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

Subject	**Physics**
Level	**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 centres consisted of partial evidence for the course assessment. Almost all centres included details of further planned assessment, to ensure evidence assessed skills and content selected from across the entire course. 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 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. In a few cases this adaptation reduced the level of demand.

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.

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. When used in their entirety, the papers tended to have a slightly low level of demand and underassess the skills of scientific inquiry. There were also issues with individual questions, including 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 have a low level of demand and underassess 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 the skills of scientific inquiry, 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 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 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 used values that differed from those given in the Data Sheet; for example, g = 10 N kg^{-1} rather than g = 9.8 N kg^{-1}.
- Incorrect substitutions — marks were frequently awarded incorrectly to candidates who had substituted values into the relationship incorrectly:

    - sign conventions — candidates were not using appropriate sign conventions when substituting data; for example, $0 = 6.25 + (9.8t)$ rather than $0 = 6.25 + (-9.8t)$;
    - incorrectly substituting values for initial and final velocity; for example, v = 0.0 m s^{-1}, u = 4.3 m s^{-1}, and m = 1.5 kg in $\Delta p = mv - mu$ and then $\Delta p = (1.5 \times 4.3) - (1.5 \times 0.0)$ rather than $\Delta p = (1.5 \times 0.0) - (1.5 \times 4.3)$.

- Negative signs — marks were sometimes awarded incorrectly to candidates who dropped a negative sign either from the substitution or the final answer inappropriately.
- Implied relationships — marks were sometimes awarded incorrectly to candidates for an implied relationship when they had substituted values incorrectly. A correct relationship cannot be implied from incorrect substitution.
- '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.
- '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. However, the mark for a correct statement can be awarded even if the candidate has an incorrect justification or no justification.
- '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 accuracy of the diagram did not justify this.
- Graphs — marks were sometimes awarded incorrectly to candidates in questions that required them to use the line of best fit to determine a quantity, such as the gradient, and the candidate had either not included a line of best fit or used data from the table, which may not lie on the line drawn by the candidate.
- 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.

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.

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 deviating 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 all 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.