Chapter-06
Triangles

- **Similar Triangles**: Two triangles are said to be similar if their corresponding angles are equal and their corresponding sides are proportional.
- All congruent figures are similar but the converse is not true.
- Two polygons with same number of sides are similar, if
  (i) Their corresponding angles are equal and
  (ii) Their corresponding sides are in the same ration (i.e., proportion).
- Criteria for Similarity: in and $\Delta ABC \text{ and } \Delta DEF$
  (i) **AAA Similarity**: $\Delta ABC \sim \Delta DEF$ When $\angle A = \angle D, \angle B = \angle E$ and $\angle C = \angle F$
  (ii) **SAS Similarity:** $\Delta ABC \sim \Delta DEF$ when $\frac{AB}{DE} = \frac{BC}{EF}$ and $\angle B = \angle E$
  (iii) **SSS Similarity**: $\Delta ABC \sim \Delta DEF$, $\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$
- The proof of the following theorems can be asked in the examination:
  (i) **Basic Proportionality Theorem**: If a line is drawn parallel to one side of a triangle to intersect the other sides in distinct points, the other two sides are divided in the same ratio.
  (ii) The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.
  (iii) **Pythagoras Theorem**: In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.
  (iv) **Converse of Pythagoras Theorem**: In a triangle, if the square of one side is equal to the sum of the squares of the other two sides then the angle opposite to the first side is a right angle.
- **Right Angled Triangle:**

(i) If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, then the triangles on both sides of the perpendicular are similar to the Whole triangle and also to each other.

(ii) In the right triangle, the square of the hypotenuse is equal to the sum of the square of the other two sides (Pythagoras Theorem).

(iii) If in a triangle, square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.

- **Thales Theorem:** If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio (Basic Proportionally Theorem or Thales Theorem).
- If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.