Ch-11 Areas Related to Circles

1. **Circle –** The set of points which are at a constant distance of 'r' units from a fixed point 'O' is called a circle. Fixed point is called the centre and radius = r units.
2. **Circumference and Area of a Circle –** for a circle of radius 'r', we have –
   a. Circumference = $2\pi r$.
   b. Area = πr^2.
   c. Circumference of semi-circle = $(\pi r + 2r)$.
   d. Area of semi-circle = $\frac{\pi r^2}{2}$.
3. **Length of an Arc, Area of a Sector –** let an arc AB make an angle $\theta < 180^o$ at the centre of a circle of radius 'r'. Then, we have –
   a. Length of the Arc, AB = θ x $\frac{2\pi r}{360}$ = l.
   b. Area of the sector $= \theta \text{ x } \frac{\pi r^2}{360}$
      $= \frac{1}{2} \text{ x } \left(\theta \text{ x } \frac{2\pi r}{360}\right) \text{ x r}$
      $= \frac{1}{2} \text{ x l x r.}$
4. **Area of a Ring –** let R and r be the Outer and Inner radii of a ring. Then, area of the ring = $\pi (R^2 - r^2)$.
5. **Area of a Segment –**
   a. Area of the Minor Segment = (Area of the Sector) – (Area of the Triangle)
      $= \left[\left(\theta \text{ x } \frac{\pi r^2}{360}\right) - \frac{1}{2} r^2 \sin\theta\right]$.
   b. Area of the Major Segment = (Area of the Circle) – (Area of the Minor Segment).
6. **Rotating Wheels –**
   a. Distance moved by a wheel in 1 rotation = Circumference of the wheel.
   b. Number of rotations in 1 min. = $\frac{\text{Distance covered in 1 min.}}{\text{Circumference}}$.
7. **Rotating of the Hands of a Clock –**
   a. Angle described by the minute hand of a clock in 60 min. = 360^o.
   b. Angle described by the hour hand of a clock in 12 hrs. = 360^o.