Physics 160 Written Homework - Chapter 8.

1 Momentum

Block A has a mass of $7kg$ and slides to the left down a ramp that makes an angle of 35° with the horizontal. Block B has a mass of $4kg$ and slides to the right along the level surface at the bottom of the ramp. Block A and B meet at the bottom, where Block B has a velocity of $3m/s$ and Block A has a velocity of $5m/s$. The blocks collide and stick together. Assume that they collide and form one entity instantly, meaning disregard corner effects, and ignore friction.

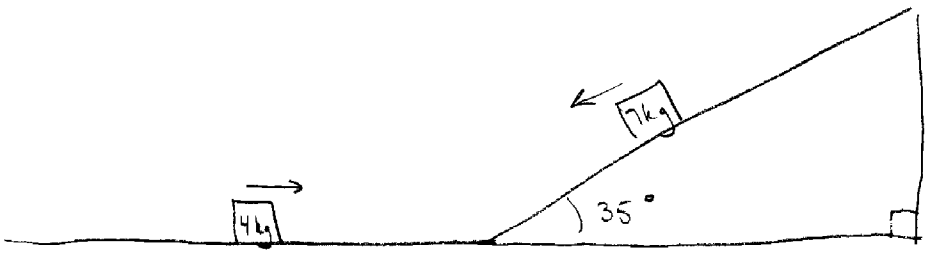
a. Find the direction and magnitude of the velocity of the two blocks stuck together.

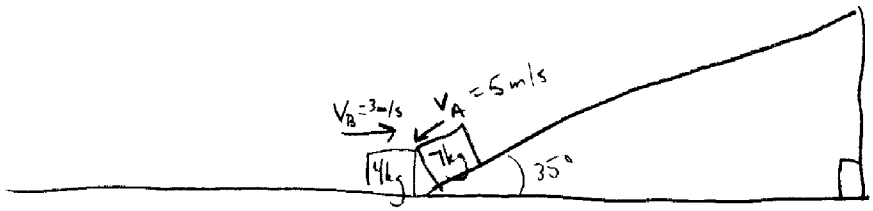
b. Reverse the masses and velocities of the two blocks, find the new direction and magnitude of the velocity of the two blocks.

c. How far above the horizontal will the block pair travel in this second situation?

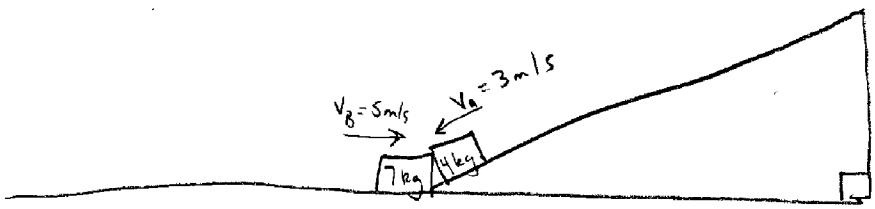
Block A, mass $3kg$, hangs from a $1m$ long string that is initially held at an angle θ from the vertical. It is released from its position and collides perfectly elastically with Block B, mass $5kg$, that has been propelled $1.5m$ towards Block A along a horizontal surface, with $\mu_k = .45$, from a spring with force constant $350N/m$ that was compressed $.5m$. The moment after the collision, Block A has a velocity of $1.5m/s$. Find the angle θ.

Problem 1



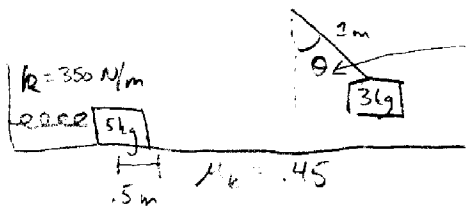


Situation 1

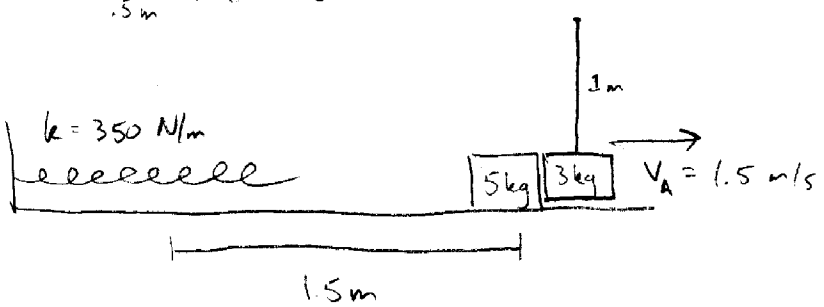


Situation 2

Problem 2



Inital



Moment after Elastic Collision