**Fortrose Academy**

**Physics Dept**

**National 5**

**Assignment**

**Instructions for candidates**

**This is the only “help” document you are allowed in the Write up / examination room.**

**Instructions for candidates**

These instructions apply to the assignment for National 5 Physics.

This assignment is worth 20 marks. The marks contribute 20% of the overall marks for the course assessment.

It assesses the following skills, knowledge and understanding:

 applying knowledge of physics to new situations, interpreting information and solving problems

 planning, designing and safely carrying out experiments/practical investigations to test given hypotheses or to illustrate particular effects

 selecting information from a variety of sources

 presenting information appropriately in a variety of forms

 processing the information (using calculations and units, where appropriate)

 making predictions based on evidence/information

 drawing valid conclusions and giving explanations supported by evidence/justification

 suggesting improvements to experiments/practical investigations

 communicating findings/information

Your teacher or lecturer will tell you how the assignment will be carried out and any required conditions for doing it.

In this assignment you have to investigate a topic in physics by doing research.

Your research involves gathering data/information from an experiment and from internet/literature sources.

You then produce a report on your investigation.

Your report is not marked at any point by your teacher or lecturer. It is sent to SQA for marking.

Your assignment has two stages:

 research

 report

**Research stage**

**Choosing your topic**

 You need to choose a relevant topic in physics to investigate.

 Your topic must be agreed with your teacher or lecturer.

**Deciding your aim**

 Once you have chosen your topic you need to decide what the aim of your investigation is. Remember that you need to do an experiment **and** try to find data/information to compare with your experimental results.

 Your teacher or lecturer will provide advice on the suitability of your aim.

**Experimental research**

 When choosing your experiment, remember it must allow measurements to be taken.

 When carrying out your experiment, you must either work on your own or as part of a small group. If you are working as part of a small group, you must take an active part.

 Make sure you take measurements over a wide enough range to meet the aim of your investigation.

 You should repeat measurements, if possible.

 You will use your raw experimental data during the report stage.

**Internet/literature research**

 You need to find data/information from the internet, books and/or journals that you can compare to your experimental data. This could be a table or a graph, or information from diagrams or text.

 It is important that you record where you get your data/information from in enough detail that another person could find it. This is known as a reference.

 In your report you need to explain, in your own words, the physics relevant to your aim. You can gather information using the internet, books and/or journals.

**Report stage**

**Producing the report**

 The report must be all your own work.

 When producing your report, you are supervised by your teacher or lecturer at all times.

 You have 1 hour and 30 minutes to complete your report.

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| **Resources**   |  |  | | --- | --- | | **In the report stage, the only materials you are allowed to have are:** | **In the report stage, you cannot have a previously prepared:** | |  these instructions for candidates   information you have gathered from the internet, books and/or journals to help you explain the physics relevant to your aim   the experimental method   your raw experimental data   your internet or literature data/information, including the reference to the source of the data/information |  draft of your report   draft of your explanation of physics relevant to your aim   specimen calculation or set of calculations for mean or derived values   graph   comparison of data   conclusion   evaluation of your experimental procedure | |  |

Your teacher or lecturer cannot provide you with feedback or tell you how to improve your report.

**Guidance on producing your report**

Your report must be easy to follow.

You may find that using headings will help to make your report clear.

**Title**

 Your title must tell the reader what your report is about.

**Aim**

 Your aim must describe clearly the purpose of your investigation.

**Underlying physics**

 You must explain the physics relevant to your aim.

 You must use your own words as much as possible.

 You may choose to include:

— relationships or equations

— definitions of symbols used

— explanations or justifications of relationships or equations

— explanations of physical properties

— copies of diagrams which you would find difficult to draw

 You can quote from sources as long as you give a description or explanation showing that you understand the physics.

 Do not include a passage copied directly from a source. This would not show that you understand the physics.

**Description of experiment**

 You must give only a **brief** description of the experiment you carried out.

 You must show that you can summarise your experimental method and must not give a full description.

**Experimental data**

 You must include a table showing **all** of the measurements you recorded in your experiment.

 Make sure you include column headings and units.

 You must use the data from your table to carry out calculations.

 If you have repeated measurements, you should calculate average values. These can be included in your table of results.

 If you’ve used the results from your experiment to determine further values, you should show at least one sample calculation.

**Graphical presentation**

 You must produce a graph of your experimental results.

 The graph must:

— be a scatter graph, line graph or a bar graph, whichever is appropriate for your data

— be large enough to allow points to be read accurately

— have suitable scales, labels and units on the axes

 You must use graph paper or a computer graphing package.

 If you are using a computer graphing package, include both major and minor gridlines, and use plotting symbols which are clear but not too large.

 If you are plotting a scatter graph, a line or curve of best fit should usually be drawn. However, if there is no obvious pattern to your plotted data points, you should not try to draw a line or curve of best fit.

**Data/information from an internet/literature source**

 You must include data/information obtained from an internet/literature source that you can compare with the data from your experiment.

 You must include a reference to this source of data/information, which would allow another person to find it. For example:

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| --- | --- |
| **Source** | **Reference** |
| Website | full URL for the page or pages |
| Journal | title, author, journal title, volume and page number |
| Book | title, author, page number and either edition or ISBN |

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| **Analysis**   You must compare your experimental data with the data/information from your internet/literature source.  **Conclusion**   You must state a conclusion which relates to your aim. The conclusion must be based on the data in your report.  **Evaluation**   You must identify a factor in your experiment which had a significant effect on the reliability, accuracy or precision of your experiment.   You must then explain either:  — what you did or could have done to minimise the effect of this factor  or  — how you know this factor had a significant effect. |  |

**Summary**

You can use this table to check you have covered all sections in your report.

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| --- | --- | --- |
| **Section** | **Description** | **Marks** |
| Title | The report has an informative title. | 1 |
| Aim | A description of the purpose of your investigation. | 1 |
| Underlying physics | A description of the physics relevant to your aim, which shows your understanding. | 3 |
| Data collection and handling | A brief description of your experimental method. | 1 |
|  | Sufficient data from your experiment. | 1 |
|  | Data from your experiment presented in a table with headings and units. | 1 |
|  | Values correctly calculated from your experimental data. | 1 |
|  | Data/information from an internet/literature source. | 1 |
|  | A reference for the internet/literature source. | 1 |
| Graphical presentation | Appropriate type of graph used to present your experimental data. | 1 |
|  | Suitable scales. | 1 |
|  | Suitable labels and units on axes. | 1 |
|  | All data plotted accurately, with line or curve of best fit if appropriate. | 1 |
| Analysis | Experimental data compared to data/information from internet/literature source. | 1 |
| Conclusion | A conclusion relating to your aim, based on data in your report. | 1 |
| Evaluation | Identification of a factor affecting the reliability, accuracy or precision of your experiment **and** a related explanation. | 2 |
| Structure | A report which can be easily followed. | 1 |
|  | **Total** | **20** |

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| Once complete, your report should be given to your teacher or lecturer for submission to SQA. |  | |  |
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