Rotational Motion

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

Moment of Inertia - Data

Theoretical Moment of Inertia

Give the formula for the theoretical value of moment of inertia of a disk.

Enter the mass and radius of the disk.

Calculate the theoretical value for the moment of inertia of the disk.

Experimental Momentum of Inertia

Complete the following table.

Table 1

Run	**A**	**B**	**C**	**D**	**E**
Pulley in use	medium	medium	large	large	large
Mass of the hanging weight (kg)					
Radius of the pulley (m)					
Average acceleration $(rad/s)^2$					
Moment of inertia of a disk ($kg \cdot m^2$ (I_{exp}))					

Conservation of Mechanical Energy - Data and Calculations

Record the letter of the run you will be evaluating in this portion of the lab.

Complete the following table for the run you chose.

Table 2

Mass of the hanging weight (kg)	M	
Initial position of the falling object (m)	y_i	
Final position of the falling object (m)	y_f	
Initial angular speed (rad/s)	ω_i	
Final angular speed (rad/s)	ω_f	
Change in potential energy (J)	$\Delta\mathrm{PE} = Mg(y_\mathrm{f} - y_\mathrm{i})$	
Change in kinetic energy (J)	$\Delta\mathrm{KE} = (1/2)I_\mathrm{theor} \cdot (\omega_\mathrm{f}^2 - \omega_\mathrm{i}^2)$	

Compare the change in kinetic energy to the change in potential energy. Is the difference between the values within 10% of each other?