

**Honors Physics:**  
**1<sup>st</sup> Semester Exam: Review Material**

**Basic Outline:**

- 50 Multiple Choice Questions
  - 31 Concept Questions
  - 19 Mathematics Questions
- 1 Page Free Response

**Basic Ideas:**

- Units for Variables
- Definitions of Key Variables or Terms

**Mathematical Toolkit (5 Questions):**

- Sig Figs
- Trig
- Vectors
  - Adding and Subtracting Vectors Visually
  - Converting Polar to Rectangular Coordinates
  - Converting Rectangular to Polar Coordinates
  - Components

**Kinematics in One-Dimension (7 Questions):**

- Vectors vs. Scalars
  - Distance vs. Displacement
  - Speed vs. Velocity
- Kinematic Equations
- Graphical Analysis (the 'Snowman')
  - Slope of a Position vs. Time Graph
  - Slope of a Velocity vs. Time Graph
  - Area under an Acceleration vs. Time
  - Area under a Velocity vs. Time Graph
  - Concavity (Concave up and Concave down)
- Gravity and Free Fall

**Kinematics in Two-Dimensions (Projectiles) (6 Questions):**

- Definition of Projectile Motion
- Assumptions of Projectile Motion
  - Only acceleration due to gravity
  - No acceleration in the x-direction
  - Constant velocity in the x-direction
  - No initial y-velocity for a  $\frac{1}{2}$  projectile
  - Time is the same whether measured in the x- or y-direction
- $\frac{1}{2}$  Projectile
- Full Projectile

**Forces (7 Questions):**

- Mass and Inertia
- Newton's Three Laws of Motion
- Free Body Diagrams
- Equilibrium vs. Non-Equilibrium
- Finding the  $\Sigma F$
- Mass vs. Weight
- Masses on an Incline
- Forces Studied
  - Normal Force
  - Force of Gravity
  - Force of Friction (Static and Kinetic)
    - Be able to differentiate between the two

**Work, Power and Energy (9 Questions):**

- Work
- Power
- Energy
  - Work-Energy Theorem
  - Kinetic and Potential Energy
  - Conservation of Energy

**Impulse, Momentum, and Collisions (6 Questions):**

- Impulse
- Momentum
- Impulse Momentum Theory
- Conservation of Momentum
- Collisions
  - Elastic, Inelastic, and Total Inelastic

**\*Other General Questions (10)**