

Mechanics

These notes are your ultimate revision weapon to revise Mechanics. We've distilled years of previous exam questions (PYQs) into one powerful, concise resource. Everything you need to know, nothing you don't.

- **PYQs, Decoded:** All key concepts from past exams, organized and simplified.
- **Revise in Record Time:** Short, precise, and designed for last-minute review.
- **Focus on What Matters:** Master high-probability topics and boost your confidence.

1. Simple Machines

- **Purpose:** To make work easier by allowing the same amount of work to be done with less force.
- **Examples:** Pulleys, levers, wheels, and screws.

2. Physical Quantities

- **Scalar Quantities (Magnitude only)**
 - **Definition:** Quantities that have only magnitude.
 - **Examples:** Volume, pressure, time, speed, distance, energy, and work.
- **Vector Quantities (Magnitude and Direction)**
 - **Definition:** Quantities that have both magnitude and direction.
 - **Examples:** Displacement, velocity, force, acceleration, and momentum.

3. Force, Mass, and Motion

- **Newton's Laws of Motion**

- **First Law (Law of Inertia):** An object at rest stays at rest, and an object in motion stays in motion unless acted upon by an external force.
 - **Example (Inertia of Rest):** When a train starts, a passenger leans backward because the lower body moves with the train, but the upper body tends to remain at rest.
- **Third Law (Action-Reaction):** For every action, there is an equal and opposite reaction.
- **Key Definitions**
 - **Force:** The product of mass and acceleration ($F = m \times a$).
 - **Momentum:** The product of mass and velocity. Therefore, $\text{Mass} = \text{Momentum} / \text{Velocity}$.
- **Friction**
 - It is more difficult to walk on ice than on a road because ice has less friction.
 - **Static friction** (needed to start moving an object) is greater than **kinetic friction** (needed to keep it moving). This is why pushing a loaded cart is harder to start than to keep moving.

4. Energy

- **Law of Conservation of Energy:** Energy can neither be created nor destroyed; it can only be transformed from one form to another.
- **Types and Conversions**
 - **Wind Energy:** A form of kinetic energy (energy of motion) converted into electrical energy by wind turbines.
 - **Other Energy Conversions:**
 - **Heat → Electric:** Solar cell
 - **Electric → Sound:** Loudspeaker
 - **Mass → Heat:** Nuclear reactor
 - **Chemical → Heat and Light:** Fuel combustion

5. Measurement and Properties

- **Weight of Air:** Air has weight. One liter of air weighs about 1.225 grams. Taking a deep breath (e.g., 4.8L) slightly increases a person's weight.
- **Cube Geometry:** For a cube, if the volume (l^3) equals the surface area ($6l^2$), then the length of the edge (l) must be 6.
- **Statics:** The branch of mechanics that deals with objects in a state of rest or equilibrium.

Know More About Mechanics:

- [Mechanics – Old Year Questions](#)
- [Mechanics One Liner Questions & Answers](#)

