} \\ = 0.4 \text{ m} \end{array} \right\}$$

$$= 3.8 \text{ m.}$$

Q.16 The rain fall on a certain day was 6 cm. How many litres of water fell on 3 hectares of field on that day?

Sol: Area of field = 3 hectares
 $= 3 \times 10000 \text{ m}^2$ $\left\{ \because 1 \text{ hectare} \right.$
 $= 30000 \text{ m}^2$ $\left. = 10000 \text{ m}^2 \right\}$

rainfall = 6 cm = 0.06 m.

$\therefore$ volume of rainfall = 30000×0.06
 $= 1800 \text{ m}^3$
 $= 1800 \times 1000 \text{ litres}$
 $= 18 \times 10^5 \text{ litres.}$

Q.17 An 8 m long cuboidal beam of wood when sliced produces four thousand, 1 cm cubes and there is no wastage of wood in this process. If one edge of beam is 0.5 m, find the third edge.

Sol: Vol. of cuboidal beam = Vol of 4000 cubes.
 $\Rightarrow 8 \times 0.5 \times h = 4000 \times (0.01)^3$
 $\Rightarrow h = \frac{4000 \times 0.01 \times 0.01 \times 0.01}{8 \times 0.5}$
 $= 0.001 \text{ m.}$

Q.18 The dimension of a metal block are 2.25 m by 1.5 m by 27 cm. It is melted and recast into cubes, each of side is 45 cm. How many cubes are formed?

Sol: V. of Metal block = $(2.25 \times 1.5 \times 0.27) \text{ m}^3$

$$\begin{cases} d = 2.25 \text{ m} \\ b = 1.5 \text{ m} \\ h = 0.27 \text{ m} \end{cases}$$

Side of cube = 45 cm
 $= 0.45 \text{ m}$

Volume of cube = $(0.45 \times 0.45 \times 0.45) \text{ m}^3$

$$\therefore \text{No. of cubes} = \frac{2.25 \times 1.5 \times 0.27}{0.45 \times 0.45 \times 0.45} = 10 \text{ cubes.}$$

Q.19 A solid rectangular piece of iron measures 6 cm by 6 cm by 2 cm . Find the weight of this piece, if 1 cm^3 of iron weighs 8 gm .

Sol: Length = 6 cm , breadth = 6 cm , height = 2 cm .

Volume of rectangular piece = $6 \times 6 \times 2$
 $= 72 \text{ cm}^3$

Weight of $1 \text{ cm}^3 = 8 \text{ gm}$

$$\therefore \text{Total weight} = 72 \times 8$$

$$= 576 \text{ g}$$

$$= 0.576 \text{ kg}$$

Q.20

Fill in the blanks in each of the following (23)

so as to make the statement true :

(i) $1 \text{ cm}^3 = \dots \text{ cm}^3$

(ii) $1 \text{ litre} = \dots \text{ cubic decimetres}$

(iii) $1 \text{ Kl} = \dots \text{ m}^3$

(iv) The volume of cube of side 8 cm is $\dots$

(v) The volume of wooden cuboid of length 10 cm and breadth 8 cm is 4000 cm^3 . The height of the cuboid is $\dots \text{ cm}$.

(vi) $1 \text{ Cu. dm} = \dots \text{ Cu. mm}$

(vii) $1 \text{ Cu. Km} = \dots \text{ Cu. m}$

(viii) $1 \text{ litre} = \dots \text{ Cu. cm}$

(ix) $1 \text{ ml} = \dots \text{ Cu. cm}$

(x) $1 \text{ Kl} = \dots \text{ Cu. dm} = \dots \text{ Cu. cm}$

Q4: (i) 10^6

(ii) 1

(iii) 1

(iv) 512 cm^3

(v) 50

(vi) 10^6

(vii) 10^9

(viii) 10^3

(ix) 1

(x) $1000, 10^6$