Wave Superposition

Name:_____ Date: _____

Instructor: _____

Teammates

1.- _____ 2.- _____

3.- _____ 4.- _____

Instructions: Follow the steps on this worksheet, using your lab manual as a guide, unless directed to do otherwise by your lab instructor. Show at least one sample calculation for each step. Box final mathematical results. Do not forget the units.

1 Data

1. Measure and record the mass and length of the sample string provided by your instructor.

2. Without disassembling your setup, measure and record the string length in your setup.

3. For the tension corresponding to the 150 g mass, find and record the frequencies that produce $1, 2, 3, 4, 5, 6,$ and7 antinodes. Calculate and record the wavelength, λ, and the period, T, for each frequency. Tabulate **all** of your data neatly.

4. Repeat the process in Problem 3 for the tension corresponding to the 300 g mass.

2 Analysis

1. Find the mass per unit length, μ, in kg/m of the sample string provided by your instructor.

2. Calculate the tension force (F), in N, for suspended masses of 150 g and 300 g.

3. Calculate the predicted wave velocity (v_p) for a string under tension when the suspended mass is 150 g and then for 300 g. Include the mass of the hanger in the masses and give the result in SI units.

4. Make a plot of wavelength versus period and use it to determine the velocity associated with each mass. Compare the velocities to those you calculated in Problem 3.

5. Find v_{300g}/v_{150g} for your data. What should it be theoretically?