Higher
Coursework
Assessment Task

Higher Physics- Candidate Information

Assignment

Assessment task

This document has been saved with the **Instructions to Candidate Guide only.** **It covers** the coursework component of this course in terms of the skills, knowledge and understanding that are assessed.

Valid from session 2018-19 and until further notice.

This edition: May 2018 (version 1.0)

Introduction

This document contains instructions for candidates for the Higher Physics assignment.

This assignment is worth 20 marks (scaled to 30). This contributes 20% to the overall marks for the course assessment.

Instructions for candidates

This assessment applies to the assignment for Higher Physics.

This assignment is worth 20 marks. This contributes 20% to the overall marks for the course assessment.

It assesses the following skills, knowledge and understanding:

- applying physics knowledge to new situations, interpreting information and solving problems
- planning and designing experiments/practical investigations to test given hypotheses or to illustrate particular effects
- recording detailed observations and collecting data from experiments/practical investigations
- selecting information from a variety of sources
- presenting information appropriately in a variety of forms
- processing information (using calculations, significant figures and units, where appropriate)
- drawing valid conclusions and giving explanations supported by evidence/justification
- quantifying sources of uncertainty
- evaluating experiments/practical investigations and suggesting improvements
- communicating findings/information effectively

Your assignment has two stages:

- research
- report

Your teacher or lecturer will let you know if there are any specific conditions for doing this assessment, and tell you how the assignment will be carried out.

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

Your research involves gathering data **either** from one experiment and an internet/literature source, **or** from two experiments**.**

In addition, you may gather extracts about the underlying physics from internet/literature sources.

You then produce a report on your investigation.

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

Research stage

Choosing your topic

- You need to choose a relevant topic in physics to investigate.
- You must agree your topic 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 carry out and collect data from one experiment and find data from internet/literature source(s) which is relevant to your experimental data.

  Or

  - — you need to carry out and collect data from two experiments related to your aim.
- Your teacher or lecturer will provide advice on the suitability of your aim.

Experimental research

- When choosing your experiment(s), remember that it/they must allow measurements to be taken.
- When carrying out your experiment(s), you must work either 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 a sufficient number of measurements over a wide enough range to meet the aim of your investigation.
- You must repeat measurements.
- You must estimate the scale reading uncertainty in all the measurements you make.
- You will use your raw experimental data during the report stage.

Internet/literature research

- If you have gathered experimental data from a single experiment, you need to find data from websites, books and/or journals that is relevant to your experimental data. This could be a table or a graph, or data from diagrams or text.
- In your report, you will need to describe the physics relevant to your aim. You can gather extracts from websites, books and/or journals to help you write your description of the underlying physics. During the report stage you will need to show your understanding by writing this description using your own words.
- It is important that you record where you get your data or extracts from in enough detail that another person could find it. This is known as a reference.

Report stage

Producing the report

- The report must be all your own work.
- When producing your report, you will be supervised at all times.
- You have 2 hours to complete your report.

Resources

During the report stage you are only allowed to have certain materials.

You can have:	You cannot have a previously prepared:
♦ these instructions for candidates ♦ extracts you have gathered from websites, books and/or journals to help you describe the physics relevant to your aim ♦ the experimental method(s) ♦ your raw experimental data ♦ data from websites, books and/or journals that is relevant to your experimental data, if you have data from **a single** experiment ♦ the references to the sources of data or extracts	♦ draft of your report ♦ draft of your description of physics relevant to your aim ♦ specimen calculation or set of calculations for mean or derived values ♦ specimen calculation or set of calculations for uncertainties ♦ graph ♦ analysis of data ♦ conclusion ♦ evaluation

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 describe 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(s)

- You must give only a **brief** description of the experiment you carried out.
- If you carried out two experiments, you should give a brief description of both. You will be awarded the mark if one of the two descriptions is acceptable.
- You must show that you can summarise your experimental method(s) and must not give a full description.
- Your description must include the measuring instruments you used, although you don't need to give details of the range of measurements or the number of repeats.

Experimental data

- You must include a table showing **all** of the measurements you recorded in your experiment.
- If you carried out two experiments, you should include a table of measurements from each experiment. You will be awarded the mark if one of the two tables is acceptable.
- Make sure you include column headings and units.
- You must calculate mean values for your repeated measurements. These must be included in your table.
- Any derived values needed for graphing must be included in your table.

Graphical presentation

- You must produce a scatter graph of your experimental data.
- If you carried out two experiments, you should include scatter graphs of your data from both experiments. In this case, both graphs will be marked, and you will be awarded the mark for the better of your graphs.
- You must use graph paper or graphing software. If you are using graphing software, include both major and minor gridlines, and use plotting symbols which are clear but not too large.
- 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.
- The graph(s) must be large enough to allow points to be read accurately and have suitable scales. It/they must also have labels and units on the axes.

Uncertainties

- You must include scale reading uncertainties for **all** the measurements you have made in your experiment, and calculate the random uncertainty in your repeated measurements.
- If you carried out two experiments, you should include the uncertainties in the measurements from both experiments. Both sets of uncertainties will be marked, and you will be awarded the mark for the better set.

Data from an internet/literature source or second experiment

- If you carried out a single experiment, you must include data from an internet/literature source that is relevant to your experimental data.
- If you carried out two experiments, you must include the data from your second experiment.

Citation and reference for a source of data/information from the internet/literature

- You must include a reference to a source of data/information.
  - — If you carried out a single experiment, your reference must be to the source of data obtained from the internet/literature which is relevant to your experimental data.
  - — If you carried out two experiments, your reference must be to a source of information gathered to support your description of the underlying physics.
- You must cite the internet/literature source within the body of the report, near to the relevant data/information, with the reference listed later in the report.
  - — If you carried out a single experiment and have included data from an internet/literature source in your report, you must cite this source next to the data.
  - — If you carried out two experiments, you must cite your source(s) of the information that supports your description of the underlying physics. This must be cited next to the information.

— You can cite a source in many ways. One way is to put a number, for example (1), next to the data/information and the same number beside the reference included later in the report.

- You must include the following information in the reference:

Source	Reference
Website	full URL for the page or pages, with date accessed
Journal	title, author, journal title, volume and page number
Book	title, author, page number and either edition or ISBN

Analysis

You must include a discussion of the data from your experiment. In physics this usually involves the calculation of a gradient, the calculation of a constant and/or the calculation of an absolute uncertainty in a final value. If you carried out two experiments, you should include an analysis of both experiments. Both analyses will be marked, and you will be awarded the mark for the better analysis.

Conclusion

You must state a conclusion that relates to your aim **and** is supported by **all** the data included in your report.

Evaluation

You must make three statements, supported by justification, which evaluate the data/information you have included.

The statements can relate to

- your experimental procedures
- your results
- your uncertainties
- data from your internet/literature source

Two or three of the statements can evaluate your experiment(s). No more than one of your statements can evaluate **data** from your internet/literature source.

Summary

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

Section	Description	Marks
Title and structure	An informative title and a structure that can easily be followed.	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 an approach used to collect experimental data.	1
	Sufficient raw data from your experiment.	1
	Data from your experiment, including any mean and/or other derived values, presented in a table with headings and units.	1
	Numerical or graphical data relevant to your experiment obtained from an internet/literature source, **or** raw data relevant to your aim obtained from your second experiment.	1
	A citation for an internet/literature source and the reference listed later in the report.	1
Graphical presentation	The axes have suitable scales.	1
	Suitable labels and units on the axes.	1
	All data points plotted accurately and, where appropriate, line or curve of best fit drawn.	1
Uncertainties	Scale reading uncertainties shown for all measurements and random uncertainty in measurements calculated.	2
Analysis	Discussion of experimental data.	1
Conclusion	A conclusion relating to your aim based on all the data in your report.	1
Evaluation	Three evaluative statements supported by justifications.	3
Total		**20**

Once complete, give your report to your teacher or lecturer to submit to SQA.

Administrative information

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History of changes

Version	Description of change	Date

Note: you are advised to check SQA's website to ensure you are using the most up-to-date version of this document.

Security and confidentiality

This document can be used by SQA approved centres for the assessment of National Courses and not for any other purpose.