

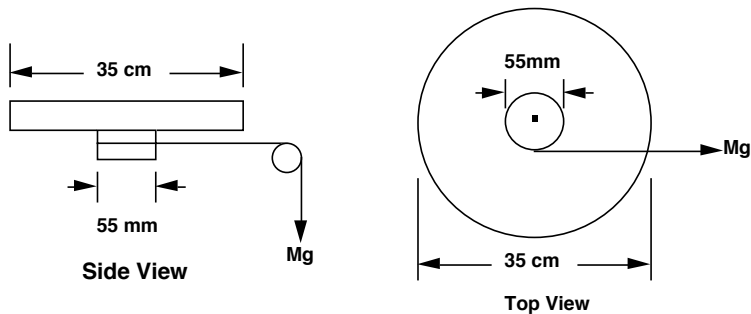
PHYS 221
Moment of Inertia
Prelab

1. What is the moment of inertia? Explain using words only. (1 pt.)

2. Draw two force diagrams for the hanging mass in this experiment. One diagram for step #2 and another for step 3. (Be sure and draw to scale. 2 pts.)

3. Compare friction compensation in this experiment to friction compensation in Newton's Second Law. See step 2 (1 pt.).

4. How much torque is applied to the apparatus in the figure below? The apparatus consists of a mass tied to a string which is wound around the axle of wheel. **The mass falls at a constant speed.** See step 2. Use $m = 5 \text{ g}$, and show all work. (1 pt.)



5. If an 20 additional grams are added to the string (for a total of 25g) on **the apparatus above** (in question #4) **it will accelerate to the floor**. The masses takes 20 seconds to fall 90 cm. Calculate the following: (5 pts)
 - a) The acceleration of the falling masses. (You should not have to be reminded, but $y = 1/2 a_y t^2$).
 - b) Angular acceleration of the axle to which the string is attached; See the figure above.
 - c) The tension in the string (see theory).
 - d) The torque applied by the falling masses. (Torque is force times radius).
 - e) The net torque applied (see step 6 of procedure).