Course report 2019

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 post-results services.

Section 1: comments on the assessment

Question paper

The question paper performed as intended with the full range of marks awarded in each question. Markers indicated that the questions were of a similar standard to previous years and that the question paper included appropriate challenge to provide a good discrimination between the grades.

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 last year. However, candidates appeared to have been better prepared. Feedback suggests that the introduction of worksheets had a positive impact on the candidates' organisation and submission of work as well as providing beneficial structure in some tasks, such as the evaluation; which is appropriate at National 5 level.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper

Question 2:	Most candidates calculated power correctly.
Question 4:	Calculating velocity ratio was consistently well done.
Question 5(b):	Candidates were able to describe at least one positive social impact in this context.
Question 7:	Most candidates correctly described a negative environmental impact.
Question 8(b) (i):	Most candidates calculated the voltage across the resistor.
Question 9(e):	Most candidates correctly completed the truth table.
Question 12(a) (i):	The input energy calculation was well done by candidates.
Question 15(a):	Most candidates made a good attempt at completing the flowchart and used pin numbers, delay units, and feedback loops with arrows in their response.

Assignment

Task 1a	The majority of candidates were successful in correctly simulating the flowchart and electronic circuit. However, some candidates renamed microcontroller pins to match the pin numbers given in the task rather than correctly selecting an appropriate microcontroller. This then impacted their code in Task 1d.
Task 3a	The majority of candidates were successful in identifying the correct planned tests and expected results.
Task 3c	The majority of candidates were successful in correctly simulating or constructing the pneumatic circuit.
Task 4	Most candidates were successful in drawing the circuit diagram.
Task 5b	Most candidates made a good attempt at drawing the flowchart.

Areas that candidates found demanding

Question paper

Question 3(a) & (b):	Most candidates did not describe the function of main air and pilot air but instead gave general features.
Question 8(c):	Many candidates either did not state an emerging technology or only provided the cause in their explanation of the possible impact.

Question 9(c):	Many candidates who attempted this question gave just the input switching condition but not the effect at the transistor's output.
Question 10(c):	Most candidates did not identify the correct position for the uni-directional restrictor to control the exhaust air leaving the cylinder.
Question 10(d):	Most candidates did not relate the advantage of a microcontroller in the pneumatics context but instead gave generic statements.
Question 11(d):	Many candidates responded with electrician rather than electrical engineer-related tasks.
Question 13(f):	Many candidates found reading the LDR graph to be challenging.

Assignment

Task 1b	A large number of candidates correctly described their initial test results. However, there were a number of candidates who completed the table vertically, rather than individually recording each initial test result and amended test result before moving on to the next test, as described in the task. A large number of candidates also described the amendments that they had made rather than the results of their testing after amendments were completed.
Task 1d	A number of candidates omitted evidence for this task. For those that did submit evidence, many lost the mark due to having renamed pin numbers in Task 1a.
Task 1e	Many candidates did not evaluate their test results appropriately against the given specification. However, there was a slight improvement in the quality of responses to the previous year. The majority of candidates did not link an improvement to the context of the concert venue. Most candidates instead described an amendment that they had made.
Task 5ai	The majority of candidates did not identify the correct input to the system diagram.
Task 5aii	Some candidates did not show an appropriate level of understanding regarding sub-system diagrams and instead produced something more similar to a sequence of events.

Section 3: preparing candidates for future assessment

Question paper

In numerical questions, it was evident that many candidates were unable to give a final answer to an appropriate number of significant figures, or to round correctly. A few candidates repeatedly used inappropriate significant figures and consequently did not receive a mark time after time. Some candidates appeared to confuse significant figures with decimal places. Centres should ensure that candidates understand and can use significant figures correctly when giving the final answer, and are able to apply the instruction given on the front of the question paper. This is not new information and has been applied consistently for some time now.

Centres should advise candidates that a question's context must always be used when responding to describe or explain type questions and that generic statements will not achieve marks.

Centres should also address the misunderstanding that some candidates have about the difference in role of specific engineers and the role of a tradesperson.

Assignment

The majority of candidates seemed well prepared in all skills required in the assignment.

Candidates may benefit from spending more time in drawing system and sub-system diagrams. Further preparation in writing evaluations, referring back to a given specification, and evaluative comments, referring to a given context, may also be beneficial.

Candidates should be encouraged to read the requirements of each task carefully because although some tasks may appear to be similar to a previous assignment, there may be significant differences (for example, the amended test results rather than amendments in Task 1a).

Centres must strictly adhere to the assessment conditions for the assignment as outlined in the course specification and the assignment documentation.

Centres should ensure candidates only submit pages of work that include their responses. Pages must be single sided, not stapled and submitted in task order, with the task number clearly indicated. Where two discrete pieces of evidence have been asked for (for example, Tasks 1a and 1c) then two labelled pieces of evidence should be submitted. Each page must have the candidate's details on the reverse. Each submission must also have a completed, signed, flyleaf at the front.

Grade boundary and statistical information:

Statistical information: update on courses

Number of resulted entries in 2018	1808

Number of resulted entries in 2019	1646

Statistical information: performance of candidates

Distribution of course awards including grade boundaries

Distribution of course awards	Percentage	Cumulative %	Number of candidates	Lowest mark
Maximum mark				
A	48.0%	48.0%	790	112
B	22.3%	70.3%	367	96
C	13.5%	83.8%	222	80
D	8.8%	92.6%	145	64
No award	7.4%	-	122	-

General commentary on grade boundaries

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

SQA aims to set examinations and create marking instructions that allow:

- a competent candidate to score a minimum of 50% of the available marks (the notional C boundary)
- a well-prepared, very competent candidate to score at least 70% of the available marks (the notional 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 every year for each subject at each level to bring together all the information available (statistical and judgemental). The principal assessor and SQA qualifications manager meet with the relevant SQA head of service and statistician to discuss the evidence and make decisions. Members of the SQA management team chair these meetings. SQA can adjust the grade boundaries as a result of the meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper has been more, or less, challenging than usual.

- The grade boundaries can be adjusted downwards if there is evidence that the question paper is more challenging than usual.
- The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual.
- Where standards 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 to year. This is because the particular questions, and the mix of questions, are different. This is also the case for question papers set by centres. If SQA alters a boundary, this does not mean that centres should necessarily alter their boundary in the question papers that they set themselves.