Formal Lab Checklist:

Abstract (10 points)

- If I read only the abstract I can tell what you did in the experiment.
- If I read only the abstract I know what your primary result was.
- The abstract is straightforward, clear and easy to read.
- The abstract contains no errors.
- The abstract was concise – not too wordy.
- The abstract contains no "extra" information or "filler."

Introduction (10 points)

- The introduction includes a history of the report topic.
- The introduction includes a discussion on how this topic is used today
- The introduction explains the purpose of this experiment and how it fits with the topic as a whole.
- The introduction is straightforward, clear and easy to read.
- The introduction includes appropriate references
- The introduction is original, not copied or slightly modified from an Internet source, other student paper or the lab manual.

Procedure (10 points)

- Written in 1st or 3rd person, not telling someone what to do, but describing what was done.
- Not a bulleted list of the steps taken.
- The narrative is NOT taken directly from the lab manual or any other source.
- Straightforward, clear, concise narrative of the procedure appropriate for a physics student to understand and/or replicate the experiment.
- All equipment and software used is named with part numbers and/or references.
- Appropriate figure or photograph is used and has an appropriate caption (If copied from the internet there is a link to the source).
- Not too wordy or repetitive.

Data (20 points)

- The data has been collected in a way that is consistent with correct and careful use of the equipment.
- Data presented correctly, choose ONE:
    - Data tables labeled with units.
    - Graph should have a caption which tells us the units and when the data means. If there is a fit line/curve the caption should tells us what the fit parameters are and what they mean.
- All measurements should be listed with uncertainties (if in table form) or with error bars (if in graphical form).
- Some words are used to explain the data and the graph/table. Do not just leave the graph/table by itself in this section.

Analysis (20 points)

- A straightforward, clear, concise description of your calculations is included.
  - All elements requested in the lab write-up should be addressed.
- Any calculations that you perform should include propagation of uncertainty.
- Your results are compared to some standard, depending on the nature of the experiment you will do one of the following:
  - Compare calculations from a model to experimental data.
  - Compare your measured values to accepted values.
  - Compare two measured values to each other.

Summary (10 Points)

- Recap and interpretation of your most important results.
- Sources of error/uncertainty:
  - If your prediction "agreed with" expectations:
    - Which of the measured quantities had the largest contribution to your uncertainty? [This is not hypothetical; you have real numbers to compare here.]
    - How could those things be measured with more precision in order to reduce your uncertainty? [Imagine you had more time or more money to do a better version of this experiment. Give realistic suggestions, not "create a perfectly frictionless environment."]
  - If your prediction did not agree with your expectations:
    - Are there assumptions in your model that are not consistent with the experimental conditions? Could these assumptions have caused the model to disagree with the experiment? If so, how?
    - Looking back, is it possible that some measurements were made incorrectly? Which ones? How would you do it differently if you re-did the experiment?
    - Looking back, did you underestimate the uncertainty in any of your measurement? Which ones? How would changing that assumption change your results?
    - Is it possible that you have discovered "new physics;" a situation where the accepted laws of physics disagree with experiment?
- Suggestions for improvement:
  - Are there extensions to the experiment that would make it more interesting?
  - Are there better techniques available for measuring the various parameters?
  - Are there models we could use which are more realistic?
  - Other ideas?

Overall/Communication (20 points)

- Grammar, spelling, and punctuation are correct.
- The communication style of the paper is appropriate for scientific communication
  - Concise, simple language. Simple sentence structure. The idea is to be clear and direct not to impress an English professor.
- The formatting is correct – following the provided template.
- The file format is correct (pdf)