Chapters/ Sections will be Covered

Book: Fundamentals of Physics by David Halliday, Jearl Walker, and Robert Resnick

Chapter Title: Motion in Two and Three Dimensions

Sections:

- Projectile Motion
- Uniform Circular Motion

Chapter Title: Force and Motion-I

Sections:

- Newton's First Law
- Force

Sample Quiz Question

When a projectile has maximum range?
a) Propelled at 90°
b) Propelled at 0°
c) Propelled at 45°
d) Propelled at 60°

What is the velocity along the x-axis during projectile motion?
a) Velocity increases
b) Velocity decreases
c) Velocity is zero
d) Velocity is constant

Sample Quiz Question

Why is a three-dimensional component not included in the projectile trajectory?
a) Because it works in one dimension
b) Because it works in two dimension
c) Because it works in more than three dimensions
d) Because it works only in positive axes

What is the horizontal acceleration in projectile motion?
a) Acceleration is constant
b) Acceleration increases
c) Acceleration is zero
d) Acceleration decreases

Sample Quiz Question

What is the velocity at maximum height in projectile motion?
a) 0
b) v_0
c) $-g$
d) g

Two projectiles are fired from the same height and speed: one at 30° and the other at 60°. What is true about how long they stay in the air?
a) The first (30°) stays in the air longer
b) Both projectiles have the same time of flight.
c) The second (60°) stays in the air longer
d) Time of flight depends only on the horizontal component of velocity.

Class Activity: Math Problem #1

NASA sends a rover (robotic vehicle) to the surface of Mars. The stationary Mars lander is the origin of the coordinates, and the surrounding Martian surface lies in the xy-plane. The rover, which we represent as a point, has $x-$ and $y-$coordinates that vary with time.

$$x = 2.0m - (0.25m/s^2)t^2$$

$$y = (1.0\,m/s)t + (0.025m/s^3)t^3$$

a) Find the rover's coordinates and distance from the lander at $t = 2.0s$
b) Find the rover's displacement and average velocity vectors for the interval $t = 0s$ to $t = 2.0s$
c) Find a general expression for the rover's instantaneous velocity vector $\vec{v}$.
d) Express $\vec{v}$ at $t = 2.0\ s$ in component form and in terms of magnitude and direction.

Class Activity: Math Problem #2

Passengers on a carnival ride move at constant speed in a horizontal circle of radius 5.0 m, making a complete circle in 4.0 s. What is their acceleration?

Class Activity: Math Problem #3

Suppose, you throw a ball from your window 8.0 m above the ground. When the ball leaves your hand, it is moving at 10 m/s at an angle 20° of below the horizontal. How far horizontally from your window will the ball hit the ground? Ignore air resistance.