

RENOTES

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Rational motion

1. Basic Concepts of Motion:

- **Definition:** Motion is the change in position of an object concerning its surroundings over a specified period.
- **Use:** Understanding the basics of motion is foundational to analyzing the behavior of objects in various scenarios.

2. Rectilinear Motion:

- **Definition:** Rectilinear motion involves an object moving along a straight line.
- **Use:** It is applicable in scenarios where motion occurs in a straight path, such as a car moving along a straight road.
- **Formulas:**
 - Displacement (s): $s = ut + \frac{1}{2}at^2$
 - u is the initial velocity, t is time, a is acceleration.
 - Final Velocity (v): $v = u + at$
 - Average Velocity (v_{avg}): $v_{avg} = \frac{u+v}{2}$

3. Projectile Motion:

- **Definition:** Projectile motion involves the motion of an object projected into the air under the influence of gravity.
- **Use:** Essential in understanding the trajectory of projectiles like a thrown ball or a launched rocket.
- **Formulas:**
 - Range (R): $R = \frac{u^2 \sin(2\theta)}{g}$
 - u is the initial velocity, θ is the angle of projection, g is the acceleration due to gravity.
 - Time of Flight (T): $T = \frac{2u \sin(\theta)}{g}$

4. Circular Motion:

- **Definition:** Circular motion involves an object moving in a circular path.
- **Use:** Relevant in problems related to objects moving in a circular trajectory or rotating systems.

- **Formulas:**

- Angular Displacement (θ): $\theta = \omega t$
 - ω is the angular velocity, t is time.
- Centripetal Acceleration (a_c): $a_c = \frac{v^2}{r}$
- Centripetal Force (F_c): $F_c = \frac{mv^2}{r}$

5. Relative Motion:

- **Definition:** Relative motion describes the motion of an object in relation to another moving object.
- **Use:** Crucial in scenarios where the motion of one object is observed from the perspective of another moving object.
- **Formula:** $v_{\text{rel}} = v_A - v_B$
 - v_{rel} is the relative velocity between objects A and B.

6. Simple Harmonic Motion (SHM):

- **Definition:** Simple Harmonic Motion is a type of oscillatory motion where the restoring force is directly proportional to the displacement.
- **Use:** Applicable to study oscillations in various physical systems.
- **Formulas:**
 - Displacement (x): $x = A \cos(\omega t + \phi)$
 - A is the amplitude, ω is the angular frequency, t is time, ϕ is the phase constant.
 - Velocity (v): $v = -A\omega \sin(\omega t + \phi)$
 - Acceleration (a): $a = -A\omega^2 \cos(\omega t + \phi)$

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BY 3 EXPERTS & 2 Albots**

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MORE INFORMATION
IN MINIMUM WORDS**

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