**Chapter - 20**

**Volume And Surface Area**

1. **CUBOID**

Let length = l, breadth = b and height = h units. Then

* 1. Volume = (l x b x h) cubic units.
  2. Surface area = 2(lb + bh + lh) sq. units.
  3. Diagonal = l2 + b2 + h2 units.



1. CUBE

Let each edge of a cube be of length a. Then,

* 1. Volume = a3 cubic units.
  2. Surface area = 6a2 sq. units.
  3. Diagonal = 3a units.

1. CYLINDER



Let radius of base = r and Height (or length) = h. Then,

* 1. Volume =r2h cubic units.
  2. Curved surface area = 2rh sq. units.
  3. Total surface area = 2r(h+r) sq. units.

1. CONE



Let radius of base = r and Height = h. Then,

* 1. Slant height,  units.
  2. Volume =cubic units.
  3. Curved surface area = rlsq. units.
  4. Total surface area = (rl + r2) sq. units.

1. SPHERE



Let the radius of the sphere be r. Then,

* 1. Volume = cubic units.
  2. Surface area = 4r2 sq. units.

1. HEMISPHERE



Let the radius of a hemisphere be r. Then,

* 1. Volume = cubic units.
  2. Curved surface area = 2r2sq. units.
  3. Total surface area = 3r2sq. units.

1. RIGHT TRIANGULAR PRISM
   1. Volume = area of base × height
   2. Lateral Surface area = perimeter of base × height
   3. Total surface area = lateral surface area + 2(area of base)
2. Right pyramid

* 1. Volume = × area of base × height
  2. Lateral Surface area = × perimeter of base × slant height
  3. Total surface area = lateral surface area + area of base

Q.1. What is the volume of a cube (in cubic cm) whose diagonal measures cm ?

Ans.1. a = 4 a = 4

Volume = (4×4×4) cm3 = 64 cm3.

Q.2. A cuboidal block of 6 cm x 9 cm x 12 cm is cut up into an exact number of equal cubes. The least possible number of cubes will be:

Ans.2. Volume of block = (6×9×12) cm3 = 648 cm3.

Side of largest cube = H.C.F. of 6 cm, 9 cm, 12 cm = 3 cm.

Volume of this cube = (3×3×3) = 27 cm3.

 Number of cube =

Q.3. The volumes of two cubes are in the ratio 8 : 27. The ratio of their surface areas is :

Ans.3.Let their edge be a and b. Then,

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Q.4. The capacity of a cylindrical tank is 246.4 litres. If the height is 4 metres, what is the diameter of the base ?

Ans.4. Volume of the tank = 246.4 litres = 246400 cm3.

Let the radius of the base be r cm. Then,

r2

= r = 14.

 Diameter of the base = 2r = 28 cm.

Q.5. The height of a right circular cylinder is 14 cm and its curved surface area is 704 sq. cm. Then its volume is :

Ans.5. 2r =

r = 

Volume =  cm3

= 2816 cm3.