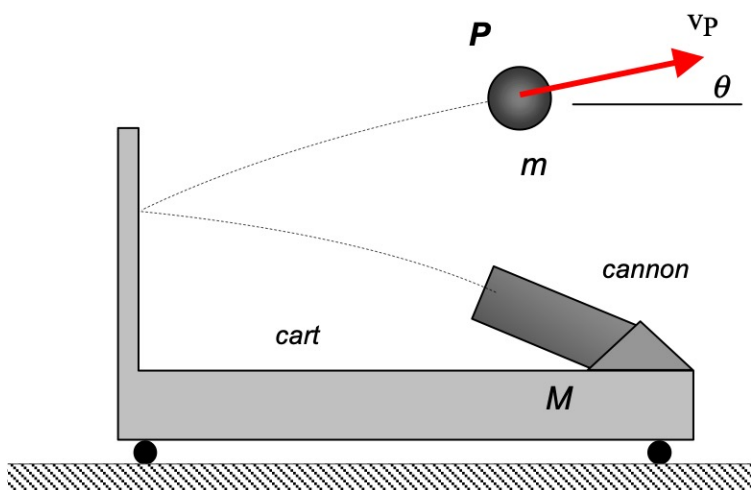


Homework H.4.K

Given: A cannonball P of mass m is fired toward a steel barrier on a stationary cart. At some time after rebounding from the barrier, the cannonball is observed to have a speed of v_P and is moving in the direction shown below in the figure. Let M be the combined mass of the cannon/cart. Assume that the cart is able to move without friction along the horizontal surface and ignore the influence of air resistance.

Find: For this problem:

- (a) Determine the velocity vector of the cart after the cannonball bounces off the steel barrier at the instant shown below;
- (a) If Δt represents the elapsed time between the firing of the cannonball and the instant shown below, determine the average value of the horizontal force acting on the combined cannon/cart over the time period of $0 < t < \Delta t$.



Use the following parameters in your analysis: $mg = 60$ lb, $Mg = 200$ lb, $\Delta t = 0.2$ s, $\theta = 20^\circ$ and $v_P = 120$ ft/s.