Physics 200
Lab 8 – Conservation of energy

Equipment required:

Pasco 850 interface	Super pulley
Cart track	Motion cart & masses
Motion sensor	Weight hanger, string, & masses

Overview:
This lab will explore conservation of energy, examining the relationship between gravitational potential and kinetic energies.

Setup:

- Step 1 – turn on Pasco 850, if it is not already on, and log onto the workstation.
- Step 2 – plug in the motion sensor and tell Capstone that you're using it.
- Step 3 – attach a length of string almost as long as the cart track to the hanger. Attach the other end to the motion cart.

Procedure:
Place the track level. Place the motion sensor at the opposite end of the track from the super pulley. Put masses on the hanger and cart such that the cart and hanger move for at least two seconds before the hanger hits the ground or the cart hits the pulley. Keep track of the masses in the hanger and the mass of the cart, since you will need to determine the total mechanical energies.

Repeat the entire procedure with the track at an angle (please keep track of this angle), so that the pulley is above the starting position of the cart.

For the level track and the angled track:

Obtain position, velocity and acceleration graphs. Keep track of the average acceleration at each trial.

Using the position results, determine the potential energies of the vertically-moving masses at every 0.2 s. Determine also the kinetic energies of the cart at every 0.2 s.

In this experiment we will not do 3 trials for each track position. Please use only the best results (i.e., at least 2 s of motion, linear velocity etc.)

Questions (address all questions for level and inclined tracks):

What is the velocity of the hanger as a function of its height?

What is the velocity of the cart as a function of hanger height?

Is the total energy of this system conserved?

How much work is done by friction in the first second?

How much work is done by friction in the next second?