[Lab Title]

[Student Name]
Physics 1310L Section [XX]
Instructor: [Name]
Team Members: [Names]
Date: [MM/DD/YYYY]

1 Introduction

[*5 points*] This section should provide background information to help readers understand the lab's purpose and context. Ensure you address these key aspects. 1) Describe what the lab is about; 2) Explain the goals; 3) Introduce the relevant physics for the experiment, summarized in a few sentences.

Overall, the lab report is graded on a 100-point scale, with each section contributing an specific number of points. To earn section points, you must comply with specific requirements. For simplicity, section points are assigned as a percentage of their total.

For example, the introduction is worth 5 points, with points awarded based on how well you meet section requirements.

(90–100)% –No issues found. (80–89)% –Misses a key aspect; (60–79)% –Misses more than one key aspect; (0–59)% –The introduction is missing.

If you score 85% in this section, you earn $(85/100) \times 5 = 4.25$ points.

The detailed rubric is available on the lab CANVAS page. Be sure to look at and understand this grading rubric.

The lab report must include all required sections, which may have subsections. For example, the following subsections are introduced here to clarify the report presentation details and unit usage.

1.1 Presentation

[*10 points*] The presentation of the report is important, and it is graded separately. A well-presented report must be easy to read and understand. The key aspects prioritized for grading are the following.

1) The report is written in paragraph style with a consistent tense, in complete sentences, with proper grammar, punctuation, and spelling. The document's layout makes the report easy to read.
2) Equations are part of complete sentences and follow grammar rules. Those that are referenced in the text should be set off from the text, numbered consecutively and with their numbers aligned to the right margin.
3) Tables and figures are used to present and summarize data, including raw data.
4) Tables must be numbered and must have headers with appropriate units.
5) Figures must be numbered and include a descriptive caption with enough information to interpret the plot. The plot's axes must be descriptive and show appropriate units.
6) The report must acknowledge any help received and cite any external sources used in its preparation.

The presentation is graded as follows:

(90–100)% –No issues found. (80–89)% –Misses a key aspect; (60–79)% –Misses more than one key aspect; (0–59)% –The report presentation makes the report difficult to read or understand.

1.1.1 Units

[*15 points*] The use of units is so important for science communication that we check them throughout the report, and they are also graded on their own. It is expected that all quantities that require units are written with SI units. Also, the table headers and plot axes must show appropriate units. Points for units are assigned as follows.

(90–100)% –No issues found. (80–89)% –One or two missing units; (60–79)% –Multiple missing units; (0–59)% –minimal use or no units.

2 Methods

[*10 points*] This section must include a brief description of the experiment and its procedures, along with sketches of the experiment.

(90–100)% –No issues found. (80–89)% –A Key aspect or a sketch of the experiment is

missing; (60–79)% –Multiple aspects of the lab are missing.(0–59)% –the Methods section is missing.

3 Data

[*15 points*] In this section, tables and figures are used to present and summarize your data. All quantities that require units must be written with SI units. In general, you should include all your data here, but if the dataset is extensive, you may include only a sample and refer the reader to the full dataset. Your raw data sheet must be included as an appendix, and you must refer to it in this section.

(90–100)% –No issues found. (80–89)% –Missing some data; (60–79)% –Missing most data; (0–59)% –The Data section is missing.

Table 1 shows an example of raw measurements collected during the experiment.

Table 1: Raw measurements collected in this experiment. Note that the units for mass are SI even though the raw data were collected in grams (a non-SI unit).

Trial	mass (kg)	acceleration (ms^{-2})
1.	20	2
2.	21	2.5
3.	23	3

4 Analysis and Results

[*30 points*] The purpose of the analysis section is to explain to the reader how the results are obtained from the raw data. The analysis section must cover the following key aspects.

1) Describes, in paragraph style, how the results are obtained from the raw data. 2) Includes sample calculations for the equations used to obtain the results. 3) The results are consistent with the data collected. 4) Answers the questions asked in the lab manual (if any). 5) It includes all required plots.

(90–100)% –No issues found. (80–89)% –Missing at most two key aspects; (60–79)% –Missing more than two key aspects; (0–59)% –The Analysis sectionis missing.

Here is an example of how to include an equation in the analysis.

The forces shown in Table 2 are obtained using Newton's second law,

$$F = ma, \tag{1}$$

where m and a are the mass and acceleration of the cart on the air track.

Sample calculation using equation (1), and data for trial 1 in Table 1
$F = (20 \times 10^{-3}\,\text{kg})(2\,\text{ms}^{-2}) = 4 \times 10^{-2}\,\text{N}$.

Table 2: Calculated forces using equation (1), using data from Table 1

Trial	Force (N)
1.	0.04N
2.	0.0525 N
3.	0.069 N

Figure 1 shows a representative plot of the force v.s. acceleration.

In general, questions in the lab manual are considered part of the analysis and must be answered in this section.

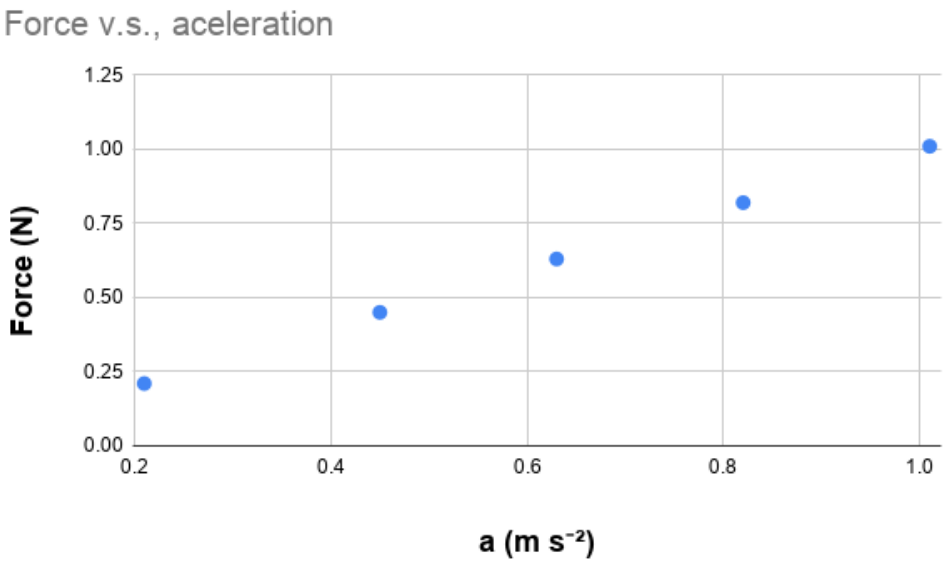

Figure 1: Example graph showing Force v.s. acceleration. The force is shown on the vertical axes in newtons, while the acceleration in ms^{-2} is shown on the horizontal axis.

5 Discussion and Conclusions

[*10 points*] Being as specific as possible, restate the lab goals and discuss them in light of your results. Show objective (numerical) evaluations of whether the results match the expectations and goals of the experiment. Avoiding broad generalizations, guide your conclusions by thinking about these questions: Are theoretical predictions capturing the essence of the phenomena? What idealizations were made that might not be reasonable?

The discussion must at least show how the experiment's goals are reflected in the results.

(90–100)% –No issues found. (80–89)% –One result in not discussed; (60–79)% –more than one result is not discussed; (0–59)% –This section is missing.

Acknowledgments

[*This section is graded as part of the presentation.*] The report must acknowledge any help received and cite any external sources used in its preparation.

Here is an example:

We would like to thank the team of instructors for their comments that helped improve this document. In particular, we would like to thank Roy Reger for providing the first draft.

Appendix

[*5 points*] The raw data sheet must be attached as an appendix to the lab report. It must include the following key pieces of information. Complete data set, experiment's date, team members, and instructor's signature. A reproduction of the full or a subset of the raw data is expected in the main text in the Data section. The raw data must be used in the calculations.

(90–100)% –No issues found. (80–89)% –The data set is complete, but may have missed a piece of information; (60–79)% –The data set is incomplete; (0–59)% –The raw data sheet is missing.