Phys 53600 Lab

Teaching Assistants:

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Materials Needed: Letter size empty paper for filling out the data, pen

Lab: You will be in groups of 3 or less. Read the lab before you come to lab. Each person will write in their "letter size empty paper" for data taking during lab and for post lab analysis. At the end of each lab, before you leave, have your TA put his initials at the point where you have finished or stopped all procedure/data taking. Then do the analysis/conclusion post lab. You will turn in your "lab report" at the beginning of the next lab. Please staple the "lab report."

Late Stuff: if you have finished your "lab report" including procedure, analysis, and conclusion, but have not turned in your "lab report" to your TA by the next lab you will be docked -0.1 points per day until you have delivered it. If you have not finished or missed a lab and need more time to complete it, there is a makeup lab day during the last week of class where you can make this up. If you choose to use the last week as a makeup you will be docked -1 points automatically, but the remaining 9 points are available.

Rubric: (Things we would like to see in your lab report" and if we don't you will lose points) **10 points possible per lab**

- Write only in pen. If you mess up, cross it out and continue writing
- State the equipment you are using while you use it
- Write legibly – **1 point**
- Lab Outline and Contents - Write in your lab "lab report" in this order and include the following:

1. **Title, date, and objective (1 point)** – First thing in your "lab report". Write the title of the lab at the top, put the date somewhere noticeable, and state your objective for that day.

Example:

Voltage Dividers

1-11-2017

Objective: To build a voltage divider and compare the experimental voltages across resistors with theoretical calculations.

2. **Procedure (4 points)** –In this section you will simply say exactly what you did. It is a story of what you did while you were in lab. To help explain what you were doing you can use plots, tables for data, draw circuit diagrams (always necessary), equations, derivations, etc. Be sure to label these plots, tables, figures, etc. Here you also state what equipment you used. The labs will have many different parts starting from part A section 1 to part A section 2 to …. Part B section 1 … up to however many parts and sections there are. You should specify which part and section you are on with labels. Writing too much is usually never a bad thing, but writing too little is.
Example:

Procedure

Part A.

1.

Fig.1 was built and measured using a Keithley 2612 Sourcemeter with R1 = 1kOhm and R2 = 1kOhm. For an input voltage Vin = 2V the corresponding output voltage was found to be Vout = 1.01V.
R1 = 1kOhm
R2 = 1kOhm
Vin = 2V
Vout = 1.01V

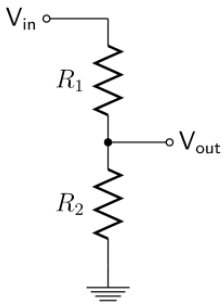

Fig. 1 – Voltage divider circuit built for part A section 1.

3. **Analysis/Discussion (3 points)** – Here is where you do the majority of your calculations. This is the section where you do the analysis that the lab instructions tell you to (or your own for fun!). Analysis can include comparisons between experiment and theory, plots of data taken, or any number crunching. Uncertainties and error propagation is important, but you need only do it if the lab tells you to, or if you see large fluctuations. You should explain what you are doing, write legibly, and box answers of interest. The analysis should also be organized by part and section (e.g. part A section 1) just like the procedure. You can use any diagrams, plots, equations, etc. to help explain yourself even if you have already put it somewhere in the lab.

Example:

Analysis
Part A
1.

According to Kirchhoff's Law, the sum of the voltage drops around a loop equals 0.
Applying Kirchhoff's Law to Fig.1
Vin – I×R1 – I×R2 = 0
gives the current as
I = Vin/(R1+R2)
Since the voltage drop across R1 is
V1 = I×R1 we have that V1 = Vin×R1/(R1+R2)
For Part A section 1 we used R1 = 1kOhm, R2 = 1kOhm, Vin = 2V, as seen on page #
Using these values, we should obtain V1 = 2×1/(1+1) = 1V as the voltage across R1. The value measured on pg# was Vout = V1 = 1.01V. This is within 1% of the theoretical value of 1V and the possible reasons for this 1% deviation are _____.

4. **Conclusion (1 point)** – Here you say what you have determined through your investigations and reiterating your analysis findings using words.
Example:

Conclusion
Part A
1.

In part A section 1 we saw that a voltage divider indeed works to divide voltage as we would like it to within 1% of the expected value. We believe the error can mainly be attributed to _____ because _____. Further experiments with different resistor values would be needed to confirm the validity of the voltage divider equation and its governing circuit.