

PRIMARY MATHS SERIES

REVISION GUIDE FOR STANDARDS 7 AND 8

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VOLUME, CAPACITY AND MASS

3.1 Specific Objectives

By the end of this unit, the learner should be able to:

- a) Calculate the volume of cubes, cuboids, cylinders and triangular prisms.
- b) Work out problems involving conversion of units of capacity to units of volumes and vice-versa.
- c) Work out problems involving conversion of units of mass.

3.2 Worked Exercises

1. A Jerry can contains 5 liters of juice. This juice is used to fill 3 containers each of radius 7 cm and height of 10cm. How many milliliters of juice are left in the jerry can?

A.380 B.480 C. 400 D. 420

Working

$$\begin{aligned}\text{Volume of container-} &= \pi r^2 h \\ &= \frac{22}{7} \times 7 \times 7 \times 10 \\ &= 1540 \text{ cm}^3\end{aligned}$$

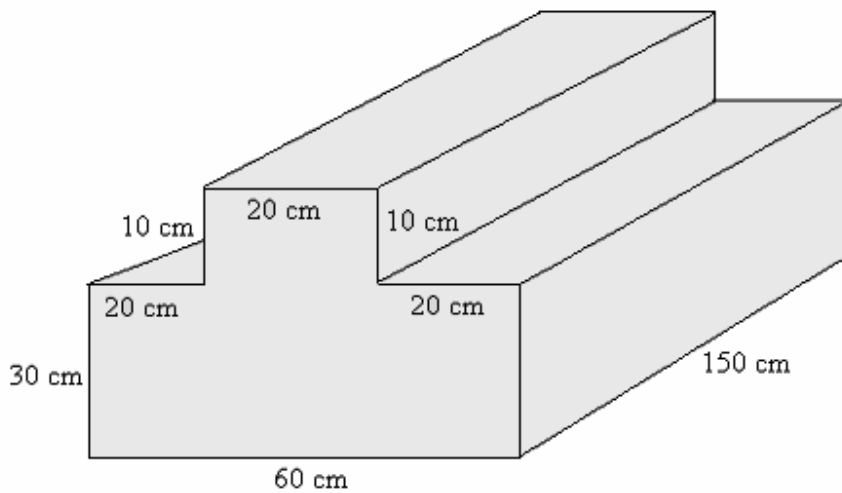
$$\begin{aligned}\text{Volume of 3 such containers} &= (1540 \times 1000) \text{ cm}^3 \\ &= 5000 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Volume of juice in jerry can} &= (5 \times 1000) \\ &= 5000 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Volume of juice left} &= (5000 - 4620) \text{ cm}^3 \\ &= 380 \text{ cm}^3 \\ &= 380 \text{ ml}\end{aligned}$$

The correct answer is A (380ml)

2. The diagram below represents a solid whose dimensions are shown.



What is the volume in cm^3 ?

A.30000

B.300000

C.3000

D.3000000

Working

Volume = Area of the Cross-section x length

Volume of the top = $(20 \times 10 \times 150)$

= $30,000\text{cm}^3$

Volume of the bottom = $60 \times 30 \times 150$

= $270,000\text{cm}^3$

Whole solid = top + bottom

= $30,000 + 270,000$

= $300,000\text{cm}^3$

The correct answer is B (300 000)

3. In the month of October, a farmer delivered 48750kg of maize to a miller. In November the amount of maize delivered was 1850kg more than that of October. The amount delivered in December was 2450kg less than that of November. What was the total mass, in tones, was delivered by the farmer in the 3 months?

A.145.65

B. 147.5

C.152.4

D. 150.55

Working

$$\begin{aligned}\text{October} &= 48750 \text{ kg} \\ \text{November} &= (48750 + 1850) \text{ kg} \\ &= 50,600 - 2,450) \text{ kg} \\ &= 48,150 \text{ kg} \\ \text{Total mass} &= 48750 + 50600 + 48150 \\ &= (147500/1000) \text{ tonnes} \\ &= 147.5 \text{ tonnes.}\end{aligned}$$

The correct answer is B (147.5)

4. A rectangular tank measures 1.2m by 80cm by 50cm. water is poured into the tank to a height of 15cm. How many more liters of water are needed to fill the tank?

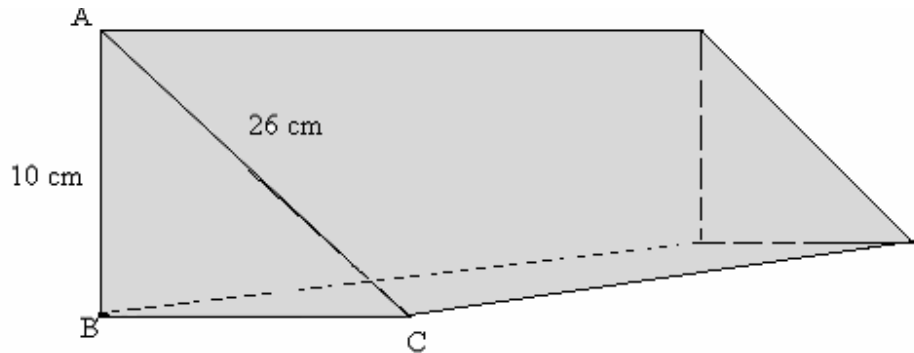
A.144 B.14.4 C.33.6 D.336

Working

$$\begin{aligned}\text{Capacity of the tank} &= 120 \times 80 \times 50 \\ &= 480,000\text{cm}^3 \\ \text{Convert to litres} &= \frac{(480,000)}{1000} \\ &= 480\text{litres} \\ \text{Volume of the water poured} &= 120 \times 80 \times 50 \\ &= 144000\text{cm}^3 \\ \text{Convert to litres} &= \frac{(144000)}{1000} \\ &= 144 \text{ liters} \\ \text{Volume of water needed} &= 480 - 144 \\ &= 366\text{liters.}\end{aligned}$$

The correct answer is D (366)

5. The diagram below represents a solid triangular prism.



What is the volume in cm^3 ?

- A. 2400 B. 2000 C. 5200 D. 576

Working

Apply Pythagorean relation in triangle ABC

$$\begin{aligned} BC &= \sqrt{26^2 - 10^2} \\ &= \sqrt{576} \end{aligned}$$

$$\begin{aligned} \text{Volume} &= \text{Area of the Cross section} \times \text{length} \\ &= \frac{1}{2} \times 24 \times 10 \times 20 \\ &= 2400\text{cm}^3 \end{aligned}$$

The correct answer is A (2400cm^3)

6. A cylindrical tank has a radius of 2m and a height of 1.5m. The tank was filled with water to a depth of 0.5m. What is the volume of water in the tank, in liters? ($\pi = 3.14$)

- A. 6280 B. 628 C. 9240 D. 18840

Working

$$\begin{aligned} V &= \pi r^2 h \\ &= 3.14 \times 2 \times 2 \times 0.5 \\ &= 6.28 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{In liters} &= 6.28 \times 1000 \\ &= 6280 \text{ litres} \end{aligned}$$

The correct answer A (6280)

7. When processed, 7kg of coffee beans produce 1kg of processed coffee. Processed coffee is then packed in 50kg bags. A farmer delivered 5.6 tonnes of coffee berries in one month. How many bags were obtained?

A.12 B.16 C. 40 D.20

Working

$$\begin{aligned}\text{Mass of coffee berries} &= 5.6\text{tonnes} \\ &= 5.6 \times 1000 \\ &= 5600\text{kg} \\ \text{Mass obtained} &= \frac{5600}{7} \\ &= 800\text{kg} \\ \text{Number of bags} &= 800 \div 50 \\ &= 16 \text{ bags}\end{aligned}$$

The correct answer is B (16)

8. A rectangular container whose base measures 40cm by 60cm has 30 liters of water when full. Find the height of the container in cm.

A.0125 B 1.25 C.12.5 D 125

Working

$$\begin{aligned}V &= \text{base area} \times \text{height} \\ \text{Height} &= \frac{\text{volume}}{\text{base area}} \\ \text{Volume} &= 30 \text{ liters} \\ &= 30 \times 1000 \\ &= 30,000\text{cm}^3 \\ \text{Height} &= \frac{30,000}{2400} \\ &= 12.5\text{cm}\end{aligned}$$

The correct answer is C (12.5)

9. A shopkeeper had 43 liters sand and 5 liters of paraffin. He packed all the paraffin in 7.5 dl-containers. How many containers did he fill?

- A. 58 B. 5.8 C. 6 D. 60

Working

Convert deciliters into liters

$$1 \text{ dl} = \frac{1}{10} \text{ litres}$$

$$5 \text{ dl} = \frac{5}{10} \text{ litres}$$

$$7.5 \text{ dl} = \frac{7.5}{10} \text{ litres}$$

$$= 0.75 \text{ litres}$$

$$\text{Hence } 43 \text{ liters } 5\text{dl} = 43.5 \text{ litres}$$

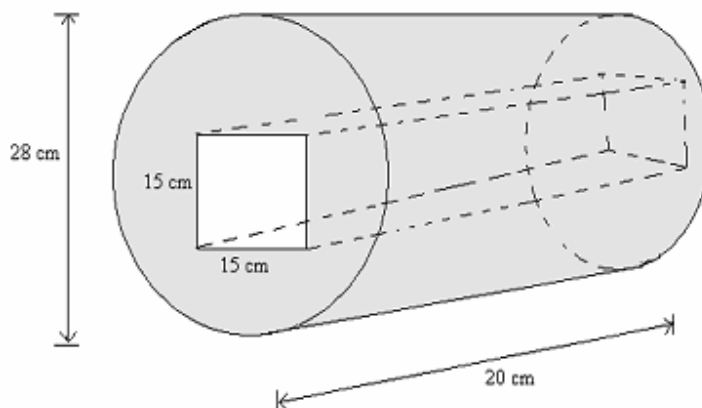
$$\text{No of containers} = \frac{43.5}{0.75}$$

$$= 58 \text{ containers}$$

The correct answer is 58 (A)

10. The figure below shows a cylindrical solid of diameter 28cm and length 20 cm. A-square hole of side 1.5 cm has been removed. What is the volume of the material in the solid, in cm³?

- A.12320 B. 4500 C 8400 D 7820



working

$$\begin{aligned}\text{Volume of solid} &= \text{volume of Cylinder} - \text{volume of the square hole} \\ &= (22/7 \times 14 \times 14 \times 20) - (15 \times 15 \times 20) \\ &= 12320 - 4500 \\ &= 7,820 \text{ cm}^3 \text{ The correct answer is D (7820)}\end{aligned}$$

3.3 Practice Test Paper 3

A shop keeper packed flour in 1.25kg packets. How many such packets will weigh one tonne?

- A. 8000 B. 800 C. 80 D. 8

2. A school received 128 liters of cooking oil packed in 2- deciliters. If the packets were in crates each holding 32 packets, how many crates were received?

- A. 20 B. 8 C. 4 D.2

3. Khedival delivered milk to a dairy in the morning and afternoon. During the month of March, he delivered an average of 78 liters every morning. If he delivered a total of 3813 liters, what was the average number of liters he delivered in the afternoon?

- A. 45 B. 49. C. 123 D.1395

4. Five hundred kilograms of coffee were packed in 500g packets. How many packets were obtained?

- A.10 B.100 C. 1000 D.10000

5. A rectangular container holds 5 liters of liquids when full. The base of the container is 40cm long and 20 cm wide. What is the height of the container in cm?

- A. 0.625 B. 6.25 C. 62.5 D. 625

6.A rectangular tank of base 5m long and 4m wide and 2m deep. How many litres of water are in the tank?

- A. 40L B. 400L C. 4000L D. 40000L

7. Wandere had 8 cylindrical containers, each of base area 616 cm^2 and height 33 cm , full of water. She used the water to fill an empty rectangular tank of volume $162,000 \text{ cm}^3$. How many litres of water remained when the tank was full?

- A. 162.624 liters B. 162 liters C. 624 liters D. 0.624

8. A lorry was loaded with 3 tones of tea which was packed in 100g, 250g and 500 g packets. The number of 100g packets was 10,000 while that of 250g packets was 5000. How many 500g packets were there?

- A. 15 B. 150 C. 1500 D. 15000

9. A lorry carried 50 cartons of books and 200 cartons of milk. Each carton of books weighed 40kg and each carton of milk weighed 5 kg. What was the total weight in tonnes of milk and books?

- A. 30 B. 1.25 C. 3 D. 8.25

10. A cylindrical container of radius 70 cm is 200 cm deep. The container is filled with water to a depth of 140 cm . What is the volume of water, in m^3 , needed to fill the remaining part of the container?

- A. 0.0264 B. 0.9240 C. 2.1560 D. 3.0800

11. A family uses 700ml milk everyday. How many litres of milk does the family use during the month of June?

- A. 2.1 B. 21 C. 210 D. 2100

12. Karangi transported the following items to his shop.

3 bags of green maize each weighing 114.6 kg

2 bags of potatoes weighing 130.0 kg

3 bags of carrots weighing 137.7 kg .

What was the total mass, in tonnes, did she transport?

- A. 2578 B. 12.578 C. 125.78 D. 1257.8

13. A cylinder has a height of 12cm. What is the diameter of the cylinder if its volume is 1848cm^3 ($\pi = \frac{22}{7}$)

- A. 154cm B. 49cm C. 14cm D. 7 cm

14. A shop- keeper had sugar packed as follows

60 packets of 250g each

80 packets of 500g each

85 packets of 1 kg each

80 packets of 2kg each

He repacked the rice into 5kg packets. How many such packets did he get?

- A.61 B.60 C.159 D.300

15. A rectangular water tank is 6m long, 4 metres wide and 3 metres high. How many litres does it hold full?

- A. 72L B. 7200L C. 72000L D 72000000L

16. Boxes measuring 10cm by 6cm by 4cm were to be packed in a carton measuring 1.5 m by 1m by 0.4m. How many boxes were needed to fill the carton?

- A. 25000 B.2500 C. 250 D.25

17. A truck was loaded with 4.3 tonnes of tea leaves which was packed in 100g, 250g, 50g and 1 kg packets. The number of 250g packets was three times the number of 500g packets. The number of 500g packets was twice the number of 1kg packets. If the number of 1kg packets was 1000, what was the number of 100g packets?

- A. 6000 B.2000 C.8000 D.5000

18. A cylindrical water has a radius of 0.7m and a height of 3m? What is the volume of the tank in m^3 ? ($\pi = \frac{22}{7}$)

- A. 4.62 B.13.2 C.16.28 D 18.48

19. Marion packed 15 cartons each containing 20 bottles of juice. The amount of juice in each bottle was 500ml. What was the total amount of the juice, in litres, packed by marion?

- A.150 B. 1500 C. 15000 D. 150000

20. A cylindrical container has a circumference of 176cm and a height of 40cm. What is the volume of the container in cm^3 ($\frac{22}{7} = \underline{\underline{22}}$)

- A 394 240 B. 98560 C. 7040 D. 3520

21. A family uses 5 dl of milk per day. How many litres of milk would the family use in the months of August and September?

- A. 305 B. 30.5 C. 30.0 D. 3.05

22. An encyclopedia has 97 sheets of paper and a cover. Each sheet has a mass of 4grams and the cover is 0.02kg. Find the mass of the book in kilograms.

- A. 0.408 B 4.08 C. 40.8 D. 408

23. A canter was loaded 4 boxes of fat and 60 bundles of flour. Each box contained twenty four 250g packets of fat. The mass of each empty box was 500g. Each bundle contained twelve 2kg packets of flour. What is the load in tonnes?

- A.1.466 B. 14.66 C. 146.6 D.1466

24. A rectangular container whose base is 1.5 m by 0.5 m is to be filled with water using 50 litre containers. How many such containers will be required to fill the tank to height of 1 meter?

- A. 15 B. 150 C. 1.5 D. 1500

25. A saleslady had 2,240 litres of juice which she packed in 500ml and 250ml packets. Three quarters of the juice was packed in 500ml packets and the rest in 250ml packets. What was the total number of packets used.

- A.56 B. 560 C. 5600 D. 56000

26. A cylindrical container of diameter 105cm contains 485.1 litres of water. What is the height of the water in the Tank?

- A. 5.6cm B. 56cm C. 224cm D. 1470cm

27. A cylindrical solid of height 20cm and radius 7cm is cut into two pieces along the diameter. What is the volume of each part in cm^3 ?

- A. 3080 B. 440 C. 1540 D. 385

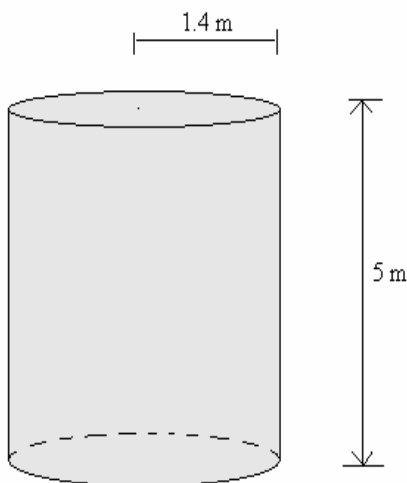
28. What is the volume of a cylindrical tank of diameter 5m and height 6m?

- A. $2 \frac{32}{35} \text{ m}^3$ B. $1 \frac{86}{105} \text{ m}^3$ C. $117 \frac{6}{7} \text{ m}^3$ D. $94 \frac{2}{7} \text{ m}^3$

29. A pick up whose mass when empty is one tonne was loaded 40 bags of sugar each weighing 50kg and three bags of maize each weighing 65kg. What was the total mass, in tonnes, of the loaded pick ups?

- A. 3.195 B. 3.065 C. 3.0 D. 2.195

30. The cylindrical tank has internal radius 1.4 m and height 5m as shown in the diagram below.



What is the capacity of the tank, in litres? ($\Pi = \frac{22}{7}$)

- A. 30800L B. 3080L C. 308L D. 30.8l

3.4 Practice Test Paper 3 Answers

1	B	6	D	11	B	16	B	21	B	26	B
2	A	7	D	12	A	17	C	22	A	27	C
3	D	8	C	13	D	18	A	23	A	28	C
4	C	9	C	14	B	19	A	24	A	29	A
5	B	10	B	15	C	20	B	25	C	30	A