

Physics 160 Written Homework - Chapter 6-7.

1 Conservation of Energy

1.1 Conservative Forces

Two blocks hang from either end of a massless rope that runs over a frictionless massless pulley (An Atwood's Machine), and are held in place. One block has a mass of $12kg$, the other block's mass is unknown. Some time after the blocks are released, the block of known mass has a velocity of $3m/s$ towards the ground, and has moved a distance of $2.3m$ from its initial position.

- a. Use energy methods to find the mass of the second block.
- b. Verify your answer using Newton's Laws.

1.2 Non-Conservative Forces

A $3kg$ block travels to the right along a frictionless surface with a velocity of $6m/s$ towards a rough incline (has friction) that makes a 25° angle with the horizontal. The block travels up the incline and then back down, where it travels along the frictionless surface to an ideal massless spring that is attached to a wall. If the spring has a force constant $k = 150N/m$ and the block compresses it $.6m$:

- a. How much work does the force of friction do on the block?
- b. Find the total distance the block travels along the incline.
- c. Find the coefficient of kinetic friction between the block and the incline.