Chapters 9-11 Test description

The Chapter 9-11 Test will be on Wednesday April 28 at 6:30-7:45pm. Please read the instructions for tests carefully so you are well prepared.

A "sample test" will be posted in Files->Tests on Canvas. The sample test does NOT necessarily include all of the material you need to know; it is for practice taking a test in a test setting. Anything covered in the homeworks, lectures, or in-class activities is fair game. The test will consist of a mixture of calculation problems (like "standard problems") and conceptual problems.

This test covers the assigned sections of chapters 9, 10, and 11 and the associated homeworks and jamboards. However, it does NOT cover moment of inertia integrals! (These will be covered on the next test). You should know:

- MEMORIZE: how to do cross products using the right-hand rule and the a*b*sin(theta) form.
- MEMORIZE: how to use the right hand rules.
- How to find the torque acting on an object when a force is applied about an axis of rotation.
- How to solve static equilibrium problems.
- How to find angular acceleration from torque and moment of inertia.
- How to use conservation of angular momentum.
- How to consider rotation in three dimensions using vectors for torque, angular velocity, angular acceleration, and angular momentum.

You should also know the material from the previous tests:

- The meanings of the metric prefixes n, μ, m, c, k, and M.
- The definitions and relationships between position, displacement, distance, velocity, speed, and acceleration in 1D.
- How to calculate instantaneous and average velocities off an x vs. t graph and accelerations off a v vs. t graph.
- How x vs. t and v vs. t graphs correspond to actual motion, and what graphs of constant acceleration and constant velocity motion look like.
- How to solve 1D kinematics problems, including using calculus techniques and problems with multiple objects and/or time intervals.
- How to add and subtract vectors graphically.
- How to find the components of vectors.
- How to use vector components to find the magnitude and direction of vectors.
- How to solve 2D kinematics problems including, but not restricted to, projectile motion.
- Radial and tangential acceleration, and how they affect objects in motion.
- The concepts related to describing circular motion
- Newton's 3 laws of motion and how they apply to various situations. You must know which law is which.

- How to draw a free body diagram.
- How to solve Newton's second law problems including:
  - Problems involving friction.
  - Problems involving tension.
  - Problems involving multiple interacting objects.
  - Problems involving taking vector components.
  - Problems involving using tilted coordinate aces.
  - Problems involving circular motion.

- The meaning of apparent weight.
- The shortcuts for calculating work and when to apply them.
- How to apply the work-energy theorem.
- How to find the power in various situations.
- How energy is transformed and transferred, and the role work plays in this.
- How potential energy is defined when a conservative force is present.
- How to solve conservation of energy problems.
- How impulse and momentum are related.
- How to solve 1D conservation of momentum problems including collisions and explosions.
- The relationships between energy, momentum, work, and impulse.