**AP Physics 1 Review Guide – Midterm Exams**

Kinematics

**One Dimensional Motion**

1. Know about scalar vs. vector quantities.
2. Understand and work with distance and displacement.
3. Understand and solve problems of average speed and average velocity.
4. Understand instantaneous speed and velocity.
5. Understand and work with acceleration.
6. Understand and solve problems using the kinematic equations
7. Understand and solve problems of free fall with kinematic equations.
8. Graphically analyze motion through position-time and velocity time graphs.

**Two Dimensional Motion**

1. Apply the kinematic equations to objects undergoing motion in both the X and Y Directions
2. Understand and solve problems to find maximum height and maximum distance
3. Understand and solve problems to find instantaneous velocity

**Forces & Dynamics**

1. Create and interpret free body diagrams for a given scenario
2. Understand Newton’s three laws
3. Apply Newton’s second law to understand the motion of an object undergoing different forces
4. Understand Friction and how it affects motion
5. Be able to solve problems involving Friction, Ramps, and pulleys

**Circular Motion & Gravitation**

1. Understand and create free body diagrams for objects undergoing circular motion
2. Understand and calculate centripetal force and centripetal acceleration
3. Understand Newton’s Law of Universal Gravitation and it’s applications
4. Understand Keppler’s Laws and their applications
5. Be able to use Universal Gravitation/Keppler’s Laws to calculate periods of planets, Fg, etc
6. Be able to use Universal Gravitation/Centripetal Motion to solve satellite motion problems

**Harmonic Motion**

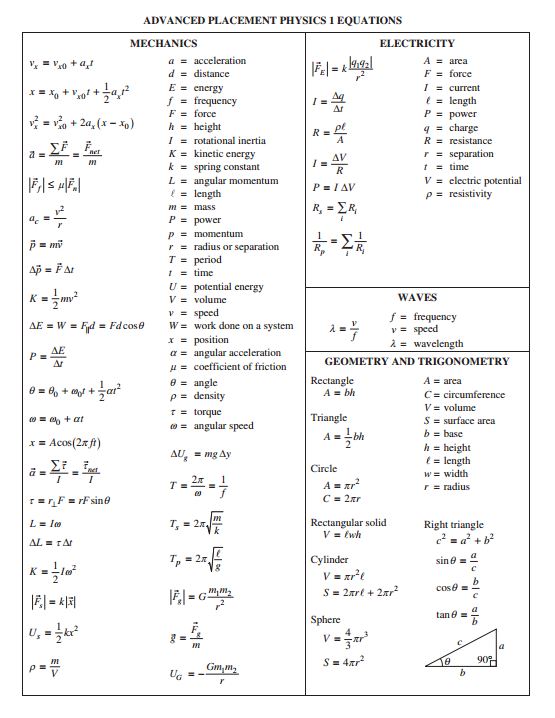
1. Understand linear restoring forces and how they will create and oscillating object.
2. Be able to create and interpret motion graphs for an oscillating object
3. Understand the differences between period and frequency
4. Use harmonic motion equations to calculate period, frequency, and displacement of an oscillating object
5. Be able to solve problems involving a simple pendulum or mass-spring system

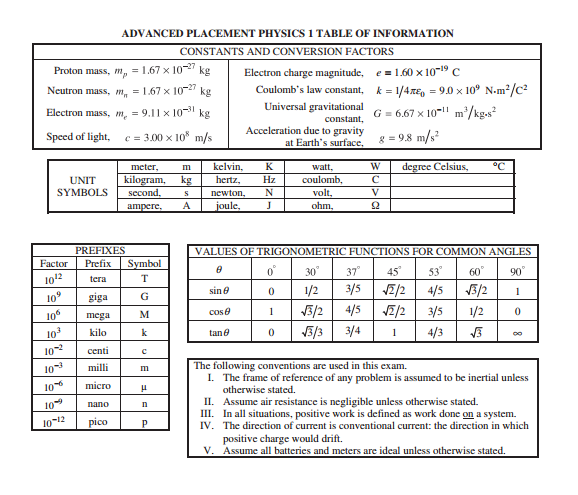
**Momentum**

1. Understand the differences between Impulse & Momentum
2. Understand the differences between elastic and inelastic collisions
3. Understand and apply Conservation of Momentum
4. Use Conservation of Momentum and impulse equations to solve problems

**Work & Energy**

1. Recognize, calculate and interpret: Work, Energy, Power
2. Understand the relationship between power and work
3. Understand Mechanical Energy, Potential Energy, and Kinetic Energy
4. Understand and apply the Conservation of Energy to solve problems
5. Understand conservative & non-conservative forces
6. Identify and calculate the work and energy in open and closed systems
7. Solve problems using equations for Kinetic Energy, Gravitational Potential Energy, and Spring Potential Energy



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