Course report 2026

Advanced Higher Physics, SCQF level 7

We've written this report for teachers and lecturers. We recommend you read this with the published course assessment documents and marking instructions.

Note: we've made changes to the course assessment from session 2026–27. Check your subject page for more information.

The report:

- provides a summary of how each course component performed
- highlights areas of the question paper and coursework where candidates performed well and areas where they did not perform well
- has advice you might find useful when preparing candidates for assessment

We collect and prepare the statistics in course reports before we complete the appeals process.

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Statistical and grade boundary information

Course entries

Number of resulted entries in 2025: 2,117

Number of resulted entries in 2026: 2,060

Distribution of course awards (including minimum mark to achieve each grade)

Course award	Number of candidates	Percentage	Cumulative percentage	Minimum mark required
A	563	27.3	27.3	107
B	501	24.3	51.7	89
C	473	23.0	74.6	72
D	323	15.7	90.3	54
No award	200	9.7	100	Not applicable

We've not applied rounding to these statistics.

In this report:

- 'Most' means greater than or equal to 70%.
- 'Many' means 50% to 69%.
- 'Some' means 25% to 49%.
- 'Few' or 'a few' means less than 25%.

You can find statistical reports on our website.

General commentary on grade boundaries

Our main aim when setting grade boundaries is to be fair to candidates across all subjects and levels, and to maintain comparable standards across the years, even as arrangements evolve and change.

For most National Courses, we aim to set examinations and other external assessments and create marking instructions that allow:

- a competent candidate to score a minimum of 50% of the available marks (the notional grade C boundary)
- a well-prepared, very competent candidate to score at least 70% of the available marks (the notional grade A boundary)

It's very challenging to get the standard on target every year, in every subject, at every level. Therefore, we hold a grade boundary meeting for each course to bring together all the information available (statistical and qualitative) and make final decisions on grade boundaries based on this information. Senior Qualifications Scotland staff normally chair these meetings.

Principal assessors use their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. We can adjust the grade boundaries as a result of the discussion at these meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper or other assessment has been more, or less, difficult than usual.

- We can adjust the grade boundaries downwards if there's evidence that the question paper or other assessment has been more difficult than usual.
- We can adjust the grade boundaries upwards if there's evidence that the question paper or other assessment has been less difficult than usual.
- If levels of difficulty are comparable to previous years, we maintain similar grade boundaries.

Every year, we evaluate the performance of our assessments in a fair way, while ensuring standards are maintained so that our qualifications remain credible. To do

this, we measure evidence of candidates' knowledge and skills against the national standard.

For full details of the approach, please refer to the Awarding and Grading for National Courses Policy.

How the course assessment performed

Question paper

The question paper was more demanding than intended.

Several questions proved to be more challenging than anticipated, particularly questions 2(b)(ii); 4(b)(ii); 5(b); 7(a)(i)(ii); 10(a)(ii); 15(a)(iii)(b)(c); and 16(c)(ii)(B). We adjusted the grade boundaries to reflect the impact of these questions.

There was again evidence that some candidates found questions based upon practical work, experimental technique, and data analysis challenging. This is most likely due to a lack of exposure to practical physics, and support at an appropriate level.

The standard of responses to both open-ended questions was similar to that in previous exam papers, and these questioned remained challenging for most candidates.

Project

The project performed as expected.

How candidates performed

Areas where candidates performed well

Question paper

Question 1(a)(b)	Most candidates integrated and differentiated the given relationship.
Question 2(a)(i)(ii)	Many candidates showed the minimum angular velocity of the bucket and also determined the complete number of rotations of the bucket.
Question 2(b)(iii)	Many candidates showed the direction of the initial velocity of the bucket.
Question 3(a)	Most candidates determined the moment of inertia of the lawnmower cutting unit.
Question 3(b)(i)(ii)	Most candidates calculated both the average angular acceleration of the lawnmower cutting unit and the average unbalanced torque acting on the unit correctly.
Question 3(c)	Most candidates stated how the unbalanced torque compared and justified their answer.
Question 4(a)(ii)	Most candidates calculated the mean radius of Europa correctly.
Question 5(c)(i)	Most candidates calculated the Schwarzschild radius of Gaia BH3 correctly.
Question 6(a)(i)(ii)	Most candidates showed the luminosity of Proxima Centauri and then determined the distance, in light-years, to Proxima Centauri.
Question 6(b)(i)(ii)	Many candidates identified the position of Proxima Centauri on the H-R diagram and stated what type of star it will ultimately become.

Question 7(a)(iii) Most candidates calculated the radius of the electron orbit correctly.

Question 7(b)(i) Most candidates calculated the total energy of the electron correctly.

Question 9(a)(i) Many candidates stated what is meant by simple harmonic motion.

Question 9(b)(i) Many candidates calculated the maximum potential energy in the bungee cord correctly.

Question 10(a)(iii) Many candidates determined the thickness of the hair.

Question 12(b)(i) Most candidates calculated Brewster's angle for sea water correctly.

Question 13(c) Many candidates determined the values of M and N.

Question 14(a)(i) Most candidates calculated the approximate random uncertainty in the mean value of time correctly.

Question 14(a)(ii) Many candidates determined the absolute uncertainty in the terminal velocity.

Question 14(b)(i) Many candidates calculated the electric field strength between the plates correctly.

Question 15(a)(i) Most candidates calculated the magnitude of the force experienced by one wire of the coil correctly.

Question 16(a)(i)(ii) Many candidates determined the time required for the capacitor to become fully charged and suggested an alteration to the circuit that would increase the time to charge fully.

Question 16(c)(i) Most candidates calculated the energy stored in the inductor correctly.

Question 16(c)(ii)(A) Most candidates calculated the back EMF generated in the circuit correctly.

Project

Abstract

Many candidates clearly stated the aim(s) and findings of their project. Most candidates who had a single, straightforward aim obtained this mark. Candidate performance in this section improved compared with previous years.

Underlying Physics

Many candidates gave an adequate account of the physics behind their project, at an appropriate level and in sufficient depth. Performance in this section improved compared with previous years.

Procedures

Most candidates scored well in the 'level of demand' section. In most cases, the procedures were at an appropriate level for Advanced Higher and reflected 10 to 15 hours of experimental work.

Many candidates described the apparatus and procedures they used in their project. Most candidates commented on the number of repeated measurements made.

Overall, candidate performance in this section improved compared with previous years.

Results

Many candidates produced sufficient raw data, which was relevant to the aim(s) of their project.

Many candidates produced suitable graphs of their data and performed appropriate analysis using the gradient. To gain full marks in the analysis section, candidates must perform graphical analysis, where possible, and for a minimum of two of their experiments.

Many candidates showed an awareness of scale reading and random uncertainties, but fewer identified calibration uncertainties. Many candidates showed combinations of uncertainties. Many candidates used the LINEST function in Excel and used the resulting data to determine an overall uncertainty in their calculated value.

Discussion

Most candidates wrote a conclusion that was valid and related to the aim(s) of their project. There was a marked improvement in this section of the report.

Many candidates evaluated their experimental procedures and included comments on accuracy and precision, sources of uncertainty, and reliability of methods. Many candidates made comparison of their experimental values for physical constants with accepted values.

Many candidates gained the quality mark, indicating a competent project that was well worked through. Performance in this section improved markedly compared with previous reports.

Presentation

Most candidates produced a well-structured report, with appropriate title, contents page and page numbers.

A small number of candidates were penalised for exceeding the word limit by more than 10%.

Areas where candidates did not perform well

Question paper

Question 4(c)	Few candidates stated the change in potential energy of Juice.
Question 7(a)(ii)	Few candidates explained the implication of the relationship.
Question 10(a)(ii)	Few candidates explained at Advanced Higher level how a bright fringe is produced.

Question 14(a)(iii) Few candidates suggested an improvement to the experimental procedure that would reduce the absolute uncertainty in the value of terminal velocity.

Question 15(a)(iii) Few candidates explained why no force acts on the rotor side QR.

Question 15(b)(i) Few candidates showed the direction of the forces acting on the rotor.

Question 15(b)(ii) Few candidates explained why the rotor cannot start to rotate in the position shown.

Question 15(c) Few candidates explained why the modification improved the operation of the electric motor.

Question 16(c)(ii)(B) Few candidates explained the role of the diode in protecting the circuit.

Project

Underlying Physics

Some candidates did not demonstrate a good understanding of the physics behind their project. While they frequently stated relationships, some candidates did not define quantities or units and made no attempt to derive the relationships. Some candidates attempted to reproduce derivations from textbooks or internet sites, but made errors and omissions. Some candidates did not include explanatory diagrams to aid their underlying physics. Some candidates included physics that was not relevant to their project or at an inappropriate level.

Procedures

Some candidates did not include clear, labelled diagrams or photographs to aid replication. Some candidates used schematic diagrams from textbooks, which did not gain marks on their own because they usually did not represent the actual experimental set-up the candidate used. A number of candidates did not describe

their procedures using the past tense impersonal voice and did not include the range and interval of the independent variable.

Results

Some candidates did not include all raw data and so could not access the data mark. Examples included the distance across 20 fringes, the measured dimensions of a ball bearing, the length of a microscope slide, and the original length of a spring.

Some candidates produced graphs using software packages that were too small, omitted minor gridlines, or used data points that were too large to allow the accuracy of plotting to be checked. Some software packages use default settings for minor gridlines with intervals that make checking the accuracy of plotting difficult, owing to inappropriate intervals. In addition, some graphs had missing or incorrect labels on the axes.

Some candidates did not show sufficient working in their analysis. Candidates should be encouraged to show sample calculations.

Some candidates showed incorrect averaging of calculated or derived values, resulting in invalid analysis.

Discussion

Some candidates did not evaluate their experimental procedures in sufficient depth or with sufficient sophistication. Some evaluations were too general in nature and were not at a standard appropriate to Advanced Higher. Examples included ‘the equipment was not reliable due to it being old’, ‘the experiment worked well’, or ‘human error contributed to the uncertainty’. Encourage candidates to identify the dominant source of uncertainty and suggest how this may be reduced.

Some candidates also did not evaluate the project as whole and instead simply repeated statements from their evaluation of the experimental procedures. In some cases, the language was superficial, for example, ‘the best result was experiment 2’. Few candidates suggested further work.

Presentation

Although this improved compared with previous years, only some candidates listed and cited references to at least three sources of information in either Vancouver or Harvard style.

A small number of candidates appeared to have used a pre-made template as a basis for their report. This is not allowed.

Preparing candidates for assessment

Question paper

In general, candidates were well prepared for the question paper and showed a good understanding of most of the concepts tested.

Candidates performed well in questions that assessed their ability to select and apply relationships to determine values.

‘Show’ type questions were generally answered well; however, remind candidates that all steps of the calculation must be shown. The answer must start with all explicit relationships from the relationships sheet and end with the correct final answer, including units, to gain full marks. When the answer to a numerical ‘show’ question is used in subsequent parts of a question, remind candidates to use the answer given in the question, rather than an unrounded value they may have calculated.

Many candidates attempted questions requiring a sketch without due care. Encourage candidates to present their sketch as neatly and accurately as possible. The use of a ruler, where appropriate, is expected. Force vectors must touch the object in question.

‘Justify’ questions were well attempted, and many candidates made a good attempt at using correct physics to explain their answer. Remind candidates that many explanations should include what variables have remained constant when explaining why a dependant variable has changed. Where appropriate, candidates should also state the relevant relationship.

In answering numerical questions, discourage candidates from rounding numbers prior to the final answer (intermediate rounding). You should strongly discourage candidates from including a penultimate line to their working, showing an unrounded or truncated value. A number of candidates rounded values incorrectly, or truncated the number, which led to errors in the final answer and loss of the final-answer mark. The final answer should be rounded to the appropriate number of significant figures and given in decimal form.

You should give candidates opportunities, either verbally or in writing, to practise explaining concepts and ideas from the course. These could include the consequences of general relativity, the event horizon of a black hole and the consequence for observation of objects within the horizon, the wave-like behaviour of particles, the conditions for interference, and ways to improve experimental techniques and measurements.

Open-ended questions in previous Advanced Higher question papers could provide opportunities for candidates to practise explaining some of the more challenging concepts in the course. However, candidates should be discouraged from simply stating three pieces of information in an attempt to access all three marks. Encourage candidates to comment on both the text and diagrams in an open-ended question and to answer in the context of the question appropriate to Advanced Higher level. Candidates should be discouraged from producing an answer that is simply a series of topical knowledge statements that do not address the question.

Encourage candidates to take care and use correct physics terminology when answering questions that assess knowledge of definitions. While some variation in wording may be acceptable in response to descriptive and explanatory questions, there is less scope for such variation when answering ‘State what is meant by ...’ questions. For example, some candidates did not state what is meant by ‘electrical potential at a point in space’ or ‘plane polarised light’ correctly.

You **must** give candidates the opportunity to take an active part in the wide range of practical work throughout the course. This is in addition to the practical work involved in their project. You must also give candidates the opportunity to evaluate and analyse experimental work, as appropriate, to develop the necessary knowledge and

skills. While the demonstration of experiments, videos and computer simulations may be useful additional tools, they cannot replace active experimental work. Regular opportunities to practise experimental skills during classwork should help candidates answer questions assessing aspects of experimental technique, analysis of data, and sources of uncertainty.

Candidates should carry out experimental work at an appropriate point in the course to link it with the theory and support understanding, rather than treat it as a separate, standalone activity.

You should encourage candidates to write as clearly as possible. This is particularly important when using 'α' in angular motion relationships and 'τ' in rotational dynamics relationships. Encourage candidates to score through incorrect working and replace it with a new clear statement to avoid ambiguity.

In the examination, candidates should also be encouraged to refer to the data sheet and the relationships sheet, rather than trying to remember data and relationships.

Centres should also refer to the Physics: general marking principles document on our website for generic issues related to the marking of question papers in Qualifications Scotland qualifications in Physics at National 5, Higher and Advanced Higher levels. Centres must adopt these general instructions for the marking of prelim examinations and centre-devised assessments for any Qualifications Scotland Physics courses.

Project

Topic choice

Unless centres are presenting a large number of candidates (more than 10), they must not allow candidates to choose a topic that may lead to experimental procedures similar to those being carried out by another candidate in the centre. Centres presenting a larger number of candidates (more than 10) must minimise the number of candidates investigating the same topic or carrying out the same procedures. If two candidates in a centre follow the same experimental procedures, you must ensure that each carries out research, including experimental work, individually. Candidates must work individually; group work is not permitted.

To score well in the project, each candidate should be encouraged to choose a topic for which the underlying physics and experimental procedures present an appropriate level of challenge and provide opportunities to access marks for the introduction, procedures, results, and discussion. In particular, the experimental procedures should allow candidates to carry out graphical analysis for at least two procedures, and should be commensurate with Advanced Higher level.

Abstract

Candidates should state a clear overall aim or aims for their project and state their findings explicitly. If the aim is to measure a physical constant using a number of procedures, candidates should name, or briefly describe, each procedure, stating the value obtained for the constant, complete with unit and preferably the uncertainty, for each procedure. If the aim is to compare methods, candidates should be clear about which aspects are being compared, for example accuracy, precision, ease of measurement, or number of uncertainties. An aim to determine the 'best method' is not valid at Advanced Higher level. If the aim is to confirm a relationship between variables, candidates should be wary of stating that a relationship shows direct proportionality if the line of best fit does not pass through the origin, unless they reference the uncertainty in the y-intercept compared to the y-intercept.

The abstract must be immediately adjacent to the contents page.

Underlying physics

To score well in this section, candidates should demonstrate a good understanding of the relevant physics of their chosen topic at Advanced Higher level. Simply stating a number of relationships without any derivation, or reproducing information from sources without input from the candidate, does not demonstrate good understanding. Encourage candidates to use diagrams and illustrations in this section to aid their underlying physics. Including historical, socio-economic or other non-physics information may be of interest, but it does not contribute towards demonstrating an understanding of physics and is unlikely to earn marks, and should be discouraged.

Procedures

Candidates should include clear, uncluttered, labelled photographs or diagrams to help describe the relevant apparatus. Attempts to sketch apparatus electronically using drawing packages sometimes produce diagrams that lack clarity for replication. It may be quicker and clearer to draw the apparatus by hand, using pencil and paper, and scan the sketch into the report.

Candidates should produce a circuit diagram to support their description of apparatus used in a procedure involving an electrical circuit. They should include values of electrical components, where appropriate. Advise candidates not to use schematic diagrams from websites or textbooks, as these may not represent the actual equipment used. Candidates should describe their procedures, using past tense impersonal voice, in sufficient detail to allow replication. Encourage candidates to include the number of repeats and the range and interval of the independent variable. The number of procedures will depend on the chosen topic, but the experimental phase of the project normally consists of three or four related experiments. Regardless of the topic, advise candidates to spend approximately 10 to 15 hours in the laboratory obtaining experimental data. For some candidates, only visiting a university to carry out procedures may not result in the appropriate number of hours spent on experimental work.

Results

For data to be considered sufficient, candidates should ensure the number of repeats, and the range and interval of the independent variable, are appropriate for the experiments. Candidates should include all their raw data in the report, not just mean values. If there is a large volume of raw data, they should include it in appendices.

Candidates should state all measurements explicitly rather than simply substituting values into relationships.

Provide additional opportunities for candidates to practise graphical analysis and the estimation and combination of uncertainties as part of classwork, as it may support

appropriate analysis of raw data, including uncertainties. Encourage candidates to use graphs of an appropriate size with minor gridlines and small data points.

You should encourage candidates to quantify all sources of uncertainty in measurements, in particular scale reading uncertainty, calibration uncertainty, and random uncertainty, where appropriate.

Encourage candidates to include the LINEST ‘box data’ to support their analysis of uncertainties.

You should remind candidates to include sample calculations for both analysis of data and uncertainties.

Discussion

In candidate evaluations of experimental procedures, you should encourage them, as appropriate, to comment on:

- the accuracy and precision of their measurements
- the adequacy of repeated readings
- the adequacy of the range over which variables are altered
- the adequacy of control of variables
- any limitations of their equipment
- the reliability of their methods
- sources of uncertainties

In their discussion and critical evaluation of the project as a whole, encourage candidates, as appropriate, to comment on the reasons for selecting procedures, any problems encountered during planning, modifications to planned procedures, the interpretation and significance of findings, suggestions for further improvements, and suggestions for further work.

You should advise candidates not to simply repeat the evaluation of their procedures.

Presentation

References to at least three sources of information, listed at the end of the report, should also be cited in the report where information is quoted from those sources.

Both the listing and citing of references should be in either Vancouver or Harvard style. In addition to the information in the instructions for candidates, many internet sites offer guidance and support in referencing in Vancouver or Harvard style.

Encourage candidates to include page numbers on full-page graphs.

Maximum word count

The project report should be between 2500 and 4500 words in length — excluding the title page, contents page, tables of data, graphs, diagrams, calculations, references, and acknowledgements. Candidates can produce a high-scoring report using considerably fewer words than the maximum permitted.

Changes to the course assessment from session 2026–27

- Reduced marks for the question paper from 155 to 130
- Reduced the duration of the question paper from 3 hours to 2 hours 30 mins
- Removed scaling in the question paper
- Increased scaled mark in project from 40 to 44.

We've amended the question paper details in the course specification. Candidates must have the opportunity to carry out a wide range of experimental work. You may wish to update prelims to match the updated format and duration of the question paper.