# CHAPTER 12
# MENSURATION

## NOTES

### ❖ Perimeter and Area of a circle

- **Perimeter of a circle (Circumference) = $2\pi r$**
- **Area of a circle = $\pi r^2$**

**Recall:**

**Chord:** The line segment joining any two points of a circle is called a chord of the circle.

**Arc:** A part of a circle between two distinct points on it, is called an arc of the circle.

**Sector:** The portion of the circular region enclosed by two radii and the corresponding arc of a circle is called a sector of the circle.

**Sectorial Angle:** Angle formed by the two radii of a sector at the centre of the circle is called sectorial angle. It is denoted by $\theta$.

**Segment:** The portion of the circular region enclosed by a chord and the corresponding arc of a circle is called a segment of the circle.

### Area of Sectors and Segments of a Circle

- **Length of an arc (s) = $\frac{\theta}{180}\pi r$**
- **Area of a (minor) sector = $\frac{\theta}{360}\pi r^2$**

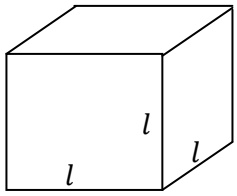
$$= \frac{1}{2} r.s$$

- **Area of major sector = Area of the circle – Area of the minor sector = $\frac{360-\theta}{360}\pi r^2$**
- **Area of a (minor) segment = $\frac{r^2}{2}(\frac{\theta}{180}\pi - sin\theta)$**
- **Area of major segment = Area the circle – Area of the minor segment**

$$= r^2\left[\frac{360-\theta}{360}\pi + \frac{sin\theta}{2}\right]$$

## *Surface Area and Volume of Some Basic Solids*

**1 Cube**

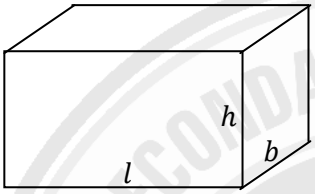



Lateral Surface Area $= 4l^2$

Total Surface Area $= 6l^2$

Volume (Capacity) $= l^3$

**2 Cuboid**

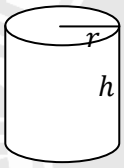



Lateral Surface Area $= 2(l + b)h$

Total Surface Area $= 2(lb + bh + hl)$

Volume (Capacity) $= lbh$

**3 Cylinder**

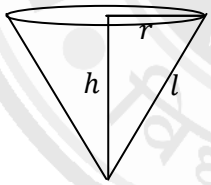



Curve Surface Area $= 2\pi rh$

Total Surface Area $= 2\pi r(r + h)$

Volume (Capacity) $= \pi r^2 h$

**4 Cone**



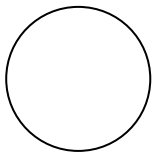

Slant Height, $l = \sqrt{r^2 + h^2}$

Curve Surface Area $= \pi rl$

Total Surface Area $= \pi r(r + l)$

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

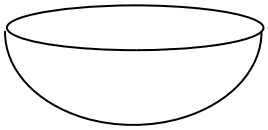
**5 Sphere**



Curve Surface Area $= 4\pi r^2$

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

**6 Hemisphere**



Curve Surface Area $= 2\pi r^2$

Total Surface Area $= 3\pi r^2$

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

## ➢ Frustum of a Right Circular Cone

If a right circular cone is cut off by a plane parallel to the base, the portion of the cone between the plane and the base of the cone is called a frustum of the cone.

- Slant Height of a frustum $(l) = \sqrt{(r_1 - r_2)^2 + h^2}$
- Curve Surface Area $= \pi(r_1 + r_2)l$
- Total Surface Area $= \pi[(r_1 + r_2)l + {r_1}^2 + {r_2}^2]$
- Surface Area of a Frustum with larger face open $= \pi[(r_1 + r_2)l + {r_2}^2]$
- Volume $= \frac{1}{3}\pi({r_1}^2 + r_1.r_2 + {r_2}^2)h$

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