Name: _____   Date: _____   Course: _____   Professor: _____

M25a Prelab: Rotational Equilibrium and Rotational Dynamics

Read lab instructions before answering the questions

In M25a experiment, you are going to observe Newton's Second Law for rotational motion, experimentally determine moment of inertia of a platform and of a hollow cylinder ("hoop"), and compare your experimental values with theoretical/calculated values.

It is possible that a number of students will be conducting this experiment before the material is covered in a lecture course. Since many concepts could be new for you, it is important to read your text, the lab handout, and become familiar with the concepts related to the experiment and the calculations you will be expected to do in the lab. You can also ask your lecture instructor for help, if needed.

Once you are fully prepared, answer the following questions:

PART I

1. Give the definition of a lever arm.

2. Write down the equation to calculate the torque if the magnitude of a force and the lever arm are given.

3. A ruler is suspended on a pivot point and a mass is hanging on each side of the suspension point. The system is in equilibrium. How does the torque on the right side compare to the torque on the left side?

PART II

4. In the second part of the experiment, the rotation of the system occurs because a hanging mass moves with linear acceleration **a**, and is attached to a pulley with radius **r.** Write down the equation that you will use to calculate the linear acceleration using the measured radius and angular acceleration.

5. Write down the equation you will use to calculate tension in the string using the linear acceleration **a**, mass **m**, and free-fall acceleration **g**.

6. The force that exerts the torque on the disk/hoop system is the tension applied to the string. Write down the equation to calculate this torque using the tension and the radius.