Acceleration

Acceleration is defined as the rate of change of velocity of an object with respect to time. It indicates how quickly an object is speeding up or slowing down. Acceleration is a vector quantity, meaning it has both magnitude and direction. Mathematically the instantaneous velocity is given:

Formula:

$$\text{Acceleration}(a) = \Delta v / \Delta t = V_f - V_i / \Delta t$$

Where Δv is the change in velocity, V_f is final velocity, V_i is initial velocity and Δt is the time interval over which the change occurs. The standard unit of acceleration is meters per second squared (m/s^2).

Characteristics:

- **Positive Acceleration:** When an object speeds up in the direction of motion.
- **Negative Acceleration (Deceleration):** When an object slows down; also known as deceleration.
- **Zero Acceleration:** When an object moves with a constant velocity.

Uniform Motion

- Uniform motion refers to the movement of an object at a constant speed in a straight line.

Characteristics:

- **Constant Speed:** The object covers equal distances in equal intervals of time.
- **Zero Acceleration:** Since the speed is constant, there is no change in velocity, resulting in zero acceleration.

Formula:

- Distance=Speed×Time