UNIVERSITY OF OTTAWA
Principles of Physics
PHY1321/1331 FALL 2014
Dr. A. Czajkowski

CLASS: PHY_____

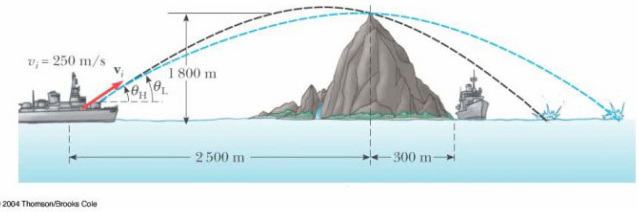
STUDENT #: _____

NAME: _____

Assignment 3: Kinematics and Forces

Assigned: Sept 19 14:30 Due: September26 18:00

1 An enemy ship is on the east side of a mountain island, as shown. The enemy ship has maneuvered to within 2 500 m of the 1 800-m-high mountain peak and can shoot projectiles with an initial speed of 250 m/s. If the western shoreline is horizontally 300 m from the peak, what are the distances from the western shore at which a ship can be safe from the bombardment of the enemy ship?



2 For each object in the table below write the Newton's II Law in component form

System	Diagram	X component	Y component
Mass M suspended on the vertical string in the elevator moving with acceleration (a) down			
Block of mass m resting on the floor of the rocket cabin accelerating up with the acceleration a			
Block of mass me is pressed against the rough vertical wall by the applied force Fa directed at angle Θ below the horizontal. Block is moving up with acceleration a			
Block of mass ma on the rough surfaced incline (α with horizontal) in equilibrium.			
Ball on a string moving in vertical circle . at its top position			

UNIVERSITY OF OTTAWA
Principles of Physics
PHY1321/1331 FALL 2014
Dr. A. Czajkowski

CLASS: PHY_____

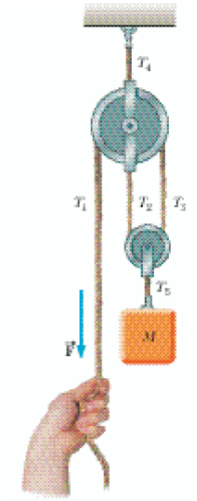
STUDENT #: _____

NAME: _____

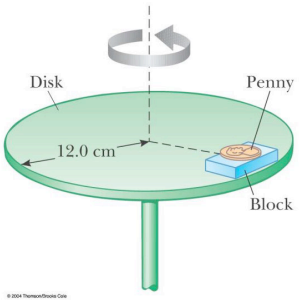
Assignment 3: Forces CONT.

Assigned: Sept 19 14:30 *Due: September 26 18:00*

3 An object of mass *M* is held in place by an applied force **F** and a pulley system as shown in Figure P5.55. The pulleys are massless and frictionless. Find (a) the tension in each section of rope, T_1, T_2, T_3, T_4, and T_5 and (b) the magnitude of **F**. *Suggestion:* Draw a free-body diagram for each pulley.



4 A penny of mass 3.10 g rests on a small 20.0-g block supported by a spinning disk. The coefficients of friction between block and disk are 0.750 (static) and 0.640 (kinetic) while those for the penny and block are 0.520 (static) and 0.450 (kinetic). What is the maximum rate of rotation in revolutions per minute that the disk can have, without the block or penny sliding on the disk?



5 A 5.00-kg block is placed on top of a 10.0-kg block (Fig. P5.44). A horizontal force of 45.0 N is applied to the 10-kg block, and the 5-kg block is tied to the wall. The coefficient of kinetic friction between all moving surfaces is 0.200. (a) Draw a free-body diagram for each block and identify the action-reaction forces between the blocks. (b) Determine the tension in the string and the magnitude of the acceleration of the 10-kg block.