General terms:

1) **Still water:** The water of a river or any other water body which is not flowing is known as still water.

2) **Stream:** It is the flowing water of a river which is moving at a certain speed.

3) **Upstream:** The boat or a swimmer moving against the stream is known as moving upstream i.e. against the flow of water.

4) **Downstream:** The boat or a swimmer moving along the stream is known as moving downstream i.e., along the flow of water.

- **Upstream = (u−v) km/hr**, where “u” is the speed of the boat in still water and “v” is the speed of the stream
- **Downstream = (u + v) Km/hr**,
- **Speed of Boat in Still Water = ½ (Downstream Speed + Upstream Speed)**
- **Speed of Stream = ½ (Downstream Speed – Upstream Speed)**
- **Average Speed of Boat = {(Upstream Speed × Downstream Speed) / Boat’s Speed in Still Water}**
- If it takes “t” hours for a boat to reach a point in still water and comes back to the same point then, the distance between the two points can be calculated by

  Distance = $\{(u^2-v^2) \times t\} / 2u$

- If it takes “t” hours more to go to a point upstream than downstream for the same distance, the formula for distance will be:

  Distance = $\{(u^2-v^2) \times t\} / 2v$,

- If a boat travels a distance downstream in “t1” hours and returns the same distance upstream in “t2” hours, then the speed of the man in still water will be:

  Speed of Man in Still Water = [v × {(t2+t1) / (t2-t1)}] km/hr

- A boat or swimmer covers a certain distance downstream in t1 hours and returns the same distance upstream in t2 hours. If the speed of the stream is Y km/hr, the speed of boat or man in still water is given

by

$= Y \left(\frac{t_2 + t_1}{t_2 - t_1} \right)$ km/hr

- A boat or swimmer takes K times as long to move upstream as to move downstream to cover a certain distance. If the speed of the stream is Y km/hr, the speed of the boat or man in still water is given by;

$= Y \left(\frac{K+1}{K-1} \right)$ km/hr