Practice Set 16.1 8th Std Maths Answers Chapter 16 Surface Area and Volume

Question 1.
Find the volume of a box if its length, breadth and height are 20 cm, 10.5 cm and 8 cm respectively.
Given: For cuboid shaped box,
length (l) = 20 cm, breadth (b) = 10.5 cm and height (h) = 8cm
To find: Volume of a box
Solution:
Volume of a box = l x b x h
= 20 x 10.5 x 8
= 1680 cc
∴ The volume of the box is 1680 cc.

Question 2.
A cuboid shaped soap bar has volume 150 cc. Find its thickness if its length is 10 cm and breadth is 5 cm.
Given: For cuboid shaped soap bar,
length (l) = 10 cm, breadth (b) = 5 cm and volume = 150 cc
To find: Thickness of the soap bar (h)
Solution:
Volume of soap bar = l x b x h
∴ 150 = 10 x 5 x h
∴ 150 = 50h
∴ $\frac{150}{50} = h$
∴ 3 = h
i.e., h = 3 cm
∴ The thickness of the soap bar is 3 cm.

Question 3.
How many bricks of length 25 cm, breadth 15 cm and height 10 cm are required to build a wall of length 6 m, height 2.5 m and breadth 0.5 m?
Given: For the cuboidal shape brick:
length (l_1) = 25 cm,
breadth (b_1) = 15 cm,
height (h_1) = 10 cm
For the cuboidal shape wall:
length (l_2) = 6 m,
height (h_2) = 2.5 m,
breadth (b_2) = 0.5 m
To find: Number of bricks required
Solution:
When all the bricks are arranged to build a wall, the volume of all the bricks is equal to volume of wall.
∴ Number of bricks = $\frac{\text{volume of the wall}}{\text{volume of a brick}}$

i. Volume of a brick = l_1 x b_1 x h_1
= 25 x 15 x 10 cc

ii. l_2 = 6m = 6 x 100 ...[∵ 1m = 100cm]
= 600 cm
h_2 = 2.5 m = 2.5 x 100 = 250 cm
b_2 = 0.5 m = 0.5 x 100 = 50 cm
Volume of the wall = l_2 x b_2 x h_2
= 600 x 50 x 250 cc

iii. $\text{Number of bricks} = \frac{\text{volume of the wall}}{\text{volume of a brick}}$
$= \frac{600 \times 50 \times 250}{25 \times 15 \times 10}$
= 40 x 2 x 25
= 2000 bricks
∴ 2000 bricks are required to build the wall.

Question 4.
For rain water harvesting a tank of length 10 m, breadth 6 m and depth 3 m is built. What is the capacity of the tank? How many litre of water can it hold?
Given: For a cuboidal tank,
Length (l) = 10 m, breadth (b) = 6 m, depth (h) = 3 m
To find: Capacity of the tank and litre of water tank can hold.
Solution:
i. l = 10m = 10 x 100 ...[∵ 1m = 100cm]
= 1000 cm,
b = 6 m = 6 x 100 = 600 cm,
h = 3 m = 3 x 100 = 300 cm
Volume of the tank = l x b x h
= 1000 x 600 x 300
= 18,00,00,000 cc

ii. Capacity of the tank = Volume of the tank
= 18,00,00,000 cc
$= \frac{18,00,00,000}{1000}$
...[∵ 1 litre =1000 cc]
= 1,80,000 litre
∴ The capacity of the tank is 18,00,00,000 cc and it can hold 1,80,000 litre of water.

Practice Set 16.2 8th Std Maths Answers Chapter 16 Surface Area and Volume

Question 1.
In each example given below, radius of base of a cylinder and its height are given. Then find the curved surface area and total surface area.

i. r = 7 cm, h = 10 cm
ii. r = 1.4 cm, h = 2.1 cm
iii. r = 2.5 cm, h = 7 cm
iv. r = 70 cm, h = 1.4 cm
v. r = 4.2 cm, h = 14 cm
Solution:
i. Given: r = 7 cm and h = 10 cm
To find: Curved surface area of cylinder and total surface area
Curved surface area of the cylinder = 2πrh
= 2 x $\frac{22}{7}$ x 7 x 10
= 2 x 22 x 10
= 440 sq.cm
Total surface area of the cylinder:
= 2πr(h + r)
= 2 x $\frac{22}{7}$ x 7(10 + 7)
= 2 x $\frac{22}{7}$ x 7 x 17
= 2 x 22 x 17
= 748 sq.cm
The curved surface area of the cylinder is 440 sq.cm and its total surface area is 748 sq.cm.

ii. Given: r = 1.4 cm and h = 2.1 cm
To find: Curved surface area of cylinder and total surface area
Curved surface area of the cylinder = 2πrh
= 2 x $\frac{22}{7}$ x 1.4 x 2.1
= 2 x 22 x 0.2 x 2.1
= 18.48 sq.cm
Total surface area of the cylinder = 2πr (h + r)
= 2 x $\frac{22}{7}$ x 1.4 (2.1 + 1.4)
= 2 x $\frac{22}{7}$ x 1.4 x 3.5
= 2 x 22 x 0.2 x 3.5
= 30.80 sq.cm
∴ The curved surface area of the cylinder is 18.48 sq.cm and its total surface area is 30.80 sq.cm.

iii. Given: r = 2.5 cm and h = 7 cm
To find: Curved surface area of cylinder and total surface area
Curved surface area of the cylinder = 2πrh
= 2 x $\frac{22}{7}$ x 2.5 x 7
= 2 x 22 x 2.5
= 110 sq.cm
Total surface area of the cylinder = 2πr(h + r)
= 2 x $\frac{22}{7}$ x 2.5 (7+ 2.5)
= 2 x $\frac{22}{7}$ x 2.5 x 9.5
= $\frac{1045}{7}$
= 149.29 sq.cm
∴ The curved surface area of the cylinder is 110 sq.cm and its total surface area is 149.29 sq.cm.

iv. Given: r = 70 cm and h = 1.4 cm
To find: Curved surface area of cylinder and total surface area
Curved surface area of the cylinder = 2πrh
= 2 x $\frac{22}{7}$ x 70 x 1.4
= 2 x 22 x 10 x 1.4
= 616 sq.cm
Total surface area of the cylinder = 2πr(h + r)
= 2 x $\frac{22}{7}$ x 70(1.4 + 70)
= 2 x $\frac{22}{7}$ x 70 x 71.4
= 2 x 22 x 10 x 71.4
= 2 x 22 x 714
= 31416 sq.cm
∴ The curved surface area of the cylinder is 616 sq.cm and its total surface area is 31416 sq.cm.

v. Given: r = 4.2 cm and h = 14 cm
To find: Curved surface area of cylinder and total surface area
Curved surface area of the cylinder = 2πrh
= 2 x $\frac{22}{7}$ x 4.2 x 14 = 2 x 22 x 4.2 x 2
= 369.60 sq.cm
Total surface area of the cylinder = 2πr (h + r)
= 2 x $\frac{22}{7}$ x 4.2 (14+ 4.2)
= 2 x $\frac{22}{7}$ x 4.2 x 18.2
= 2 x 22 x 0.6 x 18.2
= 480.48 sq.cm
∴ The curved surface area of the cylinder is 369.60 sq.cm and its total surface area is 480.48 sq.cm.

Question 2.
Find the total surface area of a closed cylindrical drum if its diameter is 50 cm and height is 45 cm. (π = 3.14)
Given: For cylindrical drum:
Diameter (d) = 50 cm
and height (h) = 45 cm
To find: Total surface area of the cylindrical drum
Solution:
Diameter (d) = 50 cm
∴ radius (r) = $\frac{d}{2} = \frac{50}{2}$ = 25 cm
Total surface area of the cylindrical drum = 2πr (h + r)
= 2 x 3.14 x 25 (45 + 25)
= 2 x 3.14 x 25 x 70
= 10,990 sq.cm
∴ The total surface area of the cylindrical drum is 10,990 sq.cm.

Question 3.
Find the area of base and radius of a cylinder if its curved surface area is 660 sq.cm and height is 21 cm.
Given: Curved surface area = 660 sq.cm, and height = 21 cm

To find: area of base and radius of a cylinder
Solution:
i. Curved surface area of cylinder = 2πrh
∴ 660 = 2 x $\frac{22}{7}$ x r x 21
∴ 660 = 2 x 22 x r x 3
∴ $\frac{660}{2\times22\times3}=r$
∴ $\frac{660}{66}=r$
∴ 5 = r
i.e., r = 5 cm

ii. Area of a base of the cylinder = πr^2
= $\frac{22}{7}$ x 5 x 5
= $\frac{550}{7}$
= 78.57 sq.cm
∴The radius of the cylinder is 5 cm and the area of its base is 78.57 sq.cm.

Question 4.
Find the area of the sheet required to make a cylindrical container which is open at one side and whose diameter is 28 cm and height is 20 cm. Find the approximate area of the sheet required to make a lid of height 2 cm for this container.
Given: For cylindrical container:
diameter (d) = 28 cm, height (h_1) = 20 cm
For cylindrical lid: height (h_2) = 2 cm
To find: i. Surface area of the cylinder with one side open
ii. Area of sheet required to made a lid
Solution:
diameter (d) = 28 cm
∴ radius (r) = $\frac{d}{2}=\frac{28}{2}$ = 14 cm
i. Surface area of the cylinder with one side open = Curved surface area + Area of a base
= $2\pi rh_1 + \pi r^2$
= $\pi r (2h_1 + r)$
= $\frac{22}{7}$ x 14 x (2 x 20 + 14)
= 22 x 2 x (40 + 14)
= 22 x 2 x 54
= 2376 sq.cm

ii. Area of sheet required to made a lid = Curved surface area of lid + Area of upper surface
= $2\pi rh_2 + \pi r^2$
= $\pi r (2h_2 + r)$
= $\frac{22}{7}$ x 14 x (2 x 2 + 14)
= 22 x 2 x (4 + 14)
= 22 x 2 x 18
= 792 sq cm
∴ The area of the sheet required to make the cylindrical container is 2376 sq. cm and the approximate area of a sheet required to make the lid is 792 sq. cm.

Practice Set 16.3 8th Std Maths Answers Chapter 16 Surface Area and Volume

Question 1.
Find the volume of the cylinder if height (h) and radius of the base (r) are as given below.
i. r = 10.5 cm, h = 8 cm
ii. r = 2.5 m, h = 7 m
iii. r = 4.2 cm, h = 5 cm
iv. r = 5.6 cm, h = 5 cm
Solution:
i. Given: r = 10.5 cm and h = 8 cm
To find: Volume of the cylinder
Volume of the cylinder = $\pi r^2 h$
= $\frac{22}{7}$ x 10.5 x 10.5 x 8
= 22 x 1.5 x 10.5 x 8
= 2772 cc
∴ The volume of the cylinder is 2772 cc.

ii. Given: r = 2.5 m and h = 7 m
To find: Volume of the cylinder
Volume of the cylinder = $\pi r^2 h$
= $\frac{22}{7}$ x 2.5 x 2.5 x 7
= 22 x 2.5 x 2.5
= 137.5 cu.m
∴ The volume of the cylinder is 137.5 cu.m.

iii. Given: r = 4.2 cm and h = 5 cm
To find: Volume of the cylinder
Volume of the cylinder = $\pi r^2 h$
= $\frac{22}{7}$ x 4.2 x 4.2 x 5
= 22 x 0.6 x 4.2 x 5
= 277.2 cc
∴ The volume of the cylinder is 277.2 cc.

iv. Given: r = 5.6 cm and h = 5 cm
To find: Volume of the cylinder
Volume of the cylinder = $\pi r^2 h$
= $\frac{22}{7}$ x 5.6 x 5.6 X 5 7
= 22 x 0.8 x 5.6 x 5
= 492.8 cc
∴ The volume of the cylinder is 492.8 cc.

Question 2.
How much iron is needed to make a rod of length 90 cm and diameter 1.4 cm?
Solution:
Given: For cylindrical rod: length of rod (h) = 90 cm, and

diameter (d) = 1.4 cm
To find: Iron required to make a rod
diameter (d) = 1.4 cm

∴ radius (r) = $\frac{d}{2} = \frac{1.4}{2}$ = 0.7 cm

Volume of rod = $\pi r^2 h$
= $\frac{22}{7}$ x 0.7 x 0.7 x 90
= 22 x 0.1 x 0.7 x 90
= 138.60 cc
∴ 138.60 cc of iron is required to make the rod.

Question 3.
How much water will a tank hold if the interior diameter of the tank is 1.6 m and its depth is 0.7 m?
Solution:
Given: interior diameter of the tank (d) = 1.6 m
and depth (h) = 0.7 m
To find: Capacity of the tank
interior diameter of the tank (d) = 1.6 m

∴ Interior radius (r) = $\frac{d}{2} = \frac{1.6}{2}$

= 0.8 m
= 0.8 x 100
...[∵ 1m = 100cm]
= 80cm
h = 0.7 m = 0.7 x 100 = 70 cm
Capacity of the tank = Volume of the tank = $\pi r^2 h$
= $\frac{22}{7}$ x 80 x 80 x 70
= 22 x 80 x 80 x 10
= 1408000 cc
= $\frac{1408000}{1000}$
...[∵1 litre = 1000 cc]
= 1408 litre
∴The tank can hold 1408 litre of water.

Question 4.
Find the volume of the cylinder if the circumference of the base of cylinder is 132 cm and height is 25 cm.
Solution:
Given: Circumference of the base of cylinder = 132 cm and height (h) = 25 cm
To find: Volume of the cylinder
i. Circumference of base of cylinder = 2πr
∴132 = 2 x $\frac{22}{7}$ x r

∴$\frac{132 \times 7}{2 \times 22} = r$

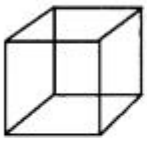
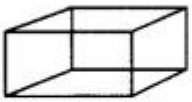
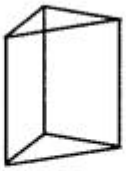
∴$\frac{6 \times 7}{2} = r$

∴3 x 7 = r
∴r = 21 cm

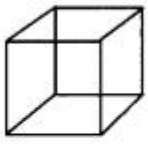
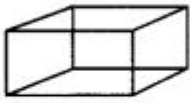
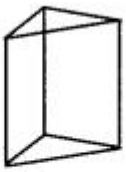
ii. Volume of the cylinder = $\pi r^2 h$
= 22/7 x 21 x 21 x 25
= 22 x 3 x 21 x 25
= 34650 cc
∴ The volume of the cylinder is 34650 cc.

Maharashtra Board Class 8 Maths Chapter 16 Surface Area and Volume Practice Set 16.3 Intext Questions and Activities

Question 1.
Leonard Euler, discovered an interesting formula regarding the faces, vertices and edges of solid figures.
Count and write the faces, vertices and edges of the following figures and complete the table. From the table verify Euler's formula, F + V = E + 2. (Textbook pg. No. 113)

Name	Cube	Cuboid	Triangular Prism	Triangular pyramid	Pentagon pyramid
Shapes					
Faces (F)	6				
Vertices (V)	8				
Edges (E)		12			10

Solution:

Name	Cube	Cuboid	Triangular Prism	Triangular pyramid	Pentagon pyramid
Shapes					
Faces (F)	6	6	5	4	6
Vertices (V)	8	8	6	4	6
Edges (E)	12	12	9	6	10

From the above table, F + V = E + 2 i.e. Euler's formula is verified.