

**Quiz #5: Dynamics I**

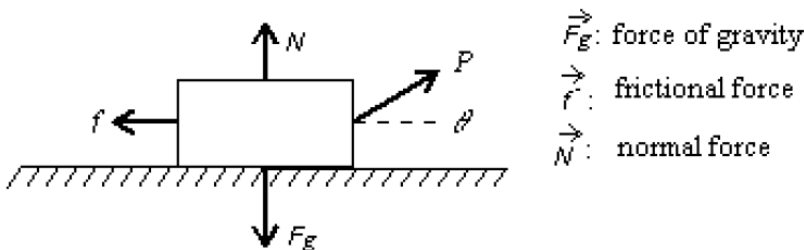
**Problem 1 (1.5 points)**

A fireman is sliding down a fire pole. As he speeds up, he tightens his grip on the pole, thus increasing the frictional force the pole exerts on the fireman. When the frictional force equals the weight of the fireman, what happens?

- a) The fireman comes to a stop.
- b) The fireman continues to descend, but with constant speed.
- c) The fireman descends with slower and slower speed.

**Problem 2 (1.5 points)**

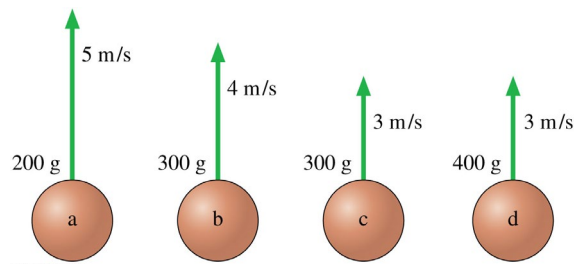
A girl pulls a wooden box along a rough horizontal floor at constant speed by means of a force  $P$  as shown in the figure below. In the diagram,  $f$  is the magnitude of the force of friction,  $N$  is the magnitude of the normal force, and  $F_g$  is the magnitude of the force of gravity. Which of the following must be true?



- a)  $P = f$  and  $N = F_g$
- b)  $P = f$  and  $N > F_g$
- c)  $P > f$  and  $N < F_g$
- d)  $P > f$  and  $N = F_g$
- e) none of these

**Problem 3 (2 points)**

The four balls shown in the figure below have been thrown straight up. They have the same size, but different masses. Air resistance is negligible. Rank, in order, from largest to smallest, the magnitude of the net force acting on each ball. Some may be equal. Give your answer in the form  $a > b > c = d$ .



**Problem 4** (5 points)

A 5.00 kg block is launched at 6.25 m/s up a long ramp that is inclined at an angle of  $38.0^\circ$ . The coefficient of kinetic friction between the ramp and block is  $\mu_k = 0.25$ . How far *along the ramp* does the block travel before coming to rest?

(Note:  $v_x^2 = v_{0x}^2 + 2a_x(x - x_0)$ )