

AI Response:

Kinematics is the branch of physics that deals with the motion of objects without

1. **Displacement (s):** Displacement is a vector quantity that refers to the change in position of an object.
2. **Distance:** Distance is a scalar quantity that refers to the total path length traveled by an object.
3. **Velocity (v):** Velocity is a vector quantity that describes the rate of change of displacement with respect to time.

$$v = \frac{\Delta s}{\Delta t}$$

where Δs is the change in displacement and Δt is the change in time.

4. **Acceleration (a):** Acceleration is a vector quantity that describes the rate of change of velocity with respect to time.

$$a = \frac{\Delta v}{\Delta t}$$

5. **Equations of Motion (for uniformly accelerated motion):**

When an object is moving with constant acceleration, the following equations of motion apply:

1. $v = u + at$
2. $s = ut + \frac{1}{2}at^2$
3. $v^2 = u^2 + 2as$

Here, u is the initial velocity, v is the final velocity, a is the acceleration, t is the time, and s is the displacement.

6. **Free Fall:** When an object is in free fall near the Earth's surface, it experiences a constant acceleration due to gravity, g .
7. **Projectile Motion:** This refers to the motion of an object that is launched into the air and follows a parabolic path.

Understanding these concepts allows for the analysis and prediction of the motion of objects in various physical situations.