General Physics I -- Review for Exam 2 Fall 2019

I. Laws, Principles, and Theorems

Recognize these by name, know the main ideas involved, the kind of situations where applicable, etc.

Newton's first Law of motion.
Newton's second Law of motion.
Newton's third Law of motion.
Impulse - momentum theorem.
The law of conservation for linear momentum.

II. Other Concepts, Terms, *etc*.

Define them, know what they mean, their applications, and other interesting things about them. Often we define quantities/concepts using equations, so you will need to know what those equations mean and how to apply them.

Units of force and energy: $N \equiv kg\ m/s^2$; $J \equiv kg\ m^2/s^2 = N\ m$
Free-body diagrams; force object and force agent ($F_{on\_\_by\_\_}$)
Collisions (inelastic *vs*. elastic)
Impulse
Linear momentum
Coefficient of restitution [varies between 0 and 1]
Frictional forces: static and kinetic; Coefficients of static and kinetic friction.
Remember: static friction does not have to equal the max. possible value!
Uniform circular motion, centripetal force & centripetal acceleration
AND non-uniform circular motion with its associated tangential acceleration component
Angular position, angular velocity, angular acceleration, period (of rotation)
Similarity relations between linear and rotational motion variables and equations
The differences between force, weight, mass, Newtons, kilograms, m/s^2, and acceleration
Internal vs. external forces on a system
Inertial vs. non-inertial reference frames
Static and dynamic equilibrium
How to take partial derivatives
forces: weight (the force of gravity), tension (what is our simple model of tension in a string, cable?)
the differences between force, weight, mass, Newtons ($N \equiv kg\ m/s^2$) , kilograms, and acceleration

III. Other Topics for Discussion, Problem-solving, *etc*.

Perfectly inelastic collisions
How do air bags work?
How is impulse represented/interpreted graphically?
Free-body diagrams (with only *physical* forces: $F_{on\_\_by\_\_}$)
Forces associated with uniform and non-uniform circular motion
Similarity relations between linear and rotational motion variables and equations
How does one find the normal force?
Basics of tension (*i.e.,* T same everywhere for non-stretching, massless rope & T same throughout a given rope for mass-less, frictionless pulleys)
How to identify third law (action/reaction) pairs
Right-handed coordinate systems
Right-hand rule for determining direction of angular velocity and angular acceleration as vectors
Similarity relations between linear and rotational motion variables and equations
What is an isolated system?
Perfectly elastic vs. perfectly inelastic collisions (and what lies in between)
Absolute and relative uncertainties
The method of partial derivatives for finding uncertainties

Obviously, you will need to know what was on the previous Exam Review Sheet (PHYS210 - review 1.f19.pdf) *to make sense of much of what we've discussed since the last exam. Please be sure to review it.*

IV. Equations

Know how to apply them to above cases! I will provide you with all necessary equations except those on the *Know Sheet.* Make sure you know the notation (symbols) and the units for the physical quantities we've discussed!