Physics CS 31 **Fall 2010**

Set #6 - for Wd Nov. 3

Read HR&K	Ch. 5, Ch. 11 - Sects. 11.1 through 11.6
Read K&K	Ch. 2 (p. 87-97) , Ch. 8 (p. 340-344), Ch. 4 (p. 152-154)
Read Feynman Vol. 1	Ch. 11, Ch. 12

From HR&K:

Ch. 5 Exercises 30, 42. Problems 4, 6, 10, 18.

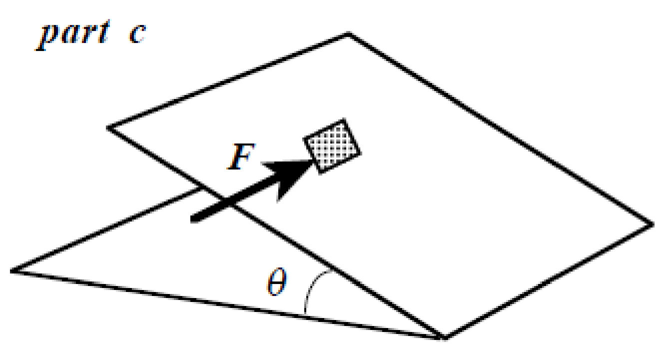
Ch. 5 Problem 2 (Extra Credit: In problem 2 use a suitable constraint equation to relate the accelerations of the pulley and of each of the masses, and solve this problem in the general case that the masses are off the ground.)

From K&K:

Ch. 2 Problems 2.6, 2.7, 2.11, 2.12.

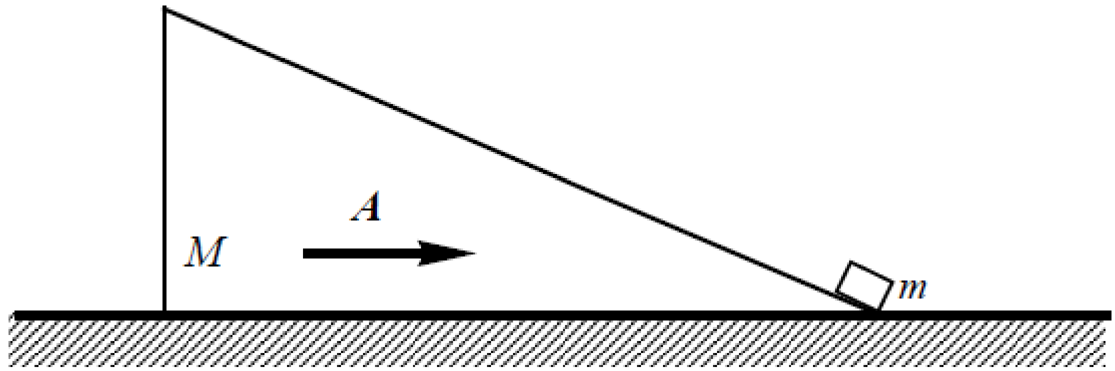
1. A cube of weight W rests on a rough inclined plane which makes an angle θ with the horizontal.

a) What is the minimum force parallel to the slope necessary to start the cube moving *down* the plane? b) What is the minimum force necessary to start the cube moving *up* the plane? c) What is the minimum *horizontal* (transverse to the slope) force necessary to start the cube moving down the plane?



2. Find the time it takes the mass m to reach the top of the wedge of length l (slant), wedge angle θ and mass M, when a horizontal acceleration A is applied to the wedge as shown below. Neglect friction with any surface. What is the minimum acceleration A

needed?



Extra Credit: A particle of mass m slides down an inclined plane under the influence of gravity. If the motion is resisted by a force $f = kmv^2$, show that the time required to move a distance d after starting from rest is

$$t = \frac{\cosh^{-1}(e^{kd})}{\sqrt{kg \sin\theta}}$$

where θ is the angle of inclination of the plane.