PHYS 146 – Lab Report Checklist

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Summary of Most Important Points

Introduction:

- ☐ The purpose is given at the beginning.
- ☐ There is a short description of the theory.
- ☐ Important equations are given.

Experimental Method:

- ☐ There is a short description of the experimental set-up.
- ☐ There is a figure for the experimental set-up.
- ☐ The procedure for collecting raw data is explained in detail.

Results:

- ☐ There is a table with raw and manipulated data (or a sample of one).
- ☐ All figures are present.
- ☐ Sample calculations and error propagation work are shown.
- ☐ Final calculated results are given at the end in the proper way.
- ☐ The rules on pages 30 and 31 of the lab manual have been double-checked.

Discussion:

- ☐ There is a comparison of final results.
- ☐ The quality of the data and fit have been discussed.
- ☐ Reasonable sources of error have been proposed.
- ☐ Improvements to the experiment based on the sources of error are suggested.

Conclusion:

- ☐ All numerical values with their uncertainties are stated.
- ☐ There is a short description of the experiment and the analysis.
- ☐ The conclusion makes sense without the rest of the report.

General

- ☐ The main body of the report is 8 pages or less.
- ☐ Everything is organised in a logical order, and there is no unnecessary repetition.
- ☐ There are no typos or spelling mistakes.
- ☐ Nothing has been copied word-for-word out of the lab manual.
- ☐ Equations are numbered.
- ☐ All symbols are italicised and are appropriately uppercase or lowercase.
- ☐ Everything is written in terms of the symbols given in the Introduction section (not the f, x, n, etc. symbols that the lab manual uses in the error propagation formulae).
- ☐ All numerical results are stated properly:
  - ☐ There are uncertainties.
  - ☐ The $\pm$ symbol is used.
  - ☐ The significant figures in the uncertainties are correct.
  - ☐ The numbers of decimal places in the values are correct.
  - ☐ There are brackets around the values with their uncertainties.
  - ☐ There are units (if applicable).

Introduction

- ☐ The purpose (the main quantity you are trying to calculate) is given at the beginning.
- ☐ The purpose is not directly copied out of the lab manual.
- ☐ There is a short description of relevant theory with real-life applications.
- ☐ Important equations are given.
- ☐ There is context given for each equation.
- ☐ All symbols are defined once, and are given in the order they appear in the equations.
- ☐ Punctuation and capitalisation around the equations make sense.

Experimental Method

- ☐ Everything is written in first person active voice.
- ☐ The section starts with a short description of the experimental set-up.
- ☐ There is a figure containing a picture or descriptive diagram of the experimental set-up.
- ☐ The figure has been referenced in the description ("as shown in Figure 1").
- ☐ The figure has typed labels that are easily read.
- ☐ There is a figure caption below the figure.
- ☐ The procedure for collecting raw data is explained in detail.
- ☐ All measurements (including what tool(s) was / were used to take the measurements) are very clearly explained.
- ☐ Properties and / or model numbers of equipment have been included wherever relevant.
- ☐ There are no details of the manipulation of the raw data, including any calculations, error propagation, or linearisation of equations (these all belong in the Results section).

Results

- ☐ There is a brief statement about what data was collected, with a reference to the table that contains the data ("which are given in Table 1").
- ☐ The linerisation of the main equation is explained, if applicable.
- ☐ Important values are presented in a data table (including raw data as well as calculated values used in the graph).
- ☐ If the full data table is in the appendix, an adequate sample of the data table is given.
- ☐ The data table is not split between pages (if it must be, the headers are repeated on the second page).
- ☐ There is a table number and caption above the data table (and on the same page as the table) that explains:
  - ☐ What the data is.
  - ☐ Where uncertainties come from (or why there are none, if there are no uncertainties for certain values).
  - ☐ Any chosen conventions in the presentation of the data.
- ☐ The data table headers include:

- ☐ The name of the quantity (if it is reasonable to put a name).
- ☐ The symbol, which is italicised (or the equation).
- ☐ The power of 10 if all values in that column have the same power of 10.
- ☐ The units.
- ☐ The uncertainty in that quantity (only if there is a non-negligible uncertainty, and if that uncertainty is the same for each value in that column).

☐ If the uncertainty is different for each row in a column, the uncertainty is given in brackets in each row individually.

☐ There is a figure (which is linearised, if necessary).

☐ The graph follows all of the guidelines for a good graph:

- ☐ No title at the top.
- ☐ No gridlines.
- ☐ No excessive whitespace.
- ☐ No unnecessary decorative effects.
- ☐ No error bars if error bars are not appropriate.
- ☐ Descriptive axis titles (similar to data table headers) with simplified and correct units.

☐ There is a figure caption under the figure that explains:

- ☐ What the graph is a plot of.
- ☐ Where the data comes from (reference your data table by number).
- ☐ The value of the slope and y-intercept of the trend line (written in the proper notation and with units).
- ☐ Any interesting features (outliers, odd behaviour, etc.).

☐ There is a sentence introducing each data table and figure, and all data tables and figures have been referenced by number in the main body text at least once.

☐ Sample calculations and error propagation work are shown.

☐ All uncertainties have one significant digit.

☐ All numbers of decimal places match the number of decimal places of the uncertainties in those values.

☐ All numbers have units (if applicable).

☐ The rules on pages 30 and 31 of the lab manual have been double-checked.

☐ The rules on pages 30 and 31 of the lab manual have been triple-checked.

Discussion

- ☐ All graphs and final values are commented on.
- ☐ There is a statement about whether final results agree with each other within error or with a value from the literature within error.
- ☐ All values have uncertainties and units, are quoted according to the rules, and are written with the proper notation.
- ☐ The quality of the fit is discussed.
- ☐ If outliers or odd trends in the data (oscillations, etc.) are present in graphs, they are discussed.
- ☐ If a value was recalculated after removing outliers, the new value is given in full and quantitatively compared to the old value.
- ☐ Reasonable sources of error have been proposed.
- ☐ Human error is not suggested as a source of error.
- ☐ The way in which these sources of error would have affected the data and final results is clearly explained.
- ☐ Improvements to the experiment based on the sources of error are suggested.
- ☐ All questions from the lab manual have been answered if there are any.

Conclusion

- ☐ All numerical results (both experimental and theoretical) are stated properly.
- ☐ There are no claims that anything was proved.
- ☐ There is a short description of the experiment and the analysis.
- ☐ The conclusion makes sense without the rest of the report.

References

- ☐ All references have been written out in full (for example, in APA style).
- ☐ References that take up more than one line use hanging indentation.
- ☐ References have been numbered in the order they appear in the report so that their use can easily be found in the rest of the report.
- ☐ Each reference is referenced in the main body of the report with the use of square brackets ([1] for the first reference, for example).

Acknowledgements

- ☐ If there are no acknowledgements to make, "No acknowledgements" has been written.
- ☐ All appropriate acknowledgements are present.
- ☐ Names of people are given.
- ☐ The role each person played is given.

Appendix

- ☐ The contents of the appendix are allowed to go in an appendix.
- ☐ The contents are appropriately separated into multiple appendices (A, B, C, etc.) if needed.
- ☐ Each appendix is referred to in the main body of the report.