

Key Notes

Chapter-13

Surface Areas and Volumes

- **Cylinder:** A solid obtained by revolving a rectangular lamina about one of its sides is called a right circular cylinder.
 - **Right Circular Cone:** A solid obtained by revolving a right-angled triangular lamina about any side (other than the hypotenuse) is called a right circular cone.
 - **Sphere:** A sphere is a solid obtained on revolving a circle about any of its diameters.
 - **Hemisphere:** When a sphere is cut by a plane through its center into two equal parts, then each part is called a hemisphere.
 - **Spherical Shell:** The solid enclosed between two concentric sphere is called a spherical shell.
 - **Hemisphere Shell:** The solid enclosed between two concentric hemispheres is called a hemispherical shell.
 - **Frustum of a Cone:** If a cone is cut by a plane parallel to the base of the cone, then the portion between this plane and the base is called the frustum of the cone.
 - Curved surface area of cylinder of radius r and height $h = 2\pi rh$ square units.
 - Total surface area of cylinder of radius r and height $h = 2\pi r (r + h)$ square units.
 - Volume of cylinder of radius r and height $h = \pi r^2 h$ cubic units.
 - Curved surface area of cone of radius r , height h and slant height $l = \pi r l$ square units where $l = \sqrt{r^2 + h^2}$
 - Total surface area of cone $= \pi r (l + r)$ sq. units.
 - Volume of cone $= \frac{1}{3} \pi r^2 h$ cubic units.
 - Total surface area of sphere of radius r units $= 4\pi r^2$ sq. units.
 - Curved surface area of hemisphere of radius r units $= 2\pi r^2$ sq. units.
 - Total surface area of a solid hemisphere of radius r units $= 3\pi r^2$ sq. units.
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- Volume of sphere of radius r units $= \frac{4}{3}\pi r^3$ cubic units.
 - Volume of hemisphere of radius r units $= \frac{2}{3}\pi r^3$ cubic units.
 - Curved surface area of *frustum* $= \pi l(r + R) + \pi(r^2 + R^2)$ sq. units. where l slant height of frustum and radii of circular ends are r and R .
 - Total surface area of frustum $= \pi l(r + R) + \pi(r^2 + R^2)$ sq. units.
 - Volume of Frustum $= \frac{1}{3}\pi h(r^2 + R^2 + rR)$ cubic units. Where $l = \sqrt{h^2 + (R - r)^2}$
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