Volume
(English Medium)

Exercise

Solution 1:

1. 1 kilolitre = 1000 litre
2. 1000 cu cm = 1000 mililitre
   1 cu cm = 1 ml
   1000 cu cm = 1 × 1000 mililitre
3. 1 cu m = 1000 litre
   1 cu m = 100 × 100 × 100 = 10,00,000 ml
   10,00,000 ml = 1000 litre …(1000 ml = 1 litre)
4. 1 cu cm = 1 mililitre
5. 1 litre = 1000 cu cm
   1 litre = 1000 ml
   1 ml = 1 cu cm
   1000 ml = 1000 cu cm
6. 4 cu m = 40,00,000 cu cm
   1 cu m = 10,00,000 cu cm
   4 cu m = 40,00,000 cu cm
7. 8 litre = 8,000 cu cm
   1 litre = 1000 cu cm
   8 litre = 8000 cu cm
8. 1 cu m = 1 kilolitre
   1 cu m = 10,00,000 ml …(1 cu cm = 1 ml)
   1 cu m = 1000 litre …(1000 ml = 1 litre)
   1 cu m = 1 kilolitre …(1000 litre = 1 kilolitre)
9. Formula to find volume of a cube is l3
10. Formula to find volume of cuboid is l × b × h

Solution 2:

Sr. No.	Length	Breadth	Height	Volume
(1)	15 cm	15 cm	15 cm	3375 cm^3
(2)	20 cm	15 cm	10 cm	3000 cm^3
(3)	10 m	10 m	10 m	1000 m^3
(4)	35 cm	15 cm	8 cm	4200 cm^3
(5)	9 m	9 m	9 m	729 m^3

Calculations:

(1) Volume of a cube = l^3 = 15 × 15 × 15 = 3375 cm^3

(2) Volume of a cuboid = l × b × h = 20 × 15 × 10 = 3000 cm^3

(3) Length, breadth and height can be found from volume only in case of cube, not in case of a cuboid
Now, volume of a cube = l^3
∴ Length of a cube = $\sqrt[3]{\text{Volume}}$ = $\sqrt[3]{10 \times 10 \times 10}$ = 10 m^3

(4) Volume of a cuboid = l × b × h = 35 × 15 × 8 = 4200 cm^3

(5) Volume of a cube = l^3 = 9 × 9 × 9 = 729 m^3

Solution 3:

Given :
Length of the cuboidal tank = 20 m
Breadth of the cuboidal tank = 15 m
Height of the cuboidal tank = 2 m
Volume of a cuboid = l × b × h
∴ Volume of the cuboidal tank = (20 × 15 × 2) m^3
= 600 m^3
Thus, the volume of a cuboidal tank is 600 m^3.
*The question has been rectified.

Solution 4:

Given:
Length of the cuboidal cement block = 30 cm
Breadth of the cuboidal cement block = 23 cm
Height of the cuboidal cement block = 12 cm
Volume of a cuboid = l × b × h
∴ Volume of the cuboidal cement block = (30 × 23 × 12) cm^3
= 8280 cm^3
Thus, the volume of the cuboidal cement block is 8280 cm^3.
*The question has been rectified.

Solution 5:

Given:

Length of the cuboidal salt-pan = 30 m

Breadth of the cuboidal salt-pan = 10 m

Height (depth) of the cuboidal salt-pan = 10 cm = 0.10 m

Volume of a cuboid = l × b × h

∴ Volume of cuboidal salt-pan = (30 × 10 × 0.10) m^3

= 30 m^3

Thus, the volume of the cuboidal salt-pan is 30 m^3.

To find the capacity of tank, convert the volume of the tank (30 m^3) into litres.

Volume of 1 m^3 = 1000 litres

∴ 30 m^3 = (30 × 1000) = 30,000 litres.

Hence, 30,000 litres of sea water can be contained in the salt-pan.

Solution 6:

Given:

Length of the cubical tank = 3 m

Volume of a cube = l^3

∴ Volume of cubical tank = (3 × 3 × 3) m^3

= 27 m^3

Hence, Volume of the cubical tank is 27 m^3

To find the capacity of tank, convert the volume of the tank, 27 m^3 into litres.

Volume of 1 m^3 = 1000 litres

∴ 27 m^3 = (27 × 1000) = 27,000 litres.

Hence, 27,000 litres of water can be stored in the tank.

Solution 7:

Given:

Length of the cuboidal box = 30 cm

Breadth of the cuboidal box = 20 cm

Height of the cuboidal box = 10 cm

Volume of a cuboid = l × b × h

∴ Volume of cuboidal box = (30 × 20 × 10) cm^3

= 600 cm^3

Length of the cube = l = 5 cm

Volume of one cube = l^3

∴ Volume of each small cube = (5 × 5 × 5) cm^3

= 125 cm^3

Now, number of smaller cubes that can be arranged in the cuboidal box

$$= \frac{\text{Volume of the cuboidal box}}{\text{Volume of one cube}}$$

$$= \frac{6000}{125}$$

= 48

Hence, 48 cubes can be arranged in the box.

Solution 8:

Given:
Length of the cuboidal milk tank = 2 m = 200 cm
Breadth of the cuboidal milk tank = 50 cm
Height of the cuboidal milk tank = 40 cm

Volume of a cuboid = $l \times b \times h$
$\therefore$ Volume of a cuboidal milk tank = $(200 \times 50 \times 40)\ cm^3$
$= 4,00,000\ cm^3$

Total quantity of milk in the tank = $4,00,000\ cm^3$
$1\ cm^3 = 1\ ml$
$\therefore\ 4,00,000\ cm^3 = 4,00,000\ ml$

Now, each milk packet contains 200 ml of milk.

Thus, number of packets that can be filled with milk in the tank

$$= \frac{\text{Milk in the tank}}{\text{Milk in each packet}}$$
$$= \frac{4,00,000}{200}$$
$$= 2,000$$

Hence, 2,000 packets of milk can be filled.

Solution 9:

Given:
Length of the bigger cuboidal box = 45 cm
Breadth of the bigger cuboidal box = 30 cm
Height of the bigger cuboidal box = 20 cm

Volume of a cuboid = $l \times b \times h$
$\therefore$ Volume of the bigger cuboidal box = $(45 \times 30 \times 20)\ cm^3$
$= 27000\ cm^3$

Given:
Length of the smaller cuboidal box = 15 cm
Breadth of the smaller cuboidal box = 6 cm
Height of the smaller cuboidal box = 4 cm

$\therefore$ Volume of the smaller cuboidal box = $(15 \times 6 \times 4)\ cm^3$
$= 360\ cm^3$

Now, number of smaller boxes which can be arranged in medicine box

$$= \frac{\text{Volume of bigger cuboidal box}}{\text{Volume of one smaller cubodal box}}$$
$$= \frac{27000}{360}$$
$$= 75$$

Thus, 75 smaller boxes can be arranged in the bigger box.

Practice – 1

Solution 1:

Let ‘l’ be the length of the cube.
Volume of a cube = length × length × length = l^3
∴ Volume of a cube of length 20 cm
= (20 × 20 × 20) cm^3
= 8000 cm^3
Hence, the volume of the cube is 8000 cm^3.

Solution 2:

The box is cuboid in shape.
Let ‘l’ be the length, ‘b’ be the breadth and ‘h’ be the height of the cuboid.
Volume of a cuboid = l × b × h
∴ Volume of the cuboid with dimensions 2 metre × 3 metre × 1 metre
= (2m × 3m× 1m)
= 6 m^3
Hence, the volume of the cuboidal box is 6 m^3.

Solution 3:

Let ‘l’ be the length of the cube.
Volume of a cube = length × length × length = l^3
∴ Volume of a cube of length 12 cm
= (12 × 12 × 12) cm^3
= 1728 cm^3
Hence, the volume of the given cube is 1728 cm^3.

Solution 4:

Let ‘l’ be the length, ‘b’ be the breadth and ‘h’ be the height of the cuboid.
Volume of a cuboid = l × b × h
∴ Volume of given cuboid
= (10 × 8 × 6) m^3
= 480 m^3
Hence, the volume of the cuboid is 480 m^3.
*The question has been rectified.

Solution 5:

Let ‘l’ be the length of the cube.
Volume of a cube = length × length × length = l^3

∴ Volume of a cubic stone of length 40 cm
= (40 × 40 × 40) cm^3
= 64000 cm^3
Hence, the volume of the cube is 64,000 cm^3.

Solution 6:

Volume of a cuboid = l × b × h
∴ Volume of the cuboidal brick of length 24 cm, breadth 10 cm and height 8 cm

= (24 × 10 × 8) cm^3

= 1920 cm^3

Hence, the volume of the brick is 1920 cm^3.

Solution 7:

Volume of a cuboid = l × b × h

∴ Volume of a cuboidal compass box of length 16 cm, breadth 4 cm and height 2 cm

= (16 × 4 × 2) cm^3

= 128 cm^3

Hence, the volume of the compass box is 128 cm^3.

Solution 8:

Volume of a cuboid = l × b × h

∴ Volume of a cuboidal tank of length 3 m, breadth 2 m and height 6 m

= (3 × 2 × 6) m^3

= 36 m^3

Hence, the volume of the tank is 36 m^3.

Practice – 2

Solution 1:

There are two boxes, and both the boxes have a cuboid shape.

Volume of a cuboid = l × b × h

∴ Volume of the bigger box = (80 × 60 × 40) cm^3

= 192000 cm^3

Volume of cube = l^3

∴ Volume of one small cubical box = (20 × 20 × 20) cm^3

= 8000 cm3

Now, number of small boxes which can be arranged in the bigger box

$$= \frac{\text{Volume of bigger box}}{\text{Vdlume of one smaller box}}$$

$$= \frac{192000}{8000}$$

= 24

Hence, 24 smaller cubical boxes can be arranged in the bigger cuboidal box.

Solution 2:

The brick is a cuboid.

Volume of a cuboid $= l \times b \times h$

$\therefore$ Volume of cuboidal brick $= 25\text{ cm} \times 10\text{ cm} \times 8\text{ cm}$

$= 2000\text{ cm}^3$

Length of earth dug out from the cubical pit $= 2\text{m} = 200\text{ cm}$

Volume of a cube $= l^3$

$\therefore$ Volume of the earth dug out from the cubical pit

$= (200 \times 200 \times 200)\text{ cm}^3$

$= 80,00,000\text{ cm}^3$

Now, number of bricks which can be made from the earth dug out

$$= \frac{\text{Volume of earth dug out}}{\text{Volume of one brick}}$$

$$= \frac{8000000}{2000}$$

$= 4000$

Hence, 4000 bricks can be made from the earth dug out from a cubical pit.

Solution 3:

Volume of a cuboid $= l \times b \times h$

$\therefore$ Volume of the cuboidal tank $= 3\text{ m} \times 2\text{ m} \times 2\text{ m} = 12\text{ m}^3$

To find the capacity of the tank, convert the volume of the tank 12 m^3 into litres.

Now, 1 m^3 = 1000 litres

$\therefore$ 12 m^3 = (12 × 1000) = 12,000 litres.

Hence, 12,000 litres of water can be stored in the tank.

Solution 4:

Vdume of a cuboid $= l \times b \times h$

$\therefore$ Volume of a cubcidal box of length 51 cm, breadth 36 cm and height 18 cm

$= (51 \times 36 \times 18)\text{ cm}^3$

Vdume of one cubcidal compass box of length 17 cm,
breadth 9 cm and height 2 cm

$= (17 \times 9 \times 2)\text{ cm}^3$

Now, number of compass boxes which can be arranged in the box

$$= \frac{\text{Volume of the box}}{\text{Volume of one compass-box}}$$

$$= \frac{51 \times 36 \times 18}{17 \times 9 \times 2}$$

$$= \frac{3 \times 4 \times 9}{1 \times 1 \times 1}$$

$= 108$

Hence, 108 compass boxes can be arranged in the box.

Solution 5:

Volume of a cuboid = $l \times b \times h$
Length of the cuboidal iron tank = 100 cm
Breadth of the cuboidal iron tank = 80 cm
Height of the cuboidal iron tank = 60 cm

$\therefore$ Volume of the cuboidal iron tank = $(100 \times 80 \times 60)\ cm^3$
$= 4,80,000\ cm^3$

To find the capacity of the cuboidal iron tank,
convert the volume of the tank into litres.
Volume of $1000\ cm^3$ = 1 litre
$\therefore\ 4,80,000\ cm^3 = \left(\frac{4,80,000}{1000}\right)$ litres = 480 litres

Hence, the tank would contain 480 litres of kerosene.
* The question has been rectified.