

## Contemporary Physics I – HW 6

### HW 6

Due November 17, 2006

Please answer all questions clearly and concisely. While you need not transcribe the question completely, it should be clear from your answer alone what you are talking about.

You are strongly encouraged to discuss the homework with your classmates, but you must complete the written homework by yourself, and of course, the material you submit must be your own.

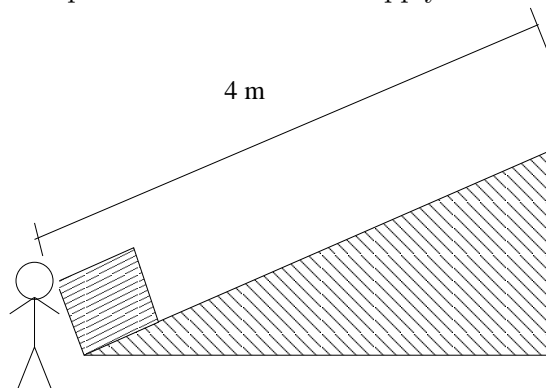
Remember, show all of your work!

1) 5.6

2) 5.8

3) 5.11

4) A required problem from the Fraternal Order of Physics Professors. You are pushing a crate (to make it more exciting, let's say that it's a crate full of gold doubloons!) up a ramp with a length 3m. The crate has a mass of 50 kg. The ramp has an angle of 20 degrees, and the coefficient of kinetic friction between the ramp and crate is 0.2. You apply a constant horizontal force of 100N



- a.. What is the instantaneous acceleration on the crate?
- b.. How much work do you do on the crate moving it from the bottom to the top?
- c.. How much work does friction do on the crate (remember the sign!)?
- d.. How much heat is produced in the crate and the ramp?
- e.. What is the change in potential energy that the crate gets from the bottom of the ramp to the top?
- f.. From these, what is the kinetic energy of the crate at the top of the ramp?

5)5.21