Name: _____
PID: _____

Physics 117 Lab Practicum – SAMPLE

Date: _____ Time: _____
Instructor: _____

Instructions: *Work individually to complete each exercise to the best of your ability, show all your work, and clearly explain your answers in the spaces provided or on the back of these papers. Record all measurements in SI units and show all calculations. For items that require a numerical result, write your answer as you would for a formal lab report, including a meaningful* ***label*** *to identify a value. Your answers will be graded based on the* ***accuracy*** *of your result and proper reporting of* ***uncertainty***, ***significant figures***, *and* ***units***. *Once the lab exam begins, you are not permitted to receive any assistance from your TA or other students. However, you may use other resources such as your lab manual, graded lab reports, sample lab exam, notes, and textbook. The questions may be answered in any order, so adjust your work according to the availability of the lab equipment, and* ***do not spend more than 15 minutes at any lab exam station*** *so that every student has an equal opportunity to complete the exercises. Record your start and stop times as indicated. When you are finished using any equipment,* ***disassemble all circuits*** *and move to an empty seat to allow other students access to the equipment.*

Honor Pledge: *All work presented here is my own.* _____

1. (5 pts.) An ammeter gives a reading of 1.867 mA. How should this current measurement be reported if the user's manual for the meter specifies an accuracy rating of ± 2% for DC currents in the range of 1 mA to 2 A?

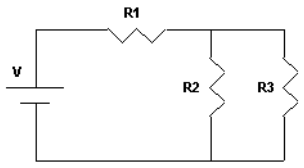
I = _____

2. (5 pts.) A student uses a protractor to measure an angle to be $\theta = 85° \pm 1°$. What should she report for $\sin\theta$?

$\sin\theta$ = _____

3. (15 pts.) Connect the following circuit and measure the current through each resistor. Verify that $I_1 = I_2 + I_3$.

V = 12.0 V
R_1 = 300 Ω
R_2 = 1000 Ω
R_3 = 500 Ω



4. (15 pts.) Determine the cold and hot resistance of a light bulb when the current is near 0 and 0.1 A, respectively. Describe the procedure you used and show your calculations.

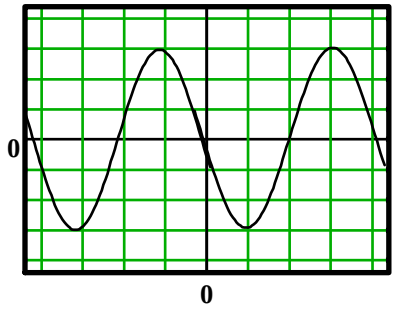
R_{cold} = _____

R_{hot} = _____

5. (5 pts.) Describe how you could estimate the time constant for a laptop power supply with an LED that fades in brightness after it is unplugged.

6. (15 pts.) Identify two resistors and connect them so that they provide the maximum and minimum possible resistance. Calculate the expected value of the total resistance and its uncertainty for each case based on the 5% tolerance rating of each resistor. Use an ohmmeter to measure and report the resistance in each case and compare with the expected values.

7. (10 pts.) An oscilloscope displays the trace below when the gain is set at 15 V/div and the sweep is set at 5 ms/div. Find the peak-to-peak voltage and frequency of the input signal. What value would be read by an AC voltmeter measuring this same signal?



8. (10 pts.) Use a function generator and oscilloscope to find the resonance frequency of an LCR circuit using the unmarked inductor and capacitor provided. Explain the procedure you used.

fo = _____

9. (10 pts.) Describe how to use a Hall probe to measure the magnetic field inside and outside of a solenoid.

10. (10 pts.) Use a HeNe laser and a ruler to find the spacing between adjacent tracks on a CD (compact disc), and describe the procedure you used.

d = _____