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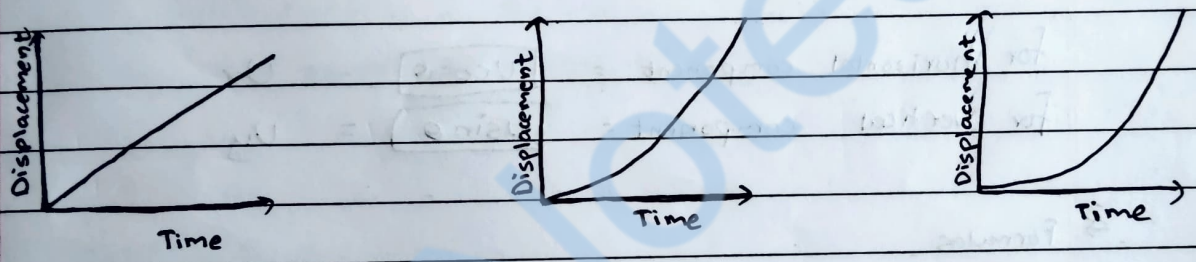
⇒ Kinematics

1. Distance - Total length of travel irrespective of the direction of motion
2. Displacement - Shortest distance between initial and final position
3. Speed - rate of change of distance
4. Velocity - rate of change of displacement
5. Acceleration - it is the rate of change of velocity

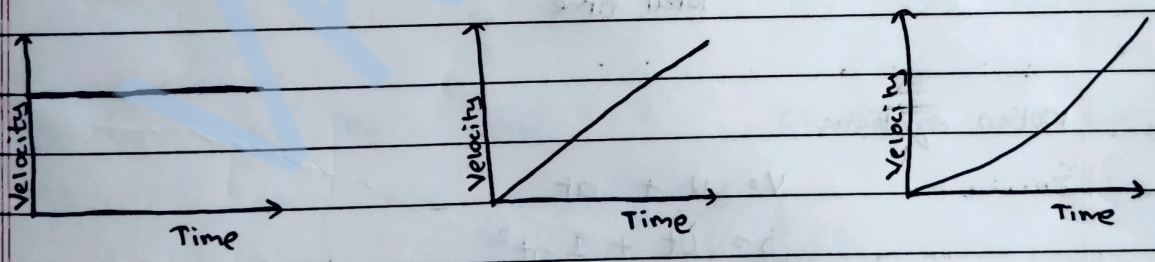
→ Motion Graphs

→ Displacement - time graph:



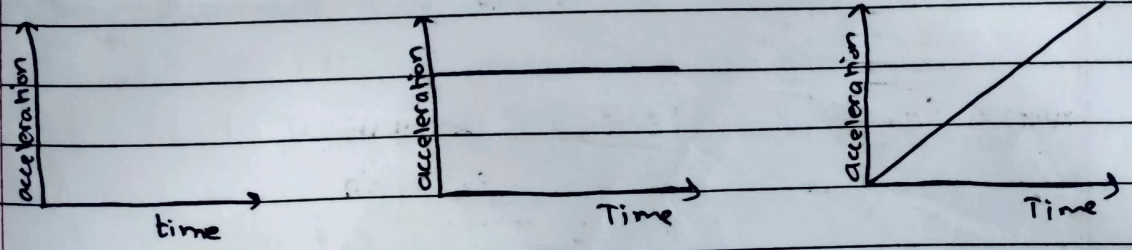
Constant Velocity | Increasing Velocity | Increasing Acceleration

→ Velocity - time graph (area under the graph = Displacement) (gradient = acceleration)



Constant Velocity | Increasing Velocity | Increasing Acceleration

→ Acceleration - time graph



Constant Velocity | Increasing Velocity | Increasing Acceleration

→ Sources of error
  → Systematic error
  → Random error

→ Projectile Motion
  → vertical component and horizontal component
  → key terms
    → Time of flight - how long the projectile is in the air
    → Maximum height - height at which the projectile is momentarily at rest
    → Range - The horizontal distance travelled by the projectile

For horizontal component = $\boxed{u\cos\theta} = u_x$

For vertical component = $\boxed{u\sin\theta} = u_y$

→ Formulas

Avg speed - $\frac{\text{Total distance}}{\text{Total time}}$

Avg velocity - $\frac{\text{Total displacement}}{\text{Total time}}$

Motion equations

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

$$s = \frac{u+v}{2} \times t$$