

Physics - Work, Energy, and Power

Topics : [Computer engineering](#)

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1. Work:

- **Definition:** Work is the product of the force applied to an object and the displacement of the object in the direction of the force. Mathematically, work (W) = force (F) \times displacement (d) \times $\cos(\theta)$, where θ is the angle between the force vector and the displacement vector.
- **Unit:** The SI unit of work is the joule (J), equivalent to one newton-meter (N·m).

2. Energy:

- **Definition:** Energy is the ability to do work and exists in various forms such as kinetic energy and potential energy.
- **Kinetic Energy:** Energy possessed by an object due to its motion, given by $KE = 0.5 \times \text{mass (m)} \times \text{velocity (v)}^2$.
- **Potential Energy:** Energy stored in an object due to its position or configuration.
- **Conservation of Energy:** Energy cannot be created or destroyed, only transformed from one form to another.

3. Power:

- **Definition:** Power is the rate at which work is done or energy is transferred/transformed. It is given by $P = W/t$, where W is the work done and t is the time taken.
- **Unit:** The SI unit of power is the watt (W), equivalent to one joule per second (J/s).

4. Applications:

- Work, energy, and power concepts find applications in mechanics, engineering, physics, and daily life activities.
- Examples include lifting objects, running machines, generating electricity, and designing efficient systems.