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 $h = \pi rh$ cubic units.

- Curved surface area of cone of radius r, height h and slant height $l = \pi rl$ square units where $l = \sqrt{r^2 + h^2}$

- Total surface area of $cone = \pi r (l + r)\ sq.$ units.

- Volume of cone $= \dfrac{1}{3}\pi r^2$ 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 $l = \sqrt{h^2 + (R - r)^2}$