Lab 3 Worksheet

CM: _____

Names: _____ , _____

Table W1. Comparison of the numerical, analytical, and experimental values for the weight position, L_{opt}, that minimizes the time it takes for the pendulum to reach the bottom of its swing.

L_{opt} (cm) by numerical simulation in Lab 2	**Analytical L_{opt} (cm) from HW 5**	**Experimental L_{opt} (cm)**

Questions:

Start a new Word document and type your answers to the following questions:

1. How do the numerical, analytical, and experimental values for the optimal weight location, L_{opt}, in Table W1 compare?

2. Describe the similarities and differences between your plotted experimental data for the average swing time, Δt, as a function of the circular weight location, $L_{\text{w,cg}}$, and your numerical simulation results from Lab 2.

3. What do you think is contributing to discrepancies in the results? Provide reasonable explanations. (Is air drag reasonable?)

Attach the following to this worksheet:

1. A printout of your plot illustrating how the pendulum's average swing time, Δt, varies with the circular weight's location (in centimeters) along the rod, $L_{\mathrm{w,cg}}$, for your experimental data and your numerical simulation results from Lab 2. Be sure to do the following:

    - Properly label your axes with units and use markers that are not connected with a line.

    - Use different markers for your experimental data and your numerical simulation results, and include a legend to clearly identify what each set of markers represents.

    - Include your initials and the date in the title of the figure, and remove the gray border around the figure.

    - Copy your plot into a Word file by selecting **Edit → Copy Figure** in the figure window and pasting the plot into your Word file.

2. A printout of your Word document containing your answers to the questions asked in this worksheet.

3. A printout of your Excel data sheet that has been **signed and dated** at the bottom.

4. A printout of your MATLAB m-file used to plot the experimental data and numerical simulation results in the same figure.