RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1: RS Aggarwal's Class 8 Maths Chapter 20, Exercise 20.1 focuses on Volume and Surface Area of Solids. This RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 introduces fundamental concepts such as finding the volume of cubes, cuboids, and cylinders using appropriate formulas. It also covers calculating the surface area of these solids by considering all their faces and bases.

Through a series of problems, students learn to apply these formulas to solve real-world problems involving dimensions and measurements of various geometric shapes. The RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 aims to develop a solid understanding of how to compute and apply volume and surface area calculations in practical scenarios.

RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 Volume and Surface Area of Solids Overview

RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 dives into the crucial topics of Volume and Surface Area of Solids through Exercise 20.1. This exercise serves as a foundational introduction to these concepts, aiming to build a strong understanding among students.

Throughout the RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1, a variety of problems are presented to reinforce learning. These problems vary in complexity, helping students to gradually master the calculations involved in finding volume and surface area. Additionally, the exercise encourages students to think critically about how these geometric properties relate to practical situations, enhancing their problem-solving skills and mathematical reasoning.

RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1

Below we have provided RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 Volume and Surface Area of Solids -

(1) Find the volume, lateral surface area and the total surface area of the cuboid whose dimensions are:

(i) Length = 22 cm, breadth = 12 cm and height = 7.5 cm

Solution: Volume of the cuboid = (l × b × h) cubic units

= (22 × 12 × 7.5) cm^3 = 1980 cm^3

Lateral surface area of the cuboid = {2 (l + b) × h} cm^2

= {2 (22 + 12) × 7.5} m^2 = 510 cm^2

Total surface area of the cuboid = 2(lb + bh + lh) sq units

= 2(22 × 12 + 12 × 7.5 + 22 × 7.5) cm^2

= 2 (264 + 90 + 165) cm^2 = 1038 cm^2

(ii) Length = 15 m, breadth = 6 m and height = 9 dm

Solution: Here, 9 dm = 0.9 m

Volume of the cuboid = {15 × 6 × 0.9} m^3 = 81 m^3

Lateral surface area of the cuboid = {2 (15 + 6) × 0.9} m^2 = 37.8 m^2

Total surface area of the cuboid = [2 {(15 × 6) + (6 × 0.9) + (15 × 0.9)}] m^2

= [2 × (90 + 5.4 + 13.5)] m^2 = 217.8 m^2

(iii) Length = 24 m, breadth = 25 cm and height = 6 m

Solution: Here, 25 cm = 0.25 m

Volume of the cuboid = {24 × 0.25 × 6} m^3 = 36 m^3

Lateral surface area of the cuboid = {2 (24 + 0.25) × 6} m^2 = 291 m^2

Total surface area of the cuboid = [2 {(24 × 0.25) + (0.25 × 6) + (24 × 6)}] m^2

= [2 × (6 + 1.5 + 144)] m^2 = 303 m^2

(iv) Length = 48 cm, breadth = 6 dm and height = 1 m

Solution: Here, 48 cm = 0.48 m and 6 dm = 0.6 m

Volume of the cuboid = {0.48 × 0.6 × 1} m^3 = 0.288 m^3

Lateral surface area of the cuboid = {2 (0.48 + 0.6) × 1} m^2 = 2.16 m^2

Total surface area of the cuboid = [2 {(0.48 × 0.6) + (0.6 × 1) + (0.48 × 1)}] m^2

= [2 × (0.288 + 0.6 + 0.48)] m^2 = 2.736 m^2

(2) The dimensions of a rectangular water tank are 2 m 75 cm by 1 m 80 cm by 1 m 40 cm. How many litres of water does it hold when filled to the brim?

Solution: Here 2m 75 cm = 275 cm; 1 m 80 cm = 180 cm and 1 m 40 cm = 140 cm

Volume of the water = (275 × 180 × 140) cm^3 = 6930000 cm^3

We know, 1L = 1000 cm^3

∴ Volume = (6930000/1000) L = 6930 L.

(3) A solid rectangular piece of iron measures 1.05 m × 70 cm × 1.5 cm. Find the weight of this piece in kilograms if 1 cm^3 of iron weighs 8 grams.

Solution: Here, 1.05

Volume of the piece of iron = (105 × 70 × 1.5) cm^3 = 11025 cm^3

If 1 cm^3 of iron weighs 8 grams then, = (11025 × 8) grams = 88200 gram = 88.2 kg

(4) The area of a courtyard is 3750 m^2. Find the cost of covering it with gravel to a height of 1 cm if the gravel costs Rs 6.40 per cubic metre.

Solution: Here, 1 cm = 0.01 m

Volume of the gravel = (3750 × 0.01) m^3 = 37.5 m^3

Therefore, the total cost = Rs (37.5 × 6.40) = Rs 240.

(5) How many persons can be accommodated in hall of length 16 m, breadth 12.5 m and height 4.5 m, assuming that 3.6 m^3 of air is required for each person?

Solution: Volume of the hall = (16 × 12.5 × 4.5) m^3 = 900 m^3

∴ Number of person whose accommodated in hall = (900/3.6) = 250 person.

(6) A cardboard box is 1.2 m long, 72 cm wide and 54 cm high. How many bars of soap can be put into it if each bar measures 6 cm × 4.5 cm × 4 cm?

Solution: Here, 1.2 m = 120 cm

Volume of the cardboard = (120 × 72 × 54) cm^3 = 466560 cm^3

Volume of each bar soap = (6 × 4.5 × 4) cm^3 = 108 cm^3

∴ Total number of bar soap = (466560/108) = 4320 bars.

(7) The size of a matchbox is 4 cm × 2.5 cm × 1.5 cm. What is the volume of a packet containing 144 matchboxes? How many such packets can be placed in a carton of size 1.5m × 84 cm × 60 cm?

Solution: Volume of a matchbox = (4 × 2.5 × 1.5) cm^3 = 15 cm^3

Volume of packet containing 144 matchboxes = (144 × 15) cm^3 = 2160 cm^3

Here, 1.5 m = 150 cm

Volume of carton = (150 × 84 × 60) cm^3 = 756000 cm^3

∴ Total number of packets could placed in a carton = (756000/2160) = 350 packets.

(8) How many planks of size 2 m × 25 cm × 8 cm can be prepared from a wooden block 5 m long, 70 cm broad and 32 cm thick, assuming that there is no wastage?

Solution: Here, 5 m = 500 cm

Volume of the wooden block = (500 × 70 × 32) cm^3 = 1120000 cm^3

Total volume of each plank = (200 × 25 × 8) $cm^{.3}$ = 40000 cm^3

∴ Total number of the planks = (1120000/40000) = 28 planks.

(9) How many bricks, each of size 25 cm × 13.5 cm × 6 cm, will be required to build a wall 8 m long, 5.4 m high and 33 cm thick?

Solution: Volume of each brick = (25 × 13.5 × 6) cm^3 = 2025 cm^3

Volume of the wall = (800 × 540 × 33) cm^3 = 14256000 cm^3

Total number of bricks = (14256000/2025) = 7040 bricks.

(10) A wall 15 m long, 30 cm wide and 4 m high is made of bricks, each measuring 22 cm × 12.5 cm × 7.5 cm. If 1/12 of the total volume of the wall consists of mortar, how many bricks are there in the wall?

Solution: Here, 15 m = 1500 cm

Volume of the wall = (1500 × 30 × 400) cm^3 = 18000000 cm^3

The quantity of the mortar = {(1/12) × 18000000} cm^3 = 1500000 cm^3

Volume of the bricks = (18000000 – 1500000) cm^3 = 16500000 cm^3

Volume of each brick = (22 × 12.5 × 7.5) cm^3 = 2062.5cm^3

∴ Total number of bricks = (16500000 ÷ 2062.5) = 8000 bricks.

(11) Find the capacity of a rectangular cistern in litres whose dimensions are 11.2 m × 6 m × 5.8 m. Find the area of the iron sheet required to make the cistern.

Solution: Volume of cistern = (11.2 × 6 × 5.8) m^3 = 389.76 m^3 = (389.76 × 1000) L = 389760 L

Area of the iron sheet = Total surface area of the cistern = 2(11.2 × 6 + 6 × 5.8 + 11.2 × 5.8) m^2 = 2 (67.2 + 34.8 + 64.96) m^2 = 333.92 m^2

(12) The volume of a block of gold is 0.5 m^3. If it is hammered into a sheet to cover an area of 1 hectare, find the thickness of the sheet.

Solution: We know, 1 hectare = 10000 m^2

∴ Thickness of the sheet = (0.5 ÷ 10000) m = 0.00005 m = 0.005 cm.

(13) The rainfall recorded on a certain day was 5 cm. Find the volume of water that fell on a 2-hectare field.

Solution: Here, 2 hectare = 20000 m^2

Rainfall recorded = 5 cm = 0.05 m

∴ Total rain over the field = (0.05 × 20000) m^3 = 1000 m^3

(14) A river 2 m deep and 45 m wide is flowing at the rate of 3 km/h. find the quantity of water that runs into the sea per minute.

Solution: Area of the cross – section of river = (45 × 2) m^2 = 90 m^2

Rate of flowing = 3 km/hr = [(3 × 1000) ÷ 60] m/min = 50 m/min.

(15) A pit 5 m long and 3.5 m wide is dug to a certain depth. If the volume of earth taken out of it is 14 m^3, what is the depth of the pit?

Solution: Let the depth of the pit be x m.

Volume of pit = (5 × 3.5 × x) m^3 = 17.5x m^3

∴ 17.5x = 14

⇒ x = (14 ÷ 17.5) = 0.8m = 80 cm

Therefore, depth of the pit is 80 cm.

(16) A rectangular water tank is 90 cm wide and 40 cm deep. If it can contain 576 litres of water, what is its length?

Solution: Here, 576 L = 0.576 m^3

Width = 90 cm = 0.9 m and depth = 40 cm = 0.4 m

Length = {0.576 ÷ (0.9 × 0.4)} m = (0.576 ÷ 0.36) m = 1.6 m.

(17) A beam of wood is 5 m long and 36 cm thick. It is made of 1.35 m^3 of wood. What is the width of the beam?

Solution: Thickness of the beam = 36 cm = 0.36 m.

∴ Width = {1.35 ÷ (5 × 0.36)} m = (1.35 ÷ 1.8) m = 0.75 m = 75 cm.

(18) The volume of a room is 378 m^3 and the area of its floor is 84 m^2. Find the height of the room.

Solution: Height of the area = (378 ÷ 84)m = 4.5 m.

(19) A swimming pool is 260 m long and 140 m wide. If 54600 cubic metres of water is pumped into it, find the height of the water level in it.

Solution: Height of the water = {54600 ÷ (260 × 140)} m = (54600 ÷ 36400) m = 1.5 m

(20) Find the volume of wood used to make a closed box of outer dimensions are 60 cm × 45 cm × 32 cm, the thickness of wood being 2.5 cm all around.

Solution: External volume of the box = (60 × 45 × 32) cm^3 = 86400 cm^3

Internal length = {60 – (2.5 × 2)} cm = 55 cm

Internal breadth = {45 – (2.5 × 2)} cm = 40 cm

Internal height = {32 – (2.5 × 2)} cm = 27 cm

∴ Internal volume = (55 × 40 × 27) cm^3 = 59400 cm^3

Volume of the wood = (86400 – 59400) cm^3 = 27000 cm^3

(21) Find the volume of iron required to make an open box whose external dimensions are 36 cm × 25 cm × 16.5 cm, the box being 1.5 cm thick throughout. If 1 $cm^3$of iron weighs 8.5 grams, find the weight of the empty box in kilograms.

Solution: External volume of the box = (36 × 25 × 16.5) cm^3 = 14850 cm^3

Therefore, Internal length = {36 – (1.5 × 2)} cm = 33 cm

Internal breadth = {25 – (1.5 × 2)} cm = 22 cm

Internal height of open box = {16.5 – 1.5} cm = 15 cm

∴ Internal volume of the box = (33 × 22 × 15) cm^3 = 10890 cm^3

Therefore, volume of the iron = (14850 – 10890) cm^3 = 3960 cm^3

If 1 cm^3 iron = 8.5 grams

∴ The weight of the box = (3960 × 8.5) grams = 33660 grams.

(22) A box with a lid is made of wood which is 3 cm thick. Its external length, breadth and height are 56 cm, 39 cm and 30 cm respectively. Find the capacity of the box. Also find the volume of wood used to make the box.

Solution: External volume of the box = (56 × 39 × 30) cm^3 = 65520 cm^3

Therefore, internal length = {56 – (3 × 2)} cm = 50 cm

Internal width = {39 – (3 × 2)} cm = 33 cm

Internal height = {30 – (3 × 2)} cm = 24 cm

∴ Internal volume = (50 × 33 × 24) cm^3 = 39600 cm^3

Volume of the wood = (65520 – 39600) cm^3 = 25920 cm^3

(23) The external dimensions of closed wooden box are 62 cm, 30 cm and 18 cm. If the box is made of 2 cm thick wood, find the capacity of the box.

Solution: External volume of the box = (62 × 30 × 18) cm^3 = 33480 cm^3

Therefore, Internal length = {62 – (2 × 2)} cm = 58 cm

Internal width = {30 – (2 × 2)} cm = 26 cm

Internal height = {18 – (2 × 2)} cm = 14 cm

∴ Internal volume = (58 × 26 × 14) cm^3 = 21112 cm^3

Therefore, the capacity of the box is 21112 cm^3.

(24) A closed wooden box 80 cm long, 65 cm wide and 45 cm high, is made of 2.5 cm thick wood. Find the capacity of the box and its weight if 100 cm^3 of wood weighs 8 g.

Solution: External volume of the box = (80 × 65 × 45) cm^3 = 234000 cm^3

Thickness = 2.5 cm

Therefore, internal length = {80 – (2.5 × 2)} cm = 75 cm

Internal wide = {65 – (2.5 × 2)} cm = 60 cm

Internal height = {45 – (2.5 × 2)} cm = 40 cm

∴ Internal volume = (75 × 60 × 40) cm = 180000 cm^3

Volume of the wood = (234000 – 180000) cm^3 = 54000 cm^3

If 100 cm^3 of wood weighs 8 g, then,

∴ Weight of the wood = {(54000 × 8) ÷ 100} g = 4320 g = 4.32 kg

(25) Find the volume, lateral surface area and the total surface area of a cube each of whose edges measures: (i) 7 m (ii) 5.6 cm (iii) 8 dm 5 cm

Solution: (i) Volume = 7^3 = 7×7×7 = 343 m^3

Lateral surface = (4 × 7^2) = 4 × 7 × 7 = 196 m^2

Total surface = (6 × 7^2) = 6 × 7 × 7 = 294 m^2

(ii) Volume = $(5.6)^3$ = 5.6 × 5.6 × 5.6 = 175.616 m^3

Lateral surface = {4 × $(5.6)^2$} m^2 = 125.44 m^2

Total surface = {6 × $(5.6)^2$) m^2 = 188.16 m^2

(iii) Here, 8 dm 5 cm = 85 cm

Volume = $(85)^3$ = 85 × 85 × 85 = 614125 cm^3

Lateral surface = {4 × $(85)^2$} m^2 = 28900 m^2

Total surface = {6 × $(85)^2$} m^2 = 43350 m^2

(26) The surface area of a cube is 1176 cm^2. Find its volume.

Solution: Let the length of the each edge of cube be a cm.

Total surface area = $6a^2$ cm^2

∴ $6a^2$ = 1176

⇒ a^2 = 196

⇒ a = √196 = 14 cm

Volume = $(14)^3 = 14 \times 14 \times 14 = 2744$ cm^3

(27) The volume of a cube is 729 cm^3. Find its surface area.

Solution: Let the length of the each edge of cube be a cm.

Volume of cube = a^3 cm^3

∴ $a^3 = 729$

⇒ $a = \sqrt[3]{729} = 9$ cm

∴ Total surface area = $\{6 \times 9^2\}$ cm^2 = $(6 \times 9 \times 9)$ cm^2 = 486 cm^2

(28) 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 side 45 cm. How many cubes are formed?

Solution: Here, 2.25 m = 225 cm and 1.5 m = 150 cm

Volume of the metal block = $(225 \times 150 \times 27)$ cm^3 = 911250 cm^3

The volume of the cube = $(45 \times 45 \times 45)$ cm^3 = 91125 cm^3

∴ Number of cubes = $(911250 \div 91125)$ = 10 cubes.

(29) If the length of each edge of a cube is doubled, how many times does its volume become? How many times does its surface area become?

Solution: Let the length of each edge be a.

Volume of the cube = a^3

Total surface area = $6a^2$

If the length of edge is double, then length becomes 2a.

∴ New volume = $(2a)^3 = 8a^3$

Total surface = $6 \times (2a)^2 = 24a^2$

Therefore while the surface area become increased by 4 then the volume increased by a factor of 8.

(30) A solid cubical block of fine wood casts Rs 256 at Rs 500 per m^3. Find its volume and the length of each side.

Solution: Volume of the cubical block = $(256 \div 500)$ m^3 = 0.512 m^3

∴ Length of the edge = ($\sqrt[3]{0.512}$) m = 0.8 m = 80 cm.

Benefits of RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1

RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 on Volume and Surface Area of Solids offer several benefits to students:

Structured Learning: The RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 provide a structured approach to learning about volume and surface area calculations for solids. They follow a systematic presentation of formulas and examples, making it easier for students to grasp and apply the concepts.

Comprehensive Coverage: The RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 covers a wide range of solid shapes including cubes, cuboids, and cylinders. It ensures that students understand how to calculate both volume and surface area for each type of solid, preparing them for more complex geometry problems in higher grades.

Clarity and Explanation: RS Aggarwal Solutions for Class 8 Maths Chapter 20 Exercise 20.1 are known for their clear explanations and step-by-step solving techniques. This clarity helps students understand the reasoning behind each calculation, enhancing their conceptual understanding rather than just memorizing formulas.

Variety of Problems: The exercise includes a variety of problems of varying difficulty levels. This variety helps in reinforcing the concepts and improving problem-solving skills. Students get to practice applying the formulas to different scenarios, which builds confidence in their mathematical abilities.

Real-World Applications: By presenting practical examples such as filling containers or wrapping gifts, the exercise connects mathematical concepts to everyday situations. This application-oriented approach helps students appreciate the relevance of geometry in real life.