## Surface areas and volumes - Points to Remember

## 1. Cuboid:

If $1, \mathrm{~b}$ and h denote respectively the length, breadth, and height of a cuboid, then
(i) Total surface area of the cuboid $=2(\mathrm{lb}+\mathrm{bh}+\mathrm{lh})$ square units.
(ii) Volume of the cuboid $=$ Area of the base $\times$ height $=l b h$ cubic units.
(iii) Diagonal of the cuboid $=12+\mathrm{b} 2+\mathrm{h} 2$ units.
(iv) Area of four walls of a room $=2(1+b) h$ sq. units.

## 2. Cube:

If the length of each edge of a cube is a units, then
(i) Total surface area of the cube $=6 \mathrm{a} 2$ sq. units
(ii) Volume of the cube $=\mathrm{a} 3$ cubic units
(iii) Diagonal of the cube $=3$ a units

## 3. Solid Cylinder:

If $r$ and $h$ denote respectively the radius of the base and height of a right circular cylinder, then
(i) Area of each end $=\pi r 2$ sq. units
(ii) Curved surface area $=2 \pi \mathrm{rh}$ sq. units
(iii) Total surface area $=2 \pi r(h+r)$ sq. units
(iv) Volume $=\pi r 2 h=$ Area of the base $\times$ height

## 4. Hollow Cylinder:

If $R$ and $r$ denote respectively the external and internal radii of a hollow right circular cylinder, then
(i) Area of each end $=\pi \mathrm{R} 2-\mathrm{r} 2$ sq. units
(ii) Curved surface area of hollow cylinder $=2 \pi(\mathrm{R}+\mathrm{r}) \mathrm{h}$ sq. units
(iii) Total surface area $=2 \pi(\mathrm{R}+\mathrm{r})(\mathrm{R}+\mathrm{h}-\mathrm{r})$ sq. units
(iv) Volume of material $=\pi \mathrm{hR} 2-\mathrm{r} 2$ cubic units

## 5. Cone:

If $\mathrm{r}, \mathrm{h}$ and 1 denote respectively the radius of the base, height, and slant height of a right circular cone, then
(i) $12=\mathrm{r} 2+\mathrm{h} 2$
(ii) Curved surface area $=\pi r l$ sq. units
(iii) Total surface area $=\pi r 2+\pi r l$ sq. units
(iv) Volume $=13 \pi \mathrm{r} 2 \mathrm{~h}$ cubic units

## 6. Sphere:

For a sphere of radius $r$, we have
(i) Surface area $=4 \pi r 2$ sq. units
(ii) Volume $=43 \pi \mathrm{r} 3$ cubic units

## 7. Frustum of a Cone:

If h is the height, 1 the slant height and r 1 and r 2 the radii of the circular bases of a frustum of a cone, then
(i) Volume of the frustum $=\pi 3 \mathrm{r} 12+\mathrm{r} 1 \mathrm{r} 2+\mathrm{r} 22 \mathrm{~h}$ cubic units
(ii) Lateral surface area $=\pi(r 1+r 2) 1$ sq. units
(iii) Total surface area $=\pi \mathrm{r} 1+\mathrm{r} 21+\mathrm{r} 12+\mathrm{r} 22$ sq. units
(iv) Slant height of the frustum $=\mathrm{h} 2+\mathrm{r} 1-\mathrm{r} 22$ units
(iv) Height of the cone of which the frustum is a part $=\mathrm{hr} 1 \mathrm{r} 1-\mathrm{r} 2$ units
(v) Slant height of the cone of which the frustum is a part $=$ lr1r1-r2 units
8. The volume of the frustum $=\mathrm{h} 3 \mathrm{~A} 1+\mathrm{A} 2+\mathrm{A} 1 \mathrm{~A} 2$, where A 1 and A 2 denote the areas of circular bases of the frustum.
9. The volume of the solid formed by joining two or more basic solids is the sum of the volumes of the constituents.
10. In calculating the surface area of a combination of solids, we can not add the surface area of the two constituents because some parts of the surface area disappear on joining them.

