Course report 2025

National 5 Engineering Science

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. You should read the report with the published assessment documents and marking instructions.

We compiled the statistics in this report before we completed the 2025 appeals process.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2024: 2,002

Number of resulted entries in 2025: 2,134

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

Course award	Number of candidates	Percentage	Cumulative percentage	Minimum mark required
A	1,130	53.0	53.0	116
B	410	19.2	72.2	99
C	267	12.5	84.7	82
D	163	7.6	92.3	65
No award	164	7.7	100%	Not applicable

We have not applied rounding to these statistics.

You can read the general commentary on grade boundaries in the appendix.

In this report:

- ‘most’ means greater than or equal to 70%
- ‘many’ means 50% to 69%
- ‘some’ means 25% to 49%
- ‘a few’ means less than 25%

You can find statistical reports on the statistics and information page of our website.

Section 1: comments on the assessment

Question paper

The analysis of the question paper showed that it was fair, balanced and accessible. Feedback from the markers and the item analysis confirmed that all questions functioned and the full range of marks was awarded.

There was an unintentional easing in the demand of this component and all grade boundaries were raised to reflect this.

Assignment

The assignment performed as intended, with the full range of marks awarded in each task.

Markers indicated that the assignment was fair and balanced, and that it effectively sampled the engineering skills and knowledge laid out in the course specification.

Tasks were of a similar standard and structure to the previous assignments in 2019 and 2024. Candidates appeared to be better prepared than in 2024.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

Question 1

Most candidates correctly named the parallel resistor arrangement, correctly drew the symbol for an ammeter and indicated where this meter would be wired in the circuit.

Question 4

Most candidates named the type of gear train and the direction of rotation, and correctly calculated the velocity ratio.

Question 5

Most candidates correctly completed the table showing the two types of motion.

Question 6(a)

Most candidates completed the universal system diagram, but some responded with specific terms, such as user input or output energy, and these answers did not achieve a mark.

Question 9(a)

Most candidates completed the flowchart to a high standard. However, some showed the first decision step as an output parallelogram.

Questions 11(c) and 11(d)

The digital electronics questions were well attempted, and most candidates successfully completed the truth table and the logic diagram.

Question 13(c)

Many candidates demonstrated that they could apply the conditions of equilibrium to calculate the reaction force R_A.

Assignment

Task 1a(i)

Most candidates correctly completed the system diagram, indicating both external input and external output.

Task 1b

Most candidates correctly completed the circuit diagram for a cold-sensing circuit.

Task 2a

Most candidates correctly simulated the flowchart and the microcontroller circuit. However, it is important to note that many candidates continue to orientate electronic components incorrectly, especially the battery symbol.

Task 2c

Most candidates correctly evidenced an amended flowchart and microcontroller circuit to reflect changes made during the testing process.

Tasks 3a, 3b and 3c

Most candidates correctly simulated or constructed the initial design for the gear train including an input to allow for testing and labelling correct gear sizes. Most candidates then correctly completed the test result table from their simulation or construction in task 3a and evaluated the initial gear train design.

Tasks 4a, 4b and 4c

Most candidates correctly completed the logic diagram for the given Boolean expression, simulated or constructed their logic diagram, and completed the truth table.

Task 5a

Most candidates correctly simulated or constructed the pneumatic circuit given. However, it is important to note that correctly connected compressed air supplies must be included in evidence for tasks of this type.

Areas that candidates found demanding

Question paper

Question 2(c)

Most candidates did not state ‘fixed loop’. Common incorrect responses included ‘open loop’, ‘closed loop’ or ‘continuous loop’.

Question 3(b)

Some candidates confused the role of an electrical engineer with that of an electronic engineer.

Question 8(a)

Most candidates did not identify the AND control produced by the piping of valve 1 and valve 2.

Question 8(b)

Many candidates did not use appropriate terminology when describing the operation of the pneumatic circuit.

Question 8(d)(ii)

Some candidates who used Nm^{-2} or Pa rather than Nmm^{-2} as the unit for air pressure did not convert the piston area from mm^2 into m^2.

Question 9(c)

Most candidates did not identify the transistor as a suitable electronic component to turn on the lamp.

Question 12(c)

Some candidates did not correctly describe the role of the control sub-system or the temperature sensor in this closed-loop application.

Assignment

Task 1a(ii)

Some candidates did not correctly complete their sub-system diagram to ensure the temperature sensor was connected to the microcontroller, or that both connections in the feedback loop were correct with arrows.

Task 1c

Some candidates did not describe expected results in terms of V_{out}.

Task 2b

Some candidates did not describe test results or re-test results correctly, often not referring to the function of the components being tested, especially the relay and motor. Also, some candidates did not give test results for the flowchart and microcontroller circuit simulated in task 2a. To achieve full marks, it is vital that the simulation and test results match.

Task 2d

Some candidates did not describe a suitable improvement to the flume control to benefit the operator. Although many candidates were able to correctly justify their suggested improvements, to achieve full marks, the suggested improvement must address the issue identified in the task.

Task 3d

Some candidates did not design compound gear trains that decreased speed.

Task 5b

Many candidates did not correctly design the pneumatic circuit to outstroke slowly and smoothly.

Task 5c

Some candidates did not describe a suitable modification to the pneumatic circuit to make the operation of the pool floor safer. Although many candidates were able to correctly justify their suggested improvements, to achieve full marks, the suggested improvement must address the issue identified in the task.

Section 3: preparing candidates for future assessment

Question paper

Candidates must be familiar with how to respond to pneumatic description questions. Appropriate terminology is required, with statements referring to 3/2 valves actuating, 5/2 valves changing state and a cylinder's piston instroking or outstroking.

In questions asking for the calculation of pneumatic air pressure or material stress, candidates need to ensure that the unit is appropriate to the value used in their final answer. Unless specifically asked for, candidates are not required to convert an area expressed in mm^2 into m^2. Consequently, Nmm^{-2} is the expected unit rather than Nm^{-2} or Pa.

Teachers and lecturers should ensure that candidates have a clear understanding of the expected response to 'explain' questions. Candidates often respond with two causes or a cause and an unrelated effect. To achieve full marks, candidates must give a single cause, appropriate to the context of the question, and a related effect.

Candidates should be able to describe the control of the output from a sub-system diagram. This description must clearly show the open or closed loop nature of the control. Candidates must include the key aspects, such as a sensor measuring the actual output and feeding back, the control sub-system comparing the set level to the actual level, and then the specific action on the output, to achieve full marks.

Assignment

Candidates may benefit from developing simulation skills that relate to flowcharts and electronic circuits, including the orientation of symbols within a circuit. Candidates would also benefit from developing testing responses that refer to components specifically signposted in the task.

Candidates will benefit from spending more time drawing system and sub-system diagrams. They will also benefit from preparing evaluation and justification responses — such as referring to a given specification or context and making evaluative comments.

Teachers and lecturers should encourage candidates to read the requirements of each task carefully. While some tasks may appear similar to a previous assignment, there may be significant differences.

Teachers and lecturers must strictly adhere to the assessment conditions for the assignment as outlined in the National 5 Engineering Science course specification and the assignment documentation.

More information and supporting documentation on the full course assessment is available on the National 5 Engineering Science subject page. This includes the course specification, past papers (question paper and assignment), specimen assignment and question paper, and previous years' course reports. Teachers and lecturers should continue to use the published materials available on the Understanding Standards website, which contains candidate evidence from past question papers and assignments with supporting commentary, presentations and webinar recordings.

Appendix: 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 is 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 to make final decisions on grade boundaries based on this information. Members of our 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. 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.

- 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.

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.