**PH 1140 Mass-Spring Oscillator (Day 3) - Data Sheet**

**Use the following space to record spring constants complete with uncertainty (report all digits).**

**Spring 1: k1 ± σ1 = 33.16±0.06505**

**m (mass of spring 1) = 6.2 g**

**Spring 2: k2 ± σ1 = 32.81±0.1909**

**m (mass of spring 2) = 3.6 g**

**Use the following space to record times and number of full oscillations from the Part 2 measurements.**

**303 g mass: “B” = 10.43±0.0003**

**(counting ½ the spring mass)**

**403 g mass: “A” = .02176 m**

**(counting ½ the spring mass)**

**“B” = 9.044**

**Auto Fit for: Latest | Force**

**Force = A\*sin(Bt+C)+D**

**B (force)‎: 9.044 +/- 8.751E-005)**

**B (position)‎: 9.044 +/- 0.0002938**

**B‎ (velocity): 9.044 +/- 0.0005549**

**B (acceleration)‎: 9.042 +/- 0.001639**

**C‎(acceleration): 2.599 +/- 0.009417**

**C (velocity)‎: 1.016 +/- 0.003214**

**C force = 2.571 +/- 0.0005022**

**C position = 5.728+/- 0.001687**

**The uncertainty increases as it goes from force to acceleration. This is because logger pro cannot measure the acceleration. Instead, it is taking the derivative of the position plot which is not as accurate as taking direct measurements,**

**When we use the formula (on lab report) we calculated our uncertainty to be 0.02. The measured uncertainty is very very small. The reason for this discrepancy is the number of data points. When we calculated the k value, we used only 5 data points. The sine wave has infinite points which allow for a better fitting curve that has a much smaller uncertainty.**