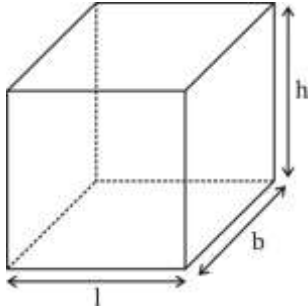


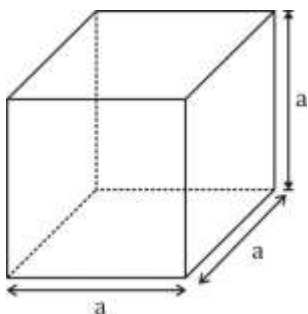
## MENSURATION IMPORTANT POINTS AND FORMULAE

### 1. Cuboid



- Volume of cuboid =  $l \times b \times h$
- Lateral surface Area = Perimeter of Base  $\times$  Height =  $2(l + b) \times h$
- Total surface area = Lateral surface Area +  $2 \times$  Area of base =  $2(lh + bh + lb)$
- Diagonal =  $\sqrt{l^2 + b^2 + h^2}$
- $V = \sqrt{A_1 \times A_2 \times A_3}$ 
  - $A_1 \Rightarrow$  Area of base or top =  $lb$
  - $A_2 \Rightarrow$  Area of one side face =  $bh$
  - $A_3 \Rightarrow$  Area of another side face =  $hl$
- To find the total surface area of a cuboid if the sum of all three sides and diagonals are given.  
Total surface area =  $(\text{sum of all three side})^2 - (\text{Diagonal})^2$
- For painting the surface area of a box or to know how much tin sheet is required, we will use, Total surface area.
- To find the length of the longest pole to be placed in a room, we will calculate diagonal i.e.  $\sqrt{l^2 + b^2 + h^2}$

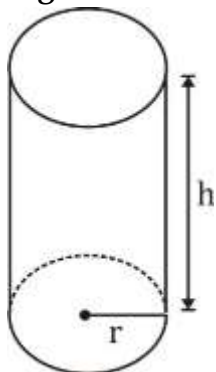
### 2. Cube



- Volume =  $(\text{side})^3 = a^3$
- Lateral surface area =  $4a^2$
- Total surface area =  $6a^2$
- Diagonal of the cube =  $\sqrt{3} a$
- Face diagonal of the cube =  $\sqrt{2} a$

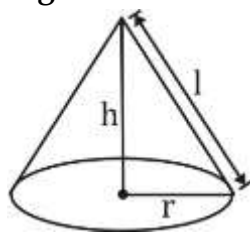
- Volume of cube =  $\left(\sqrt{\frac{\text{total surface area}}{6}}\right)^3$
- In Radius of cube =  $\frac{a}{2}$
- Circumradius of cube =  $\frac{\sqrt{3}}{2} a$

### 3. Right circular cylinder:



- Volume = Area of base  $\times$  height =  $\pi r^2 h$
- Lateral/curved surface Area = Perimeter of base  $\times$  height =  $2\pi r h$ .
- Total surface area = C.S.A + 2  $\times$  Area of one circular end =  $2\pi r(h + r)$

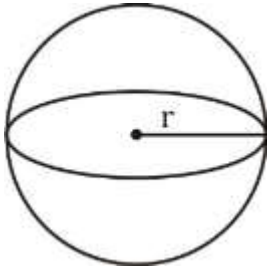
### 4. Right circular cone



- Slant height,  $l = \sqrt{r^2 + h^2}$
- Volume =  $\frac{1}{3} \times$  area of base  $\times$  height =  $\frac{1}{3} \pi r^2 h$
- Curved surface area =  $\frac{1}{2}$  (Perimeter of base)  $\times$  slant height  
 $= \frac{1}{2} \times 2\pi r \times l = \pi r l = \pi r \sqrt{r^2 + h^2}$
- Total surface area = C.S.A + Area of base  
 $= \pi r l + \pi r^2 = \pi r(l + r)$
- If cone is formed by sector of a circle then.
  - (a) Slant height = radius of circle
  - (b) circumference of base of cone = length of arc of sector
- Radius of maximum size sphere in a cone  

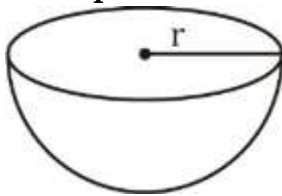
$$= \frac{h \times r}{l + r} \quad \left[ \begin{array}{l} r \rightarrow \text{radius of cone} \\ l \rightarrow \text{slant height of cone} \\ h \rightarrow \text{height of cone} \end{array} \right]$$
- If cone is cut parallel to its base and ratio of heights, radius or slant height of both parts is given as  $\rightarrow x : y$ .  
 Then Ratio of there volume =  $x^3 : y^3$

## 5. Sphere



- Volume of sphere  $= \frac{4}{3} \pi r^3$
- Surface area of sphere  $= 4\pi r^2$ .
- If a sphere is cut into  $n$  parts, then T.S.A of  $n$  parts  $= 4\pi r^2 + n\pi r^2$
- For a spherical shell if  $R$  and  $r$  are outer and inner radii, Respectively, Then volume of a shell is  $= \frac{4}{3} \pi (R^3 - r^3)$ .

## 6. Hemisphere



- Volume of hemisphere  $= \frac{2}{3} \pi r^3$
- Curved surface area  $= 2\pi r^2$
- Total surface Area  $= 3\pi r^2$