MENSURATION

VOLUME OF CUBE, CUBOID AND CYLINDER

SOME USEFUL FORMULAE

CUBOID: Let l, b and h denote respectively the length, breadth & height of a cuboid. Then,

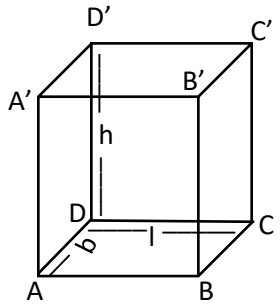
(i) Total surface area of the cuboid = 2 (lb + bh + lh) square units

(ii) Volume of the cuboid = Area of the base × Height

= Length × Breath × Height

= lbh cubic units

(iii) Diagonal of cuboid = $\sqrt{l^2 + b^2 + h^2}$ unit



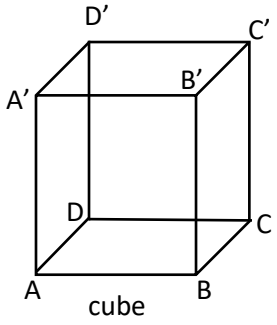
(iv) Area of four walls of a room = lh + lh + bh + bh = 2 (l + b) h square units.

CUBE : If the length of each edge of a cube is 'a' units, then

(i) Total surface area of the cube = $6a^2$ square units

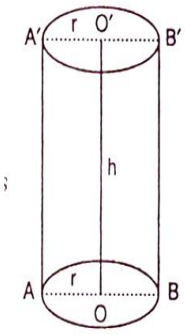
(ii) Volume of the cube = a^3 cubic units

(iii) Diagonal of the cube = $\sqrt{3}$a units



RIGHT CIRCULAR CYLINDER:

For a right circular cylinder of base radius r and height (or length) h, we have



(i) Area of each and = Area of base = pr^2

(ii) Curved surface area = 2 p r h

= 2pr × h

= Perimeter of the base × Height

(iii) Total surface area = Curved surface area + Area of circular ends

= 2pr + = $2r^2$

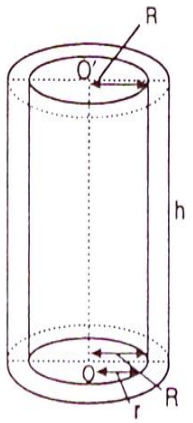
= 2pr (h + r)

(iv) Volume = pr^2

= Area of the base × height

RIGHT CIRCULAR HOLLOW CYLINDER:

Let R and r be the external and internal radii of a hollow cylinder of height h. Then,



(i) Area of each end = $p(R^2 - r^2)$

(ii) Curved surface area of hollow cylinder

= External surface area + Internal surface area

= 2 p R H + 2 p r h

= 2ph (R + r)

(iii) Total surface area

= 2 p Rh + 2p rh + $2(p R^2 - pr^2)$

= 2p (R +r) (R + h –r)

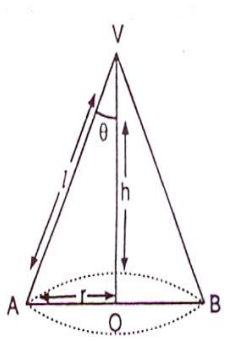
(iv) Volume of material = External volume – Internal volume

= $pR^2h - pr^2h$

= $ph(R^2 - r^2)$

RIGHT CICULAR CONE:

For a right circular cone of height h, slant height l and radius of base r, we have



(i) $l^2 = r^2 + h^2$

(ii) Curved surface area = p r l sq. units

(iii) Total surface area = Curved surface arqa + Area of the base

$= prl + pr^2$

$= pr\,(l + r)$ sq. units

(iv) Volume $= \frac{1}{3}\,\pi r^2 h$

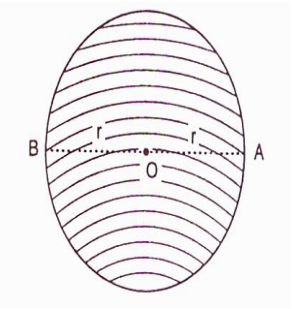
$= \frac{1}{3}$ (Area of the base) × Height

SPHERE:

For a sphere of radius r, we have

(i) Surface area = 4 p r^2

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



For a hemi-sphere of radius r, we have

(i) Surface area = $2pr^2$

(ii) Total surface area = 2 $pr^2 + pp^2 = 3\ pr^2$

(iii) Volume $= \frac{2}{3}\,\pi r^3$

SPHERICAL SHELL

If R and r are respectively outer and inner radii of a spherical shell, then

(i) Outer surface area = 4 pR^2

(ii) Volume of material $= \frac{4}{3}\pi(R^3 - r^3)$