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NAME: _____

PHYSICS 50 WINTER 2011 EXAM 3

MAKE SURE TO SHOW ALL WORK IN COMPLETE DETAIL. NO CREDIT WILL BE GIVEN IF NO WORK IS SHOWN!!!!!

- 1. For the system shown below assume a massless, frictionless pulley. Take the coefficient of kinetic friction to be 0.2. (10 pts)
 - a) Calculate the acceleration of the blocks.
 - b) Calculate the tension in the string.
 - c) Determine which direction the 17.0 kg mass moves.



- d) A 24-kg child stands on a merry-go-round making 1rotation in 5.0 s. He is standing 1.5 m away from the axis of rotation.
- a) Calculate the frictional force on the child.
 b) If the child begins to slide when r = 1.9 m, calculate the coefficient of static friction.

e) Find the tension in the rope if F = 12 N, $m_1 = 3.0$ kg, $m_2 = 1.0$ kg, and $\theta = 37$. Take all contact surfaces to be frictionless.



- f) The three connected blocks are pulled to the right on a horizontal frictionless surface by a force of magnitude $T_3 = 65.0$ N. Take $m_1 = 12.0$ kg, $m_2 = 24.0$ kg, and $m_3 = 31.0$ kg.
 - a) Calculate the acceleration of the blocks.
 - b) Calculate the tension T_1 and T_2 .



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- g) A 4.5 kg block is given an initial speed of 14 m/s up an incline plane of angle 45[°]. When the block has moved 8.0 m along the plane, the speed of the block has decreased to 5.2 m/s.
 - a) Find the coefficient of kinetic friction between the block and plane.
 - b) Calculate the maximum distance the block moves up the plane.