Physics 1403-001 Exam #1 sample questions

Instructions: Do real good. Show your work for all problems. Partial credit will be assigned for things that make sense. g=9.81 m/s^2

All questions are equally weighted.

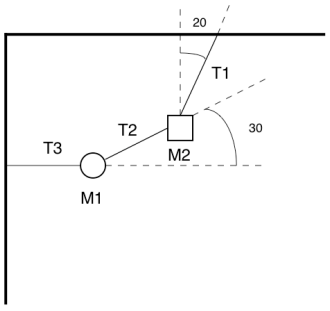
1. Write down the value of 0.000043 times 2.337 with the correct number of significant figures.

2. A pistol fired horizontally, aimed at the center of a target 75 m away, fires a bullet at 350 m/s. How far below the center of the target does the bullet hit?

3. State Newton's 3rd law of motion in words.

4. Which of the following is not true, neglecting friction?
   a) It takes the same amount of time for an object to fall to the ground if it is dropped as if it is thrown horizontally
   b) When I throw an object vertically upwards, it comes back to my height with the same speed it went up at
   c) If a I throw a lead ball and an aluminum ball straight upwards at the same speed, the lead ball will land first since it is heavier
   d) The acceleration of a thrown object is never zero.

5. Draw a free body diagram for each of the masses on the right. Angles are in degrees.



6. A 50 kg crate is pulled along on a frictionless surface by a cable which is inclined 30 degrees above the horizontal. If its acceleration is 1.50 m/s^2, find the magnitude of the force applied by the cable, **and** the normal force of the floor on the crate.

7. A ball is thrown from the top of a building, straight up, at 15 m/s. It hits the ground 6.0 s later. How tall is the building?

8. A 22.0 kg mass initially moving at 12.0 m/s on a horizontal surface slows and stops due to friction. If it travels 45.0 m before stopping, what is the coefficient of static friction?

9. A cannon is aimed at an angle of 30 degrees above the horizontal and fires a shell at 550 m/s. How far away will the shell land if it lands at the same height it started at (neglect friction)?

10. How long will the cannon shell from problem 9 be in the air before landing?

11. I want to throw a marker into a trash can which is 4.5 m away horizontally and 1.5 m below my hand. If I throw the marker at an angle of 30 degrees above the horizontal, what speed should I throw it at to hit the trash can?

12. Sue travels 35 km west, then 25 km northwest (at a 45 degree angle to west). What is the magnitude of her displacement vector?

13. Referring to problem 12, what angle does Sue's displacement vector make with respect to west?