DO NOT TURN THIS PAGE!!!!!

Name: _____

Physics 50
Fall 2016
Exam 3

MAKE SURE TO SHOW ALL WORK IN COMPLETE DETAIL. NO CREDIT WILL BE GIVEN IF NO WORK IS SHOWN. EXPRESS ALL ANSWERS IN SI UNITS.

1. Define/explain the following terms without any mathematical equations. (2 pts each)

    a) Inertia –

    b) Apparent weight –

    c) UCM –

    d) Equilibrium –

    e) Inertial reference frame –

1. The force **F** accelerates M_2 to the right. Take the coefficient of kinetic friction between all surfaces to be μ_k and assume ideal pulley and string.
   a) Draw the free-body diagram for systems M_1 and M_2.
   b) Setup the equations required to solve for the force **F** given the blocks move with acceleration 'a'.
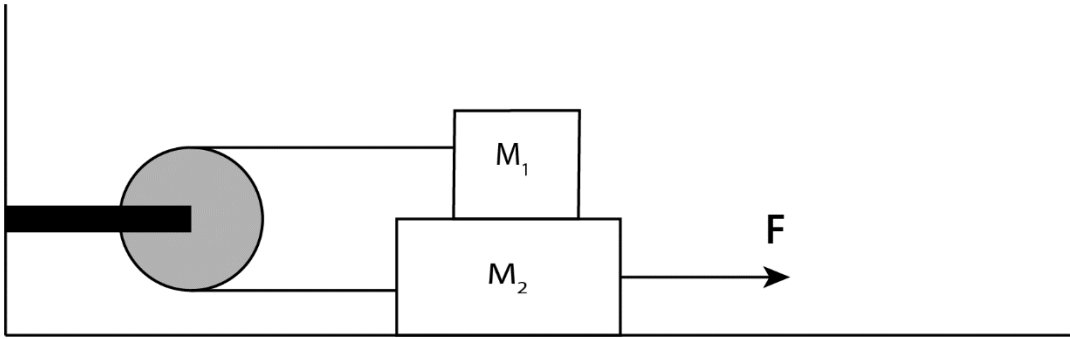
2. In the figure below, a 2.0 kg ball is connected by means of two massless strings, each of length L = 1.65 m, to a vertical, rotating rod. The string are tied to the rod with a separation d = 1.65 m and are taut. The tension in the upper string is 35 N. (10 pts)
   a) Calculate the tension in the lower string.
   b) Calculate the magnitude of the net force on the ball.
   c) Calculate the speed of the ball.
   d) Calculate the direction of the net force on the ball.

Rotating rod
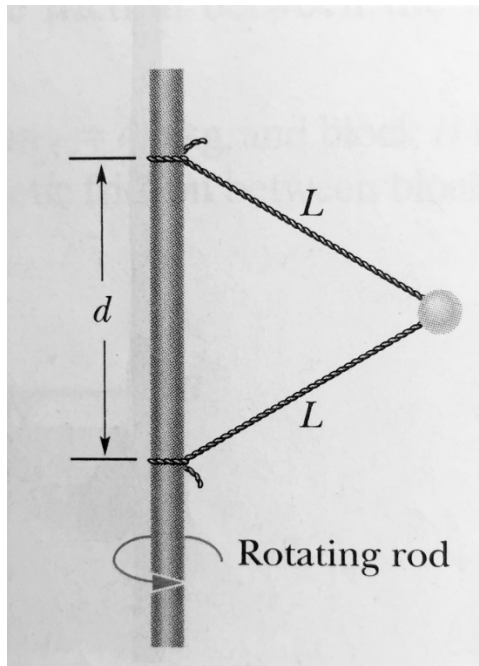
3. To move a large crate across a rough floor, you push on it with a force **F** at an angle of 40° below the horizontal as shown below. Find the force required to start moving the crate given that the mass of the crate is 60 kg and the coefficient of static friction is 0.75. (10 pts)

40°

F

45 kg