Experiment 6: Static & Kinetic Friction

Student Name: _____

Section Number: _____

PRELAB

PRE-LAB Instructions:

Print out this page. Feel free to refer to the lab Instructions and other materials, your physics textbook, other students, etc. to help you to ponder, understand, and work out answers to the following question(s). Show your work & answers in the space(s) provided.

PRE-LAB Questions

A large heavy box sits on a ramp. You need to push it up the ramp. The total mass of the box (and its contents) is M and ramp angle is θ.

1) Suppose you initially push on the box parallel to and up the ramp with a force P and it does not move. Draw a diagram that shows ALL of the forces acting on the box (label each force).

2) If P = 100 N, M = 45 kg, and θ = 25 degrees, what are the magnitudes for the following forces?

the normal force acting on the box = _____

the frictional force acting on the box = _____

the weight of the box = _____

the net (total) horizontal force on the box = _____

the net (total) vertical force on the box = _____

3) Suppose you push harder so that P increases to 220 N and the box just begins to move. Based on this result, what is the STATIC coefficient of friction for the box & tabletop? (Show your work)

4) Given the situation illustrated in Figure 6.3, derive an expression for the kinetic frictional coefficient in terms of $\mathbf{m_1}$, $\mathbf{m_2}$, $\boldsymbol{\theta}$, and $\mathbf{a}$. (Show your work)