CHAPTER-13

SURFACE AREAS AND VOLUMES

SYNOPSIS :

Cuboid:

(a) Volume = Length × Breadth × Height

(b) Total surface area = 2 [(Length × Breadth) + (Breadth × Height) + (Length × Height)

(c) Diagonal = $\sqrt{(\text{Length})^2 + (\text{Breadth})^2 + (\text{Height})^2}$

Cube:

(a) Volume = $(\text{edge})^3$

(b) Total surface area = $6\ (\text{edge})^2$

(c) $(\text{Diagonal})^2 = 3\ (\text{edge})^2$

Cylinder:

(a) Volume = Area of the base circle × Height

$\therefore$ Volume = $\pi r^2 h$

(b) Area of the lateral surface = (Perimeter of the base) × Height

$\therefore$ Volume = $2\pi rh$

(c) Total surface area = Lateral surface area + Area of two ends.

$\therefore$ Total surface = $2\pi r\,(h + r)$

(d) Hollow cylinder:

Volume of material = $\pi\,(R^2 - r^2)\,h$

Cone:

(a) Volume = $\frac{1}{3}\pi r^2 h$ cu. units

(b) Curved surface area of the cone = $\pi r l = \pi r \sqrt{r^2 + h^2}$

(c) Total surface area = $\pi r^2 + \pi r l = \pi r\,(r + l)$

Sphere:

If r is the radius of a sphere, then

(a) Surface area = $4\pi r^2$

(b) Volume = $\frac{4}{3}\pi r^3$

(c) If R and r be the external and internal of a spherical shell,

Volume of shell = $\frac{4}{3}\pi\left(R^3 - r^3\right)$