



Alternative Certification Model 2020–21: National QA Exercise Key Messages

Subject	Physics
Level	Advanced Higher

This report provides information on themes emerging from the national quality assurance exercise, which is part of the Alternative Certification Model for National 5, Higher and Advanced Higher courses.

A sample of candidates' assessed work from selected centres was reviewed to determine whether assessment was in line with the national standard. The evidence submitted may have been partial or incomplete and is unlikely to have represented all of the evidence that will be gathered to allow the centre to determine a provisional result.

The centres selected for review in this subject and at this level have been provided with specific feedback on the evidence that they submitted. The comments below highlight key points about the assessment approaches and instruments used and the sampled centres' assessment judgements, for all centres delivering the subject at this level to reflect upon and make any appropriate adjustments.

Section 1: Comments on approach to assessment

The materials submitted by most centres consisted of partial evidence for the course assessment. The materials submitted by a small number of centres consisted of complete evidence comprising the SQA 2020–21 question paper. Almost all centres included details of further planned assessment, to ensure evidence assessed skills and content selected from across the entire course when determining provisional results. A small number of centres did not include these details, making it hard to judge whether the overall approach to assessment was valid.

Most centres indicated that they would be using the SQA 2020–21 question paper as their main source of evidence to determine provisional results. In many cases this was split into shorter ‘chunks’ to enable flexibility and avoid a single ‘high-stakes’ examination-style assessment.

Some centres demonstrated good practice by randomising the order of the questions in each ‘chunk’, in order to maintain the intended level of demand. In a small number of centres, the assessment had been ‘chunked’ by topic, which compartmentalised the course coverage and removed the synoptic nature of the assessment. This reduced the intended level of demand.

Some centres adapted the SQA 2020–21 paper by replacing or altering questions, but had endeavoured to maintain the balance and level of demand of the assessment.

Many centres submitted a centre-devised assessment covering a range of topics. Some centres used questions taken from a range of recent SQA past papers to ensure the style and format of the questions was appropriate. Some centres used questions from older SQA past papers, but made suitable adaptations to the question style, mark allocation, and marking instructions to reflect current practice. In a few cases, these adaptations had not been made, which resulted in inappropriate mark allocations for some questions and marking instructions that deviated from the national standard. Recent additions to the Relationships Sheet make some types of ‘show’ question trivial; for example, the derivation of the relationship describing Kepler’s third law. This also resulted in some assessments including questions that assessed content no longer in the course specification.

Some centres used commercially produced question papers, either in their entirety or as a source of questions for a centre-devised assessment. There were a number of issues with the papers and questions. The papers tended to have a low level of demand and underassess the skills of scientific inquiry. There were also issues with individual questions, including inappropriate mark allocations, marking instructions that deviated from the national standard, and questions assessing content not in the course specification.

Some centres submitted nationally available or centre-devised end-of-topic tests. The nationally available tests tended to be of variable level of demand and have an over-emphasis on knowledge, as opposed to the skills of scientific inquiry. End-of-topic tests tend to compartmentalise the subject content and test limited knowledge. They tend to focus on testing knowledge and understanding rather than skills, and seldom require integration of

knowledge and skills. On their own, end-of-topic tests are not suitable as the main or only type of evidence; they are suitable as supplementary evidence only.

Many centres provided detailed analysis of the skills, knowledge and understanding covered in their assessments. This analysis included identification of grade A marks, allowing the level of demand to be readily determined. This also enabled centres to demonstrate good practice in ensuring that their assessments had a suitable balance of knowledge and skills, and assessed a wide range of content selected from across the course.

One particular issue to note is regarding open-ended questions. In a number of cases, the open-ended questions used by centres were either limited in scope, not appropriate to Advanced Higher Physics, or not truly open-ended, in that there was a definitive answer to the question. Some questions relied on knowledge outwith the course or on knowledge of physics at a level above Advanced Higher.

Section 2: Comments on assessment judgements

The overwhelming majority of assessment judgements were in line with national standards.

Some notable issues were identified in the standard of marking applied by centres:

- ◆ Significant figures — marks were sometimes awarded incorrectly to candidates who had stated an inappropriate number of significant figures in their final answer.
- ◆ Use of data from the Data Sheet — marks were sometimes awarded incorrectly to candidates who were careless in their use of values given in the Data Sheet; for example, $G = 6.67 \times 10^{11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$ rather than $G = 6.67 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$.
- ◆ ‘Show’ questions — marks were sometimes awarded incorrectly to candidates when they failed to state an appropriate relationship or the final answer, including unit. In a ‘show’ question, all steps must be clearly and explicitly shown, including the substitution of physical constants (such as ϵ_0).
- ◆ ‘Justify’ questions — marks were sometimes awarded incorrectly to candidates for the justification of a correct statement when the candidate had made an incorrect statement of the effect. In a ‘justify’ question, marks can only be awarded where the candidate’s statement of the effect is correct.
- ◆ ‘Must justify’ questions — marks were sometimes awarded incorrectly to candidates for a statement of the correct effect when either the candidate had made no attempt at a justification, or the justification was based on incorrect physics. In a ‘must justify’ question, marks can only be awarded where the candidate makes a correct statement followed by either a correct justification or an incomplete justification based on correct physics.
- ◆ Diagrams — marks were sometimes awarded incorrectly to candidates when the diagram was incomplete, or the accuracy of the diagram did not justify this.
- ◆ Open-ended questions — some centres awarded marks on a 1 mark for one point basis. Some centres had annotated or amended the marking instructions to include specific points to look for. These issues often led to lenient marking. Open-ended questions must be marked holistically, based on the level of understanding demonstrated by the candidate.
- ◆ Relationships involving linear and angular quantities — marks were sometimes awarded incorrectly to candidates who had stated an incorrect relationship confusing linear and angular quantities; for example, stating ‘ a ’ rather than ‘ α ’ or ‘ v ’ rather than ‘ ω ’. This is wrong physics.
- ◆ Definitions of physical quantities — marks were sometimes awarded incorrectly to candidates whose definitions lacked the detail required; for example, in defining electrical potential in terms of unit charge rather than unit positive charge.

In addition, there were some examples of lenient marking where assessors awarded marks based on an inference of ‘what candidates meant’ rather than their actual response.

Many centres made effective use of the [Physics: general marking principles](#) publication. These centres tended to have fewer issues with their assessment judgements.

Many centres showed good practice by annotating marking instructions to include alternative acceptable responses to some questions.

Where centres indicated cut-off scores for assessments, some had adjusted these from notional to reflect the level of demand of the assessment. This is good practice. Nevertheless, a number of centres indicated that notional cut-off scores would be applied, despite the level of demand of the assessments varying from the national standard.

In a small number of cases, centres indicated that they would base cut-off scores on an average of the grade boundaries for recent SQA course assessments. This is not appropriate. Cut-off scores should be set to reflect the level of demand of the assessment.

There was considerable evidence of good practice, with the overwhelming majority of centres selected showing clear evidence of rigorous internal and/or local moderation processes. Many centres had detailed records of discussions between assessors and moderators relating to assessment judgements. Where there was disagreement between the assessor and the moderator, final decisions were made clear, often with supporting commentary.