

## Words to the Wise for Exam 2

March, 2003

Please read this note carefully. (It was written by the author of Exam 2!)

1. Any material that we covered in the reading assignments, lectures, activities, and/or homework is fair game for the exam.
2. Keeping in mind #1, it would be a logical assumption that the most important subjects have been covered by at least two of the four listed above, probably all of them.
3. The following Sample Problems from the book will help you prepare for the exam:  
7-2, 7-3, 7-6, 7-7, 7-8  
8-1, 8-2, 8-3, 8-4, 8-7  
9-1, 9-4, 9-5, 9-7  
10-1, 10-2, 10-4, 10-5  
11-2, 11-4, 11-6, 11-7  
12-3, 12-4, 12-5, 12-6, 12-7, 12-9
4. Make sure you understand all of the equations on the Formula Sheet: what the symbols mean, when you can use them, when you cannot.
5. Check the review notes.
6. When you take the exam, do the questions you know how to do first, then go back to the ones that you were not sure about.

Here are some additional tips from an experienced teacher:

(1) Look at EACH equation on the formula sheet and answer for EACH; (A) What does each variable mean and (B) AS IMPORTANTLY under what conditions can I or can I not apply this equation. This is really important. (C) What UNITS is each thing measured in.

(2) Think about each of the following: energy, kinetic energy, mechanical energy, linear momentum, rotational momentum, angular momentum, rotational energy, inertia, mass, force, torque Which can be conserved? Under what conditions? Which are independent of path and under what conditions? Which are scalar, which are vectors? What does this mean when it comes to solving equations? Which do you need to resolve into components? Under what conditions? How do you add work in the Y direction to work in the X direction? How do you add momentum in the X direction to momentum in the Y direction? Write a conservation equation for each quantity that you think can be conserved.

(3) Something rotates at 20 rotations per minute. How many radians per second is this? how many degrees per second?

(4) Draw a spinning disk. Label angular acceleration, centripetal acc, tangential acc, linear acceleration, and radial acceleration. Show how all or any of these variables relate to each other. For each, describe how it physically looks when one of these increases.

(5) Relate  $\tau$ ,  $\alpha$ ,  $\theta$ ,  $\omega$ , and  $I$  (moment of inertia) to their linear counterparts

(6) What is center of mass, what's its use? How do you calculate it?

(7) What is the potential energy of a spring? How does it relate to the force of the spring? How does it relate to the energy of an object launched by the spring?

(8) What's an elastic collision? What does it allow you to do mathematically? What does a perfectly inelastic collision look like? When energy is "lost" where does it go? How much kinetic energy does something have when it's stopped? when it's turning around?

(9) What is a conservative force? What does that mean? Give an example where a conservative force simplifies a problem

(10) How does the mass of a cart affect its momentum? Its kinetic energy? Its potential energy? How does the angle of a track affect a cart's momentum, its kinetic energy, its potential energy (if the angle changes)?