Physics Quiz – Energy, Vectors, Friction, Force, Power

1. Why are light bulbs rated in Watts instead of Joules?

Choose to do Problem 2 (max 8/10 points) *or* Problem 3 (max 10/10):

2. A 500 kg bomb is dropped from an airplane at 800 m of altitude. How fast is the bomb going when it's 10 meters above the ground?

3. Roller Coaster Tycoon is probably the best game ever. Most of you probably don't remember it because you were fetuses at the time. The game had to calculate all sorts of things like speeds and heights and losses to friction. Here's a problem that the programmers would have had to work into the code: The initial hill of the rollercoaster is 60 meters high. The player wants to go around a loop-the-loop. How tall can the loop be if the player needs to have at least 1 m/s of speed at the top of the loop and the coaster loses 23% of it's total energy to friction?

Choose to do Problem 4 *or* 5. Problem 5 assess more standards than 4 does.

4. After being kicked towards a flight of stairs, a 15 kg box of puppies decelerates at a rate of 7 m/s/s. What's the coefficient of friction between the box and the floor?

5. A box of glass Christmas tree ornaments is sliding down a shabbily constructed Wal-Mart shelf. If the shelf has a slope of 2 degrees, and the box is gaining 1 cm/s of speed each second, what is the coefficient of friction (mu) between the box and the shelf? Remember that the weight of an object is $m*g$.