

CHAPTER 20

SURFACE AREA AND VOLUME OF 3-D SHAPES

More Questions for Practice

1. A wallpaper, 312 m long and 25 cm wide, is required to cover the walls of the room. If the length of the room is 7 m and its breadth is twice its height, determine the height of the room.
2. The external dimensions of a metal box open at the top are 62 cm \times 30 cm \times 18 cm. The box is made up of metal 2.5 cm thick. Find the capacity of the box and the volume of metal required to make the box.
3. Eight identical cuboidal wooden blocks are stacked one on top of the other. The total volume of the solid so obtained is 128 cu cm. If the height of each block is 1 cm and the base is a square, find the dimensions of each block.
4. The quantity of paint in a certain container is sufficient to paint an area equal to 9.375 sq m. How many bricks measuring 22.5 cm \times 10 cm \times 7.5 cm can be painted out of this container?
5. Three cubes whose edges are 6 cm, 8 cm and 10 cm respectively are melted without any loss of metal into a single cube. Find the surface area of the new cube.
6. Find the volume, the total surface area, the lateral surface area and the length of the diagonal of a cube each of whose edge measures 15 cm.
7. If the length of a diagonal of a cube is $8\sqrt{3}$ cm, find its surface area and volume.
8. A cube of edge 11 cm is immersed completely in a rectangular vessel containing water. If the dimensions of the base of the vessel are 15 cm \times 12 cm, find the rise in the water level (in cm) correct to one decimal place assuming that no water overflows.
9. Three cubes of edges 3 cm, 4 cm and x cm are melted into a single cube. If the total volume of the new single cube is 216 cu cm, find the value of x .
10. The length, breadth and height of a cuboidal reservoir is 7 m, 3 m and 15 m respectively. 8400 litres of water is pumped out from the reservoir. Find the fall in the water level in the reservoir.
11. The length, breadth and height of a room are 5 m, 4 m and 4 m respectively. If the four walls of the room are to be covered with a 50 cm wide wallpaper, find the length of the wallpaper required.
12. The length, breadth and height of a hall are in the ratio 2 : 2 : 1. If the lateral surface area of the hall is 1152 sq m, find the length of its diagonal.
13. Three cuboids of dimensions 2 cm \times 3 cm \times 4 cm, 4 cm \times 5 cm \times 6 cm and 3 cm \times 4 cm \times 6 cm are melted and moulded into a cube. Find the edge of the cube.
14. The inner dimensions of a closed wooden box are 2 m by 1.2 m by 0.75 m. The thickness of the wood is 2.5 cm. Find the cost of wood required to make the box if 1 cu m of wood costs ₹ 5400.

15. The length, breadth and height of a cuboid are in the ratio 6 : 5 : 3. If the total surface area of the cuboid is 2016 sq cm, find its volume.
16. A pipe of radius 2.8 cm discharges water at the rate of 3 m/s. Calculate the volume of water discharged per minute, giving your answer in litres.
17. A closed metal cylinder container has a base radius of 5 cm and a height of 12 cm.
- Calculate the total surface area of the container.
 - The lid of the container is then removed and the exterior of the container, including the base, is painted green. Express the area of the container that is painted as a percentage of the total surface area.
18. An open rectangular tank of length 18 cm and breadth 16 cm contains water to a depth of 13 cm. The water is poured into a cylindrical container of diameter 17 cm. Find:
- the volume of water in the tank;
 - the height of water in the cylindrical container; and
 - the surface area of the cylindrical container that is in contact with the water.
19. The figure shows a solid cuboid of dimensions 12 cm by 10 cm by 7 cm with a half-cylinder of diameter 4 cm horizontally carved out of it

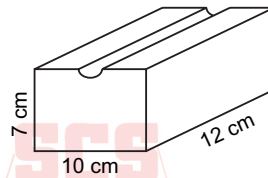


Fig. 20.1

Find:

- the volume, and
 - the total surface area of the solid.
20. A cylindrical barrel of diameter 70 cm and height 80 cm is filled to the brim with water. A hole at the bottom drains away 0.2 litres of water every minute. Find the time taken for the water level in the barrel to drop by 6 cm.

ANSWERS

1. 3 m 2. 22087.50 cu cm; 11392.5 cu cm 3. 4 cm × 4 cm × 1 cm
4. 100 5. 864 sq cm 6. 3375 cu cm; 1350 sq cm; 900 sq cm; 25.98 cm
7. 384 sq cm; 512 cu cm 8. 7.4 cm (approx.) 9. 5 10. 40 cm
11. 144 m 12. 36 m 13. 6 cm 14. ₹ 1350 15. 5760 cu cm
16. 443.52 litres 17. (i) 534.3 cm² (ii) $85\frac{5}{17}\%$
18. (i) 3744 cm³ (ii) 16.5 cm (iii) 1108.64 cm²
19. (i) 764.57 cm³ (ii) 562.86 cm² 20. 115.5 minutes.