Writing Lab Reports for 1114/1118 Labs

The lab reports for 1114 and 1118 courses consist of following sections: Headings, Purpose, Apparatus, Data, Calculations and Conclusion.

Lab reports should be written on loose paper and then stapled like an article. Follow the guideline "write with pen, draw with pencil". To respect the integrity of scientific writing, white-out and erasable pen are strictly forbidden in lab reports. We reserve the right to run an eraser through the whole report before marking.

Below is a description of the sections in a typical lab report. If there is more than one problems in a lab, you should finish one problem before starting the next one, but do not repeat the Headings.

Headings

At the upper left corner of the front page, write your name, your partner's name, your course and section number, desk number, and the date. Then write the title of the lab in the center.

You only need to write the Headings once, at the very beginning of the report, even if there is more than one problem in the lab. Do not write them on the top of every page.

Purpose

State the purpose of the lab. Answer the purpose in the Conclusion section.

Apparatus

List all the apparatus used along with the identifying numbers. Draw a schematic diagram of the apparatus if it can help people to understand the setup. The apparatus used in the lab but not shown in the diagram must be listed separately. The Apparatus section should be complete so that other people can reproduce your experiment.

Data

Treat data as the most valuable part of your entire report. Make sure that:

- The meaning of each piece of data is clear.
- Data must have units. The unit should be the one used by the measuring device.
- Data must have uncertainties. To learn more about determining uncertainties, please see "Measurement: Basic" (http://www.langaraphysics.com/measurementsbasic.pdf).

Group data logically, and use tables to help you organize the data.

Calculations

Here you calculate the results from the data. The steps are:

- Do any necessary unit conversions.
- Write down the symbolic equation that calculates the result from the raw data.
- Substitute the symbols with their numerical values with the units.
- Calculate the numerical result using the calculator.

If your calculator gives many digits, do not round off to sig figs yet – keep at least 5 non-zero digits. In case you use the result for further calculations, keeping the extra digits will avoid rounding errors. However, you may want to underline the last sig fig in the result to indicate that not all 5 digits are significant. Again, please see "Measurement: Basic" for the rules used to determine significant figures in calculated results.

If there is a reference value, compute the "percentage discrepancy" between your result and the reference value at the end of the Calculations:

$$\text{Percentage discrepancy} = \frac{|\text{your value} - \text{reference value}|}{\text{reference value}} \times 100\%$$

Round the percentage discrepancy to the nearest whole percent, or to 1 sig fig if it is less than 1%.

Conclusion

The Conclusion must answer the purpose of the lab. Write in full sentences, use words rather than symbols to describe the quantities. Present the final numerical result with correct sig figs and proper units. You may have to use scientific notations to show the correct sig figs, or if the numbers are very big or very small. Give the percentage discrepancy at the end of the Conclusion. For example:

"The density of metal cylinder #13 was found to be 2.80×10^3 kg/m^3, which is 4% higher than the reference density of Aluminium, 2.70×10^3 kg/m^3."

Discussion

Not all labs have Discussion section. But if there are discussion questions in the lab write-up, answer them here.

Even for labs where Discussion section is not required, you are encouraged to discuss the lab if you have extra time. One thing to discuss is whether the discrepancy between your result and the reference value is too big, or big but acceptable. This depends on how precise the measurements are. If all data have low percentage uncertainty or high precision, you should achieve a low percentage discrepancy. If not, there may be mistakes somewhere.

You can also discuss how to improve the lab. If the majority of the uncertainty comes from one measurement, you may look into how to reduce the uncertainty of that measurement. If some physical factors were ignored and that could affect the result, you can think about how to eliminate or reduce those factors.