

CHAPTER : 16

SURFACE AREA AND VOLUME

SYNOPSIS :

Solid objects have different types of faces which are two dimensional plane figures. The total area of different faces of a solid is called the 'surface area' of the same.

We have already learnt about the solids like Cubes and Cuboids. Some of the solid objects discussed in this chapter include Cone, Cylinder, Sphere and Hemisphere.

Cube :

- (a) Volume of a cube = (edge)³
(b) Total surface area of a cube = 6 (edge)²
(c) (Diagonal)² of a cube = 3 (edge)²
- Volume of a cylinder = Area of the base circle × Height
∴ Volume = $\pi r^2 h$

Cuboid :

- Volume of a cuboid = Length × Breadth × Height

- Total surface area of a cuboid
= $2 [(Length \times Breadth) + (Breadth \times Height) + (Length \times Height)]$
- Diagonal of a cuboid = $\sqrt{(Length)^2 + (Breadth)^2 + (Height)^2}$

Cylinder :

- Area of the lateral surface of a cylinder
= (Perimeter of the base) \times Height
 \therefore Volume = $2\pi rh$
- Total surface area of a cylinder = Lateral surface area + Area of two ends
 \therefore Total surface area = $2\pi r (h + r)$
- Volume of material of a hollow cylinder = $\pi (R^2 - r^2) h$

Cone :

- Volume of cone = $\frac{1}{3} \pi r^2 h$ cu. units
- Curved surface area of a cone = $\pi r l = \pi r \sqrt{r^2 + h^2}$
- Total surface area of a cone = $\pi r^2 + \pi r l = \pi r (r + l)$

Sphere :

- If r is the radius of a sphere, then
Surface area of a sphere = $4 \pi r^2$
- Volume of a sphere = $\frac{4}{3} \pi r^3$
- If R and r be the external and internal radii of a spherical shell respectively,
Volume of shell = $\frac{4}{3} \pi R^3 - r^3$

Hemisphere :

- Curved surface area of an open hemisphere = $2 \pi r^2$
- Total surface area of a closed hemisphere = $3 \pi r^2$.