Coursework Assessment Specification PHB903: Technical report

Notes:

1. The final grade will be allocated according to distribution of grades as indicated in the matrix together with academic judgment (this is necessary as both Outstanding and Fail span disproportionate percentages when compared to the other grade boundaries).
2. Each 'section' carries approximately equal weight.
3. Grades in the table should be considered cumulative – that is it is not possible to achieve a good without also exceeding the outcomes satisfactory first.

ILO		Fail <30%	30-40% Requires improvement	40-50% Threshold	50-60% Satisfactory	60-70% Good	70-80% Excellent	>80% Outstanding
3.2	Introduction - aims	No experimental aims	Stated project goal taken from experimental brief.	Project goal broken down into multiple aims (as appropriate for project), related to broader context.	Logical progression from background/theory to experimental aims.	Broad hypotheses stated with reference to theory/literature. These might be general expected trends. Importance/relevance of aims well justified.	Demonstrates curiosity and creativity when defining aims. Testability of hypotheses is considered with reference to literature. The project aims are linked with the experimental design with reference to the state-of-the-art techniques.	Aims demonstrate exceptional creativity and originality, having arisen from independent research into contemporary literature.
1.2	Introduction / background	Not evident	Only a brief and superficial introduction Mostly copied from the lab script without any attempt to refer to the literature. Incomplete theory and/or mostly wrong.	Basic background context provided for project. Key physical concepts are explained correctly. Does not extend beyond lab brief.	Physical concepts are discussed in detail, with equations and figures used if appropriate. May show a lack of focus on essential areas. Does not extend beyond suggested reading, or only to inappropriate sources. If present, only non-static sources (e.g. websites) used. Physics is presented without errors but may only be accessible to an informed reader.	Demonstration of breadth and depth of knowledge. Detailed but curated background on more than one aspect of project e.g., physics theory, broader context, methodological approaches, materials/devices. Relevant use of independently sourced references, justifying why the experiment is conducted.	Demonstrates sophisticated understanding when discussing subject background. This may entail a critical evaluation of sources, identifying trends in literature, links to other areas of physics or applications. Discusses real-world application/implementation of project or links to other areas of work.	Demonstrates extensive independent engagement with surrounding literature. Critical insight used to draw out novel ideas. Cited resources are of contextual value

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1.1 3.2	Method	Method not present, unclear, or simply repeats lab brief.	Description is not sufficient for experiment to be reproduced. Insufficient description of methods or limited to only some of the measurements taken. Does not consider experimental error or limitation of experimental design.	Method is described such that it could be reproduced with some reverse engineering. Method is broadly appropriate. May not be presented in the most logical order.	Methodology description is clear but may be unnecessarily verbose. Diagrams provided where relevant. Method is such that all aims of experiment can be met. Omissions are minor I.e. may not provide complete list of kit used for the experiment.	Clear, accurate, concise method linked to literature. All necessary part numbers or component values are provided. Method includes appropriate techniques to ensure high quality data. Diagrams/images of setups are presented clearly with appropriate annotation.	Differences and similarities to methods in the literature are drawn out and critically discussed. Unusual or surprising design choices are well justified. Control and/or analysis code provided in full either in appendices or version-controlled repository. This is written such that an unfamiliar person would be able to use it.	Style and content of method would make it suitable for publication. Methodological choices demonstrate creative problem-solving. Demonstrates awareness of limitations in the experimental setup and includes a discussion of how these might influence results.
2.1 3.1 3.2 3.3	Results – data quality	No data presented, or data presentation so poor that it cannot be evaluated.	Poor progress towards aims Presented data may indicate fundamental misconception or lack of evaluation, e.g. a speed greater than *c*	Progress towards aims is limited. Presented data may indicate minor misconception or lack of evaluation Where appropriate, experimental repeats are used to improve accuracy.	Correct data presented logically and clearly. High-quality data sufficient to make conclusions about the experiment. (e.g., choice of appropriate ranges for voltage, current, illumination or other variables). Correct experimental errors stated, and data is presented to an appropriate precision for these. Anomalous data points are noted.	Progress towards aims indicates good use of lab time. Spread of data is inline with reported experimental errors or discussed if not. Appropriate explanation is offered for anomalous readings.	Progress towards aims indicates excellent use of lab time. Time used efficiently to maximise results e.g. thoughtful choice of data points and ranges.	Lab time has been used exceptionally well, e.g. evidence of automation.

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3.2 3.3	Results – data presentation	Data presentation missing or very poor	Data is presented but may be unreadable or unexplained	Data is plotted correctly with appropriate use of scales and without large empty spaces in the graph. May include more data or figures than appropriate or necessary	Data is presented appropriately for the type of data without common errors (such as connecting data points, fitting models without justification) All necessary features are present; figure captions, legends, axis labels. Graphs are sized appropriately but individual points or labels may be unreadable.	All graph elements are legible if the report was to be printed on A4 paper. Graphs are thoughtfully constructed e.g., sensible ranges, clear distinction between data sets. Error bars are presented where appropriate. Graphs are properly referenced in text. Figure captions would allow graphs to stand alone.	Graphs are high quality. Decisions have been made, such as combining data sets on a single graph to ensure good data density without clutter. Additional features such as labels used as appropriate. Shows creativity in data presentation. Data transformed into meaningful plots that can be later used for curve fitting procedure.	All relevant measurements are presented. Publication quality plots with appropriate axes label, font size, data symbols, figure captions and legends.
2.1 3.2 3.3	Results – data analysis	No analysis, or analysis incorrectly applied.	Attempts to follow the analysis described in the lab brief with some success. Realistic estimates of error are stated for recorded values.	Analysis described in brief is performed with only minor errors. Standard errors are carried through to derived quantities.	Analysis described in lab brief performed without errors e.g., with consideration of what range to fit, goodness of fits judged qualitatively	Goodness of fits assessed with appropriate metrics (e.g., R^2), and the impact on results discussed. Errors are provided for all fitted and derived values, with results stated to an appropriate number of significant figures based on these.	Analysis performed extends substantially beyond that described in the brief e.g., synthesising additional information, interrogation of anomalous or unexpected results, comparison of models. Additional insight beyond the lab-script provided based on own observation.	Analysis demonstrates exceptional curiosity and originality. May make used of independently identified analysis techniques. All data is analysed to compare theoretical expectations using formulae beyond those in the lab script or draws inspiration from the scientific literature.
2.1 3.2	Discussion – analysis	No discussion.	Results are compared to expected/literature values.	Results compared to expected values with consideration of measurement errors.	General trends in data discussed and linked to theory. Possible reasons for deviations from expected values are provided.	Potential reasons for deviation from expected values discussed in depth. Arguments are coherent with a solid grounding in the physics of the experiment reported. Literature references are well integrated. Any assumptions made in analysis are justified.	Discussion is logical and concise, synthesising information from experimental results and a range of literature thoughtfully. Demonstrates sophisticated interpretation of experimental results. Discussion of potential impact of design choices on collected data or calculated results.	Analysis is of a publishable quality.

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1.2 3.2	Discussion - evaluation	No discussion.	Results are linked to broader implications/wider context of the work.	Limitations in experimental design are discussed.	Limitations in technique are followed up with appropriate suggestions for improvement – these are specific and actionable e.g., not solely 'better equipment.'	Describes extension work that follows logically from the results presented with reference to literature and wider context.	Alternative or extension experimental techniques or approaches are evaluated critically with consideration of cost (not necessarily financial) vs predicted benefits. Descriptions are eloquent and conclusions well argued. Ideas are conveyed in a transparent and clear fashion.	Discussion shows exceptional creativity, originality, or insight informed by in-depth understanding of subject area.
1.2 2.1 3.2	Conclusion	No conclusion or a conclusion that is at odds with the presented data.	A poor conclusion. May simply restate results or make some unsupported statements.	Results are considered in relation to experimental aims. May make some statements that are insufficiently supported by evidence.	Conclusion successfully links aims and hypotheses to experimental results. Conclusions drawn are supported by evidence. May introduce new findings or be inappropriately verbose.	Concisely presents key findings and their relevance to research objectives. Discusses significance of findings using errors or uncertainties. If appropriate, makes evidence-based recommendations.	Conclusion synthesises all key information contained in the report efficiently and effectively. References broader implications of the experimental work considering the quality of data collected and links to other real-world applications.	Conclusion is of a publishable quality.