## Exam Title: 2003380 Physics Courses Assessed by this Exam: Physics & Physics Honors Updated 12/15/15

**Key Vocabulary**: Acceleration, amplitude, current, elastic potential energy, electrical circuit, electrical conductor, electromagnetic forces, electrical insulator, final displacement, final velocity, frequency, friction, gravity, gravitational forces, gravitational potential energy, hypothesis, hypotenuse, independent variable, initial displacement, initial velocity, joules, kinematic equations, kinetic energy, magnitude, mechanical energy, melting, net force, Newton's Law of Motion, Ohm's law, potential difference, potential energy, power, resistance, resistor, scalar quantity, scientific model, speed, strong nuclear forces, trough, vector, velocity, wavelength, weak nuclear forces.

## **Student Tasks:**

- Be able to identify components of a valid experiment as well as how to improve an experiment.
- Be able to identify the various components of a scientific experiment/scientific method. (i.e. observations, hypothesis, dependent variable, independent variable, constants, duplicating experiments, and drawing a conclusion)
- Be able to calculate average velocity if given different variables.
- Be able to calculate final displacement if given different variables (i.e. velocity and angle.)
- Understand how kinetic energy relates to objects in motion and/or objects at rest.
- Understand how energy can be converted from one form to another (i.e. kinetic energy; potential energy; elastic potential energy; gravitational potential energy)
- Be able to categorize the fundamental forces from weakest to strongest.
- Be able to calculate the average rate of acceleration if given variables.
- Be able to compare differences in work and power if given Newtons, distance, and time.
- Be able to calculate work if given distance and force in Newtons.
- Understand how objects apply forces on one another if given each objects force in Newtons.
- Be able to calculate work if given a force vs. distance graph.
- Be able to identify gravitational attraction between objects as it relates to the mass of each object and the distance between each object.
- Be familiar with Einstein's theory of general relativity as it pertains to the nature of light.
- Be able to calculate work if given watts and time.
- Be able to make inferences when given a graph of distance versus time.

Last Edited: December 15, 2015

- Be able to make a vector diagram that depicts various forces
- Understand the process of conduction.
- Know the properties of an electrical insulator.
- Understand the relationship between power, current, and resistance.
- Understand the relationship between wavelength, frequency, and energy for electromagnetic waves.
- Be able to calculate power if given voltage and resistance.
- Be able to calculate the speed of a wave as it travels from one medium to another.
- Be able to calculate the speed of an object if given its mass and momentum.
- Know how to change a scalar quantity into a vector quantity
- Understand why objects have limitations regarding their ability to travel at the speed of light.
- Using Ohm's law, be able to calculate the potential difference if given different variables.
- Be able to identify various components of a wave
- Understand how momentum changes and/or is transferred during/after a collision.
- Be familiar with Newton's first law.
- Understand Newton's second law.
- Be able to calculate force if given mass and acceleration
- Understand the benefits of scientific models
- Be able to identify characteristics of scientific models, including physical and computer models.
- Be able to describe the purpose of a model.
- Be able to express numbers in scientific notation.

Last Edited: December 15, 2015