📘 PHYSICS NOTEBOOK — Day 5

Chapter: Motion in a Straight Line (Kinematics — Part 1)

(Board + JEE focused)

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1. Basic Kinematics Formulas

- $v = u + at$
- $s = ut + \frac{1}{2}at^2$
- $v^2 = u^2 + 2as$
- Average velocity (constant acceleration):
  $\mathrm{v}_{avg} = \frac{u+v}{2}$

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2. Acceleration

Formula:

$$a = \frac{v - u}{t}$$

Key ideas:

- Positive a → speed increases
- Negative a → retardation
- If starting from rest → u = 0

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3. Velocity–Time Graph Basics

- Slope = acceleration
- Area under graph = displacement
- Straight line from origin → uniform acceleration
- Horizontal line → constant velocity
- Slope downwards → negative acceleration

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4. Relative Velocity (Linear Motion)

Formula:

$$v_{A/B} = v_A - v_B$$

Rules:

- Positive → A ahead of B
- Negative → opposite direction
- Relative speed = |difference|

Shortcut:

Same direction = subtract ; Opposite = add