



Course report 2022

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| Subject | Engineering Science |
| Level | National 5 |

This report provides information on candidates' performance. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published assessment documents and marking instructions.

The statistics used in this report have been compiled before the completion of any appeals.

Grade boundary and statistical information

Statistical information: update on courses

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|------------------------------------|------|
| Number of resulted entries in 2022 | 1745 |
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Statistical information: performance of candidates

Distribution of course awards including grade boundaries

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|-----------------|------------|------|-----------------------|------|----------------------|-----|-----------------------|-----|
| A | Percentage | 57.1 | Cumulative percentage | 57.1 | Number of candidates | 995 | Minimum mark required | 72 |
| B | Percentage | 17.5 | Cumulative percentage | 74.6 | Number of candidates | 305 | Minimum mark required | 58 |
| C | Percentage | 10.9 | Cumulative percentage | 85.5 | Number of candidates | 190 | Minimum mark required | 45 |
| D | Percentage | 8.2 | Cumulative percentage | 93.7 | Number of candidates | 145 | Minimum mark required | 31 |
| No award | Percentage | 6.3 | Cumulative percentage | N/A | Number of candidates | 110 | Minimum mark required | N/A |

You can read the general commentary on grade boundaries in appendix 1 of this report.

In this report:

- ◆ 'most' means greater than 70%
- ◆ 'many' means 50% to 69%
- ◆ 'some' means 25% to 49%
- ◆ 'a few' means less than 25%

You can find more statistical reports on the statistics page of [SQA's website](#).

Section 1: comments on the assessment

Question paper

The question paper performed in line with expectations and was found to be fair, balanced, and accessible. Feedback from the marking team and the item analysis confirmed that all questions functioned as intended, and the full range of marks were awarded.

Assignment

The requirement to complete the assignment was removed for session 2021-22.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

- Question 3: Most candidates correctly calculated the work done.
- Question 5(b): The selection and justification of the material choice was well answered by most candidates.
- Question 6(a)(iii): Most correctly identified 'mechanical engineer'.
- Question 9(b): Most candidates described the function of the program line.
- Question 11(b): Many candidates described a social and economic impact of the lift installation.
- Question 12(a): Most completed the truth table for the logic diagram.
- Question 12(b): Most candidates completed the logic diagram from the Boolean equation.
- Question 12(d)(i): Most candidates correctly calculated the force.
- Question 13(d): Most could explain an impact of the emerging technology.

Areas that candidates found demanding

Question paper

- Question 1(a): Many could not state the type of gear train.
- Question 2(a): Many candidates could not identify an output from the system.
- Question 4(b): Many were unable to name the part of the transistor.
- Question 6(a)(i): Many could not identify 'electronic engineer'.
- Question 9(c): Most could not explain why the program would not function as intended.
- Question 11(a): Some candidates could not use moments to calculate the force, and a few did not attempt the calculation of the reaction in part (ii).
- Question 11(c): Some candidates did not use the given input and output energy type provided in the question stem.
- Question 15(a): Many candidates could not complete the piping of the pneumatic components.
- Question 15(b): Many could not draw the pneumatic symbol for a uni-directional restrictor or orientate it to slow exhaust air.
- Question 15(d): Many did not explain the difference in size between the instroking and outstroking force.

Section 3: preparing candidates for future assessment

Centres should encourage candidates to clearly show their working in calculation-based questions so that appropriate credit can be given for each stage when an incorrect final answer is given.

In general, most candidates consistently used the correct number of significant figures to express their final answer. However, a few candidates rounded too early in the calculation and subsequently produced an inaccurate final answer. Where practical, only a final answer should be rounded.

Centres should make candidates aware of the difference between the role of an electronic engineer and an electrical engineer.

Centres should ensure candidates are well prepared to answer questions on pneumatics and, in particular, the port-to-port piping of components in a circuit. The symbol and orientation of a uni-directional restrictor when used to control exhaust air should also be emphasised.

Centres should reinforce static equilibrium-based calculations. Candidate performance was not as good as in previous sessions, with several candidates not attempting the question at all.

Appendix 1: General commentary on grade boundaries

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

For most National Courses, SQA aims 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 is very challenging to get the standard on target every year, in every subject at every level. Therefore, SQA holds a grade boundary meeting for each course to bring together all the information available (statistical and qualitative) and to make final decisions on grade boundaries based on this information. Members of SQA's Executive Management Team normally chair these meetings.

Principal assessors utilise their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. SQA 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.

- ◆ The grade boundaries can be adjusted downwards if there is evidence that the question paper or other assessment has been more difficult than usual.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the question paper or other assessment has been less difficult than usual.
- ◆ Where levels of difficulty are comparable to previous years, similar grade boundaries are maintained.

Grade boundaries from question papers in the same subject at the same level tend to be marginally different year on year. This is because the specific questions, and the mix of questions, are different and this has an impact on candidate performance.

This year, a package of support measures including assessment modifications and revision support, was introduced to support candidates as they returned to formal national exams and other forms of external assessment. This was designed to address the ongoing disruption to learning and teaching that young people have experienced as a result of the COVID-19 pandemic. In addition, SQA adopted a more generous approach to grading for National 5, Higher and Advanced Higher courses than it would do in a normal exam year, to help ensure fairness for candidates while maintaining standards. This is in recognition of the fact that those preparing for and sitting exams have done so in very different circumstances from those who sat exams in 2019.

The key difference this year is that decisions about where the grade boundaries have been set have also been influenced, where necessary and where appropriate, by the unique circumstances in 2022. On a course-by-course basis, SQA has determined grade boundaries in a way that is fair to candidates, taking into account how the assessment (exams and coursework) has functioned and the impact of assessment modifications and revision support.

The grade boundaries used in 2022 relate to the specific experience of this year's cohort and should not be used by centres if these assessments are used in the future for exam preparation.

For full details of the approach please refer to the [National Qualifications 2022 Awarding—Methodology Report](#).