Course Report 2018

Subject	Practical Electronics
Level	National 5

This report provides information on the performance of candidates. 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

Summary of the course assessment

Component 1: question paper

The question paper is worth a total of 60 marks. This scaled to 30 marks and is worth 30% of the overall marks for the course assessment. The question paper was structured in a similar way to the specimen question paper, containing questions that sampled the areas of circuit design, simulation and construction in approximately equal proportions.

Feedback from both the marking team and practitioners indicated that the question paper was fair both in terms of course coverage and in terms of overall level of challenge. Analysis of the question paper results showed that all questions were answered correctly by at least a proportion of the candidates, and that there was a spread of performance across the range of available marks.

Component 2: practical activity

This component has a wide range of activities that allows for differentiation between candidates. These range from the practical elements such as soldering, wiring and assembly skills, working safely and independently, through to the more demanding tasks such as circuit design and simulation, circuit layout plans, circuit testing and evaluation. The revised marking scheme in place for this session aids this differentiation and is more precise, detailed and accurate than the previous marking scheme.

The new revised marking scheme for the National 5 practical activity has been welcomed as being more precise in relation to the tasks being performed. Teachers, lecturers and assessors experienced in practical electronics are fully conversant with the terminology used in the marking scheme.

Section 2: comments on candidate performance

Areas in which candidates performed well

Component 1: question paper

In the following questions, candidates performed well:

Question 1 (b) (i)	The majority of candidates could determine the value of a resistor from its colour bands.
Question 1 (b) (ii)	The majority of candidates could determine the tolerance value of a resistor from its colour bands.
Question 1 (b) (iii)	The majority of candidates could determine the colour bands of a resistor from its value.
Question 3 (b)	Most candidates could calculate the parallel resistance.
Question 3 (e)	Most candidates could calculate the power dissipation in resistor R_3.
Question 4 (a)	Most candidates could complete a truth table for an OR gate.
Question 4 (b)	The majority of candidates could identify a logic gate from its ANSI symbol.
Question 7 (a) (i)	The majority of candidates could extract a value from a graph.
Question 9	The majority of candidates could complete a costings sheet.

It was noted by the marking team that candidates who performed well in the questions involving calculations also did well in the combinational logic question.

Component 2: practical activity

Overall, candidates performed well in the more practical aspects of the task. These consist of circuit construction, wiring and assembly, as well as circuit simulation. It is essential that candidates have access to a suitable range of properly maintained tools and equipment, in order to achieve these tasks.

Areas which candidates found demanding

Component 1: question paper

Question 2	The ‘uses of writing types’ question proved to be challenging. The majority of candidates either answered the question incorrectly or gave no response at all.
Question 5	Describing how to use a logic probe was challenging for many candidates. Some responses lacked the clarity and precision required to be awarded more marks.
Question 6 (a)	In the CRO frequency calculation, some candidates found converting milliseconds to seconds challenging.
Question 7 (a) (iii)	Candidates found the explanation for the MOSFET to be demanding. Many candidates gave no response.
Question 8	When asked to identify errors in simulation, some responses lacked the clarity and precision required to be awarded more marks.
Question 10	Most candidates who attempted the systems/block diagram question were able to gain some of the marks available.
Question 11	A significant number of candidates made no attempt to answer the ‘layout diagram’ question. Of those who did, many were able to gain at least some marks. Some candidates laterally reversed their circuit diagram, making the question more challenging than necessary.

A small number of candidates had either not prepared for or did not appreciate the depth of understanding and application of knowledge required for the question paper.

Component 2: practical activity

Candidates found the initial analysis of the given problem, which is worth 7 marks, demanding. Candidates analysing the given task correctly can achieve the maximum 7 marks, whereas others will be guided and marked accordingly in order to proceed with the rest of the assignment. Good circuit simulation should also include a range of circuit performance results. This will assist candidates when testing the solution that they will build in order to compare actual test results with the simulation results. This will also assist candidates in gaining marks in the construction section for the inclusion of test points in their circuits, and assist with the reporting section.

The final 12 marks can be demanding for candidates. They consist of 7 marks for testing the solution and 5 marks for reporting and evaluation. The key to gaining marks is the ability to keep clear and accurate project logbooks detailing key stages in the task, in addition to the ability to evaluate the completed circuit test results against the simulation test results and the given task specification.

Section 3: advice for the preparation of future candidates

Component 1: question paper

Candidates answering questions which require either restricted or extended responses should be wary of over-elaboration. Some candidates could identify errors in simulations but could not express themselves with the required degree of clarity or precision to gain the mark.

Centres should ensure that candidates can describe, in a succinct and precise way, how to use the various instruments described in the course specification. In terms of applying relationships, candidates found calculating the switch-on voltage of a transistor the most challenging and may need more practice in voltage division in general. Candidates should also be made aware that when they are asked to draw circuit diagrams, they should ensure that there is a node on the end of the V+ and 0V lines.

Centres should be aware that most typical ‘A type’ questions are those which require the candidate to take information from one conceptual format and present it in another, for example, in systems/block diagrams or when transferring a layout diagram to a circuit diagram (or vice versa).

Component 2: practical activity

Teachers and lecturers should ensure that candidates can gain as many marks as possible from the less demanding tasks such as circuit construction, wiring and assembly, as well as circuit simulation.

Centres should give candidates access to a suitable range of properly maintained tools and equipment. Candidates also need to gain experience of using these tools and equipment, as well as the simulation software.

The more demanding tasks of testing and reporting are dependent on candidates including a range of circuit performance results from their simulation. This will assist them when testing the actual solution built, allowing candidates to compare actual test results with the simulation test results and the given task specification.

Grade boundary and statistical information:

Statistical information: update on courses

Number of resulted entries in 2017	210

Number of resulted entries in 2018	179

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	33.5%	33.5%	60	70
B	21.2%	54.7%	38	60
C	15.6%	70.4%	28	50
D	11.7%	82.1%	21	40
No award	17.9%	-	32	-

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 which allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and 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 Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.

- The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- Where standards are comparable to previous years, similar grade boundaries are maintained.

Grade boundaries from exam 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 exams set by centres. If SQA alters a boundary, this does not mean that centres should necessarily alter their boundary in the corresponding practice exam paper.