EXERCISE 21.2

1. Find the volume in cubic metres (cu. m) of each of the cuboids whose dimensions are:
(i) length = 12 m, breadth = 10 m, height = 4.5 m
(ii) length = 4 m, breadth = 2.5m, height = 50 cm
(iii) length = 10m, breadth = 25 dm, height = 25 cm.
Solution:
(i) Given details are,
Length of a cuboid = 12 m
Breadth of a cuboid = 10m
Height of a cuboid = 4.5 m
By using the formula
Volume of cuboid = $l \times b \times h$
$= 12 \times 10 \times 4.5$
$= 540\ m^3$

(ii) Given details are,
Length of a cuboid = 4 m
Breadth of a cuboid = 2.5 m
Height of a cuboid = 50 cm = 0.50m
By using the formula
Volume of a cuboid = $l \times b \times h$
$= 4 \times 2.5 \times 0.50$
$= 5\ m^3$

(iii) Given details are,
Length of a cuboid = 10m
Breadth of a cuboid = 25 dm = 2.5 m
Height of a cuboid = 25 cm = 0.25 m
By using the formula
Volume of a cuboid = $l \times b \times h$
$= 10 \times 2.5 \times 0.25$
$= 6.25\ m^3$

2. Find the volume in cubic decimetre of each of the cubes whose side is
(i) 1.5 m
(ii) 75cm
(iii) 2 dm 5 cm

Solution:
(i) Given details are,
Side of cube = 1.5m = 15 dm
So, Volume of cube = $15^3 = 3375$ dm^3

(ii) Given details are,
Side of cube = 75cm = 7.5 dm
So, Volume of cube = $7.5^3 = 421.875$ dm^3

(iii) Given details are,
Side of cube = 2dm 5cm = 2.5 dm
So, Volume of cube = $2.5^3 = 15.625$ dm^3

3. How much clay is dug out in digging a well measuring 3 m by 2 m by 5 m?
Solution:
Given details are,
Dimensions of well = 3m × 2m × 5m
So,
Volume of clay dug out from well is = l × b × h
= 3 × 2 × 5
= 30 m^3

4. What will be the height of a cuboid of volume 168 m^3, if the area of its base is 28 m^2?
Solution:
Given details are,
Volume of a cuboid = 168 m^3
Area of base = l × b = 28m^2
Let height of cuboid be 'h' m
We know that,
Volume = l × b × h
h = volume/ l × b
= 168/28
= 6m
∴ Height of cuboid is 6 m

5. A tank is 8 m long, 6 m broad and 2 m high. How much water can it contain?
Solution:
Given details are,

Dimensions of a tank = 8m × 6m × 2m
We know that,
Volume of tank = l × b × h
= 8 × 6 × 2
= 96 m^3
= 96000 litres
∴ The tank can contain 96000 litres of water.

6. The capacity of a certain cuboidal tank is 50000 litres of water. Find the breadth of the tank, if its height and length are 10 m and 2.5 m respectively.
Solution:
Given details are,
Capacity (volume) of cuboidal tank is = 50000 litre = 50 m^3
Height of tank = 10 m
Length of tank = 2.5 m
Let breadth of tank be 'b' m
We know that,
Volume = l × b × h
b = volume / (l × h)
= 50/(10×2.5)
= 2m
∴ Breadth of tank is 2m

7. A rectangular diesel tanker is 2m long, 2m wide and 40cm deep. How many litres of diesel can it hold?
Solution:
Given details are,
Length of a tanker = 2m
Breadth of a tanker = 2m
Height of a tanker = 40cm = 0.4m
So, Dimensions of rectangular diesel tank = 2m × 2m × 0.4m
Volume of tank (amount of diesel it can hold) = l × b × h
= 2 × 2 × 0.4
= 1.6m^3
= 1600 litres
∴ A rectangular diesel tanker can hold 1600 litres of diesel.

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.

Solution:
Given details are,
Length of a room = 5m
Breadth of a room = 4.5m
Height of a room = 3m
So, Dimensions of a room are = 5m × 4.5m × 3m
Volume of air = l × b × h
= 5 × 4.5 × 3
= 67.5m^3
∴ The room contains 67.5m^3 volume of the air.

9. A water tank is 3 m long, 2 m broad and 1 m deep. How many litres of water can it hold?
Solution:
Given details are,
Length of water tank = 3m
Breadth of water tank = 2m
Height of water tank = 1m
So, Dimensions of water tank is = 3m × 2m × 1m
Volume the water tank can hold = l × b × h
= 3 × 2 × 1
= 6m^3
= 6000 litres
∴ The water tank can hold 6000 litres of water.

10. How many planks each of which is 3 m long, 15 cm broad and 5 cm thick can be prepared from a wooden block 6 m long, 75 cm broad and 45 cm thick?
Solution:
Given details are,
Dimensions of one plank = 3m × 15cm × 5cm = 300cm × 15cm × 5cm
Dimensions of wooden block = 6m × 75cm × 45cm = 600cm × 75cm × 45cm
We know that,
Number of planks that can be prepared = volume of wooden block / volume of one plank
= (600 × 75 × 45) / (300 × 15 × 5)
= 90 planks
∴ 90 planks are required to prepare the block.

11. How many bricks each of size 25 cm × 10 cm × 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?
Solution:
Given details are,
Size of one brick = 25cm × 10cm × 8cm
Dimensions of wall = 5m × 3m × 16cm = 500 cm × 300 cm × 16cm
We know that,
Number of bricks required to build a wall = volume of wall / volume of one brick
= (500×300×16) / (25×10×8)
= 1200 bricks
∴ 1200 bricks are required to build the wall.

12. A village, having a population of 4000, required 150 litres water per head per day. It has a tank which is 20 m long, 15 m broad and 6 m high. For how many days will the water of this tank last?
Solution:
Given details are,
Population of village = 4000
Dimensions of water tank = 20m × 15m × 6m
Water required per head per day = 150 litres
Total requirement of water per day = 150 × 4000 = 600000 litres
Volume of water tank = l × b × h
= 20 × 15 × 6
= $1800m^3$
= 1800000 litres
We know that,
Number of days water last in the tank = volume of tank / total requirement
= 1800000/600000
= 3 days
∴ Water in the tank last for 3 days.

13. A rectangular field is 70 m long and 60 m broad. A well of dimensions 14 m × 8 m × 6 m 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?
Solution:
Given details are,
Dimensions of rectangular field = 70m × 60m
Dimensions of well = 14m × 8m × 6m
Amount of earth dug out from well (volume) = l × b × h
= 14 × 8 × 6 = $672m^3$

We know that,
Rise in earth level = dimensions of rectangular field / amount of earth dug up
= (70×60) / 672
= 0.16m
= 16cm
∴ Rise in earth level on a rectangular field is 16cm.

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 level of water.
Solution:
Given details are,
Dimensions of swimming pool = 250 m × 130m
Volume of water pumped in it = 3250 m^3
We know that,
Rise in water level in pool = volume of water pumped / dimensions of swimming pool
= 3250/(250×130)
= 0.1m
∴ Rise in level of water is 0.1m

15. A beam 5 m long and 40 cm wide contains 0.6 cubic metre of wood. How thick is the beam?
Solution:
Given details are,
Length of beam = 5 m
Width of beam = 40 cm = 0.4 m
Volume of wood in beam = 0.6 m^3
Let thickness of beam be 'h' m
We know that,
Volume = l × b × h
h = volume/(l × b)
= 0.6/(5×0.4)
= 0.3m
∴ Thickness of the beam is 0.3m

16. The rainfall on a certain day was 6 cm. How many litres of water fell on 3 hectares of field on that day?
Solution:
Given details are,
Area of field = 3 hectare = 3×10000 m^2 = 30000 m^2

Depth of water on the field = 6cm = 6/100 = 0.06m
Volume of water = area of field × depth of water
= 30000 × 0.06
= 1800 m^3
We know that $1m^3$ = 1000 litre
So, 1800 m^3 = 1800 × 1000
= 18 × 10^5 litre
∴ 18 × 10^5 litres of water fell on 3hectares of field.

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 the beam is 0.5 m, find the third edge.
Solution:
Given details are,
Length of cuboidal beam = 8m
One edge of beam = 0.5m
Let the third edge of beam be 'h' m
Number of cubes of side 1cm (.01 m) produced = 4000
We know that,
Volume of beam = volume of each cube × no. of cubes
8 × 0.5 × h = 4000 × $(0.01)^3$
h = 0.004/4
= 0.001m
∴ Length of third edge is 0.001 m

18. The dimensions of a metal block are 2.25 m by 1.5 m by 27 cm. It is melted and recast into cubes, each of the side 45 cm. How many cubes are formed?
Solution:
Given details are,
Dimensions of metal block = 2.25m × 1.5m × 27cm = 2.25m × 1.5m × 0.27m
Side of each cube formed = 45cm = 0.45 m
We know that,
Number of cubes can formed = volume of metal block / volume of one cube
= (2.25×1.5×0.27) /(0.45×0.45×0.45)
= 0.91125 / 0.091125
= 10 cubes
∴ 10 cubes are formed.

19. A solid rectangular piece of iron measures 6 m by 6 cm by 2 cm. Find the weight

of this piece, if 1 cm^3 of iron weighs 8 gm.

Solution:

Given details are,

Dimensions of solid rectangular piece = 6m × 6cm × 2cm

Volume of rectangular iron = 600cm × 6cm × 2cm = 7200cm^3

Weight of 1cm^3 iron = 8 gm.

So, weight of 7200cm^3 = 7200 × 8

= 57600 gm.

= 57.6 kg

∴ The weight of the piece is 57.6 kg

20. Fill in the blanks in each of the following so as to make the statement true :

(i) 1 m^3 =.....cm^3

(ii) 1 litre =..... cubic decimetre

(iii) 1 kl =.....m^3

(iv) The volume of a cube of side 8 cm is …….

(v) The volume of a wooden cuboid of length 10 cm and breadth 8 cm is 4000 cm^3. The height of the cuboid is …. cm.

(vi) 1 cu. dm =.....cu. mm

(vii) 1 cu. km = ...cu. m

(viii) 1 litre =.....cu. cm

(ix) 1 ml =.....cu. cm

(x) 1 kl = …… cu. dm =..... cu. cm.

Solution:

(i) 1 m^3 = 1 × (100×100×100) = **$\underline{10^6 cm^3}$** (since 1m = 100cm)

(ii) 1 litre = 1000cm^3 = 1000 × (0.1×0.1×0.1) dm^3 = **$\underline{1dm^3}$** (since 1cm = 0.1dm)

(iii) 1 kl = 1000 litre = **$\underline{1m^3}$** (since 1m^3 = 1000 litre)

(iv) The volume of a cube of side 8 cm is ……

We know that, side of a cube = 8cm

So, volume of cube = 8^3 = **$\underline{512cm^3}$**

(v) The volume of a wooden cuboid of length 10 cm and breadth 8 cm is 4000 cm^3. The height of the cuboid is …. cm.

Given, volume of cuboid = 4000 cm^3

Length of cuboid = 10cm

Breadth of cuboid = 8cm

We know that volume = l × b × h
h = volume / (l × b)
= 4000 / (10×8)
= **50cm**

(vi) 1 cu. dm = $1dm^3 = 1 \times (10 \times 10 \times 10) = 10^3 cm^3$ (since 1dm = 10cm)
$10^3 \times (10 \times 10 \times 10) =$ **10^6 mm^3** (since 1cm = 10mm)

(vii) 1 cu. km = 1000×1000×1000 = **$10^9 m^3$** (since 1km = 1000m)

(viii) 1 litre = 1000 cm^3 = **$10^3 cm^3$**

(ix) 1 ml = 1/1000 litre = 1/1000 × 1000 = **$1cm^3$** (since 1ml = 1/1000 litre)

(x) 1 kl = 1 × 1000 litre = $1m^3 = 1 \times (10 \times 10 \times 10)\ dm^3$ (since 1m = 10dm)
1 kl = **1000 dm^3** = $10^3\ dm^3 = 1000 \times 1000 =$ **10^6 cm^3**