

Motion

Motion

Types

Change In position of an object with respect to a fixed position with time

Motion along straight line

- The actual path traversed by a body **Is Its distance** (scalar quantity)
- The shortest straight distance between the Initial and final positions of a body Is Its displacement (vector quantity)

Motion along circular path

- When moving in a circular path with uniform speed, it is said to be uniform circular motion
- Direction changes continuously
- $v = \frac{2\pi r}{t}$

Uniform Motion

- The object covers equal distances In equal Intervals of time
- E.g, car travelling 2 km In 2 min, 2 km In another 2 min, 2 km in next 2 min.

Non-Uniform Motion

- The object covers unequal distances In equal Intervals of time
- E.g, car moving In a crowded street

Graphical representation

- **Pictorial** representation or geometrical representation between two quantities **on two axes**

Distance-time graphs

Velocity-time graphs

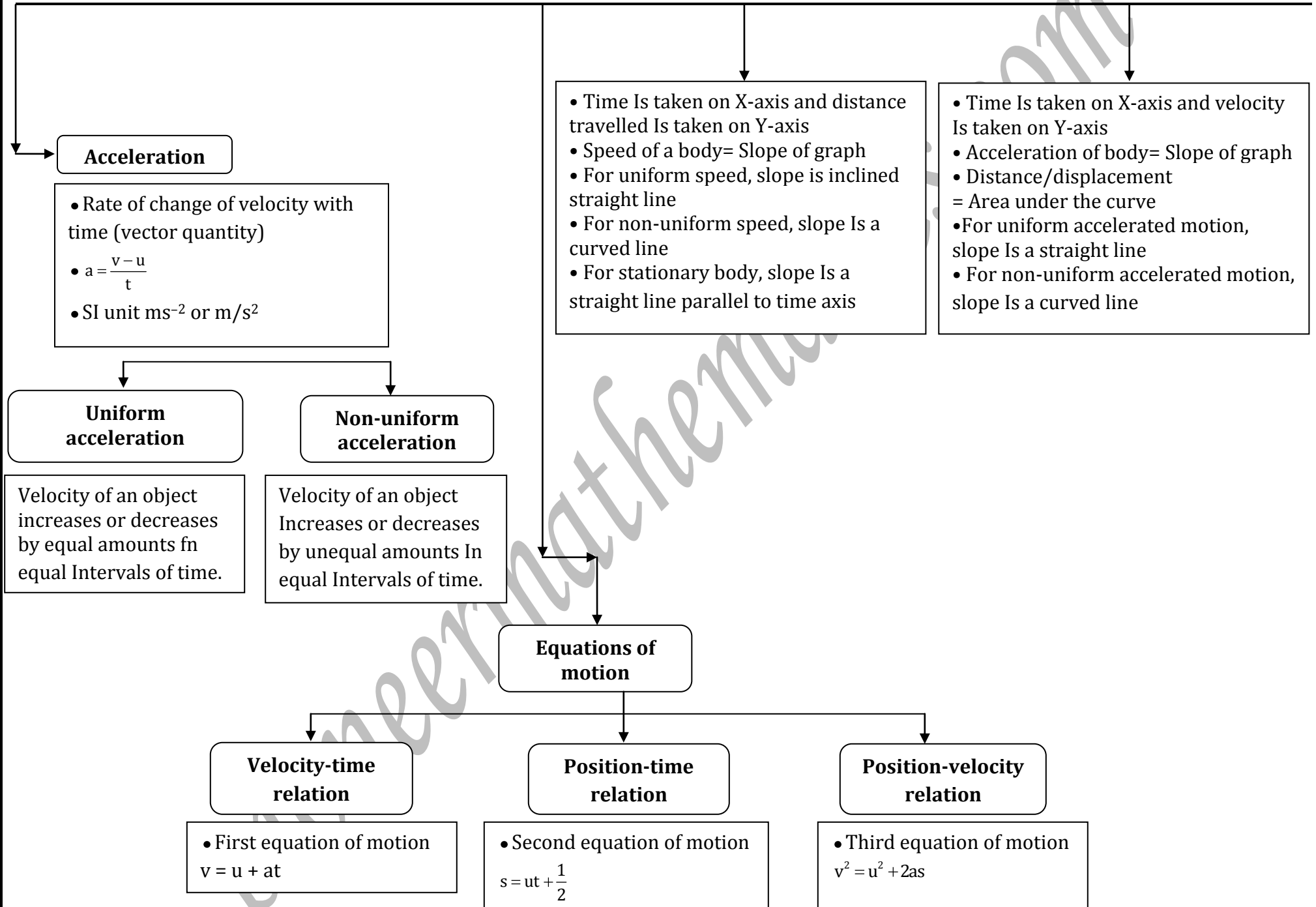
Measurement of rate of motion

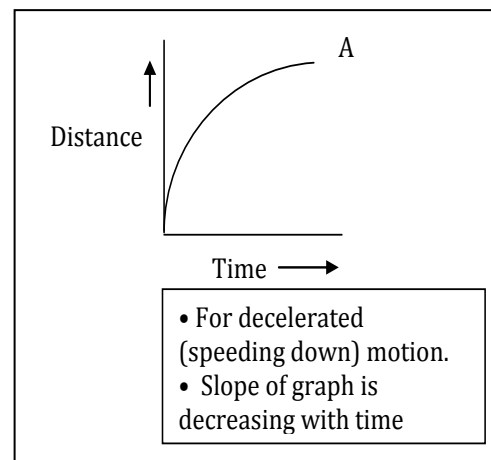
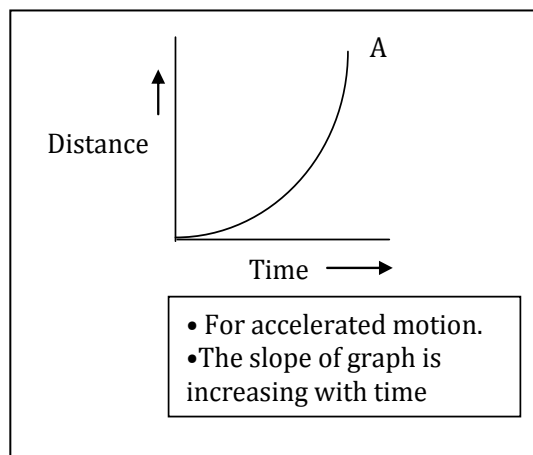
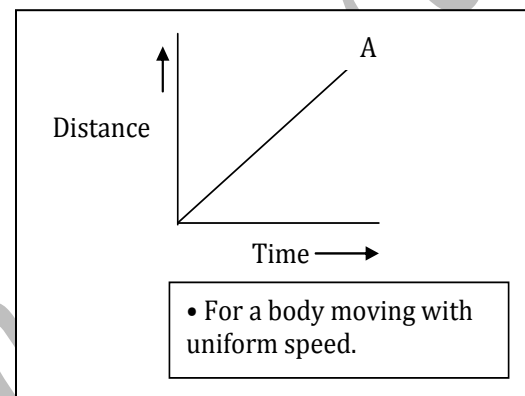
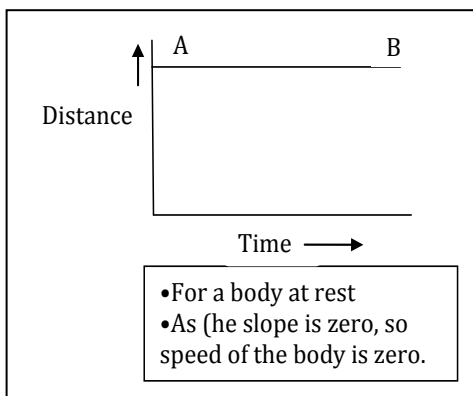
Speed

- Distance travelled by the object **in unit time** (scalar quantity)
 - Usually objects are In **non-uniform motion**, therefore, calculate average speed
- $$\text{Average speed (s)} = \frac{\text{Total distance travelled (s)}}{\text{Total time take (t)}}$$
- SI unit : ms^{-1} or m/s

Velocity

- Speed of an object moving In a definite direction (vector quantity)
 - Can be uniform or variable
 - When speed is variable, expressed as average velocity
- $$\text{Average initial velocity } u + \text{Final velocity } v \text{ velocity} \frac{\quad}{2}$$
- SI unit : ms^{-1} or m/s



Distance - Time Graphs

Velocity-Time Graphs

