



National
Qualifications

Practical Electronics

Practical activity

General assessment information

This pack contains general assessment information for centres preparing candidates for the practical activity Component of National 5 Practical Electronics Course assessment.

It must be read in conjunction with the specific assessment task(s) for this component of Course assessment, which may only be downloaded from SQA's designated secure website by authorised personnel.

Valid from session 2013/14 and until further notice

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Introduction

This is the general assessment information for the National 5 Practical Electronics practical activity.

This practical activity is worth 80 marks. This is 100% of the overall marks for the Course assessment. The Course will be graded A-D.

The Course assessment has no other Components.

This document describes the general requirements for the assessment of the practical activity Component for this Course. It gives general information and instructions for assessors.

It must be read in conjunction with the assessment task for this component of Course assessment.

The assessment task will be set and externally verified by SQA, and conducted, marked and internally verified in centres under conditions specified by SQA.

Equality and inclusion

This Course assessment has been designed to ensure that there are no unnecessary barriers to assessment. Assessments have been designed to promote equal opportunities while maintaining the integrity of the qualification.

For guidance on assessment arrangements for disabled candidates and/or those with additional support needs, please follow the link to the Assessment Arrangements web page: www.sqa.org.uk/sqa/14977.html

Guidance on inclusive approaches to delivery and assessment in this Course is provided in the *Course Support Notes*.

What this assessment covers

This assessment contributes 100% of the total marks for the Course.

The assessment will assess the skills, knowledge and understanding specified for the practical activity in the *Course Assessment Specification*. These are:

- ◆ application of knowledge and skills from the Units to develop a solution to an appropriately challenging practical problem
- ◆ skills in analysing a problem, designing an electronic solution to the problem, simulating and constructing a solution to the problem, applying safe working practices, and testing and reporting on that solution

Assessment

Purpose

The purpose of this assessment is to generate evidence for the added value of this Course by means of a practical activity.

Assessment overview

The practical activity is a meaningful and appropriately challenging task, which should clearly demonstrate application of knowledge and skills, at an appropriate level, from all three Units of the Course (as defined in the 'Further mandatory information on Course coverage' section of the *Course Assessment Specification*).

The practical activity is designed to allow candidates to demonstrate their ability to work independently.

The practical activity is set by SQA. A bank of practical activities will be provided and centres may select from the bank.

Marks will be awarded for:

- | | |
|---|----------|
| ◆ Analysis and design | 10 marks |
| ◆ Designing and simulating a solution | 10 marks |
| ◆ Construction using safe working practices | 40 marks |
| ◆ Testing the solution | 10 marks |
| ◆ Reporting on the solution | 10 marks |

The practical activity will be internally marked by centre staff, in line with the marking instructions provided in this document.

Full instructions for candidates are contained within each assessment task.

Assessment conditions

Assessors must exercise their professional responsibility in ensuring that evidence submitted by a candidate is the candidate's own work.

This assessment is a single assessment event. Candidates should undertake the assessment at an appropriate point in the Course. This will normally be when they have completed most of the work on the Units in the Course.

This is an open book assessment. There are no restrictions on the resources to which candidates may have access.

Candidates must undertake the assessment independently. However, reasonable assistance may be provided prior to the formal assessment process taking place. The term 'reasonable assistance' is used to try to balance the need for support with the need to avoid giving too much assistance. If any candidates require more than what is deemed to be 'reasonable assistance',

they may not be ready for assessment or it may be that they have been entered for the wrong level of qualification.

Reasonable assistance may be given on a generic basis to a class or group of candidates: for example, advice on how to develop a project plan. It may also be given to candidates on an individual basis. When reasonable assistance is given on a one-to-one basis in the context of something the candidate has already produced or demonstrated, there is a danger that it becomes support for assessment; assessors need to be aware that this may be going beyond reasonable assistance.

Clarification may be sought by candidates regarding the wording of a brief or specification or instructions for the assessment if they find them unclear. In this case, the clarification should normally be given to the whole class.

Some guidance may be provided during the analysis and design stages, but the candidate should work independently throughout the implementation, testing and evaluation stages.

Assessor input and advice on the candidate's analysis and design is acceptable in order to allow the candidate to progress to the next stages of the assessment. The assistance provided must be recorded so that the candidate's own analysis and design work can be marked/judged fairly.

As this practical activity is a summative assessment, support and guidance during implementation, testing and evaluation stages should be limited to minimal prompts and questioning, referring the candidate to the instructions provided in the assessment task.

However, some assistance may also be given during fault-finding if the candidate has already carried out appropriate tests but is still unable to diagnose faults, which may be (eg) due to faulty components rather than any shortcomings in the candidate's construction techniques.

The practical activity will be conducted under some supervision and control. Assessors should put in place processes for monitoring progress and ensuring that the work is the candidate's own and that plagiarism has not taken place.

For example:

- ◆ regular checkpoint/progress meetings with candidates
- ◆ short spot-check personal interviews
- ◆ checklists which record activity/progress
- ◆ photographs, film or audio evidence

Group work approaches as part of the preparation for assessment can be helpful to simulate real-life situations, share tasks and promote team working skills. However, group work is not appropriate once formal work on assessment has started.

Once the practical activity has been completed and submitted, it should not be returned to the candidate for further work to improve their mark.

Evidence to be gathered

The following candidate evidence is required for this assessment:

- ◆ the completed solution (constructed circuit or photographs and/or hard copy from simulation software)
- ◆ a record of progress through the task (see example under ‘General Marking Instructions’), including all items of evidence specified within the assessment task
- ◆ a short report on the testing of the solution (in written, electronic and/or oral form)
- ◆ evidence of candidate’s degree of independence and safe working (detailed assessor observation notes)

This evidence must be retained for quality assurance purposes.

General Marking Instructions

Assessors should allocate a mark out of 10 for each of the eight subsections, by following the instructions given below, and record this mark on the candidate assessment record, with a comment justifying why each mark was awarded.

Marks for internally assessed Components must be submitted to SQA by the centre. Evidence for this assessment should be retained in the centre for SQA quality assurance purposes. Further information on this will be provided by SQA.

For each of the sections, the assessor should select the band descriptor which most closely describes the evidence gathered.

Once the best fit has been selected:

- ◆ where the evidence almost matches the level above, the highest available mark from the range should be awarded
- ◆ where the candidate's work just meets the standard described, the lowest mark from the range should be awarded
- ◆ otherwise the mark from the middle of the range should be awarded

Notes:

- ◆ where the evidence completely matches the highest level band descriptor for any section, and has been produced by the candidate working independently, 10 marks should be awarded for that section
- ◆ zero (0) marks should be awarded for any section where no evidence has been produced by the candidate

Band descriptors for section 1:

Analysis and design: schematic diagrams of input, process and output sub-systems, and list of components

Complete (or nearly complete) and detailed schematic diagrams of input, process and output sub-systems, and list of components, produced by the candidate working independently.	9-10
Partially complete schematic diagrams of input, process and output sub-systems, and list of components, produced by the candidate working independently.	6-8
Incomplete functional schematic diagrams of input, process and output sub-systems, and list of components, produced by the candidate working independently; or, completed, but requiring significant advice and guidance.	3-5
Incomplete, despite significant advice and guidance.	0-2

Band descriptors for section 2:

Designing and simulating a solution: component layout diagrams and use of simulation software

Complete and correct working simulation demonstrated. Complete (or nearly complete) and correct component layout diagrams, produced by the candidate working independently.	9-10
Complete and correct working simulation demonstrated. Mostly complete and correct component layout diagrams, produced by the candidate working independently.	6-8
Partial working simulation demonstrated. Incomplete component layout diagrams, produced by the candidate working independently: or, complete, but requiring significant advice and guidance.	3-5
Incomplete component layout diagrams, despite significant advice and guidance, and/or no working simulation demonstrated.	0-2

Band descriptors for sections 3a, 3b and 3c:

A mark out of 10 should be awarded for each of:

3a. Constructing the solution (input system)

3b. Constructing the solution (process system)

3c. Constructing the solution (output system)

Design fully constructed, working safely and independently, fitting components accurately, and soldering to a high standard.	9-10
Design fully constructed, working safely and independently, fitting components accurately, and soldering to an acceptable standard.	6-8
Design fully constructed, working safely and independently, but with fitting of components and soldering uneven or unreliable.	3-5
Construction incomplete; or requiring supervision to ensure safe working.	0-2

Band descriptors for section 3d:

3d. Constructing the solution (wiring and assembly)

Wiring and assembly complete, electrically reliable, secure and neat, working safely and independently.	9-10
Wiring and assembly complete, electrically reliable and secure, but untidy, working safely and independently.	6-8
Wiring and assembly complete, but wiring insecure, working safely and independently.	3-5
Wiring and assembly incomplete; or requiring supervision to ensure safe working.	0-2

**Band descriptors criteria for section 4:
Testing the solution**

Test plan is logical and thorough, all faults diagnosed independently, and all required repairs carried out, working safely and independently.	9-10
Test plan partially developed, some faults diagnosed independently, and most required repairs carried out, working safely and independently.	6-8
Poor test plan, incomplete testing, incomplete fault diagnosis and/or repairs, working safely and independently.	3-5
No test plan (tests carried out, but without planning); or requiring supervision to ensure safe working.	0-2

Band descriptors for section 5:

Reporting: keeping a record of progress, record of testing, and evaluation

Record of progress complete, consistent and clear, with full record of testing, and clear, valid, reasoned evaluation, all produced by the candidate working independently.	9-10
Record of progress mainly complete, consistent and clear, with full record of testing, and some evaluative comments, all produced by the candidate working independently.	6-8
Record of progress incomplete, lacking clarity and consistency, with limited record of testing, and few evaluative comments, all produced by the candidate working independently.	3-5
Record of progress significantly incomplete, unclear or inconsistent, limited record of testing, and no evaluative comments.	0-2

The example below shows an extract from a possible *candidate's record of progress*, to provide an indication of the level of response required.

Note that the *record of progress* may be handwritten, or kept in electronic form (word processed document or blog entry), or spoken and recorded, or in any other appropriate format.

**Practical Electronics assessment (National 5)
(example extract from) record of progress**

Name:	<i>A. Learner</i>
Date:	<i>02/03/14</i>

<p>What I have done today:</p> <p><i>Today, I completed the construction of my circuit. I took some photos of it to keep as evidence. I started to think about my test plan.</i></p>
<p>What help I needed today:</p> <p><i>The photos worked out Ok, but I had to get some help to download them to the computer and save them.</i></p> <p><i>I got some example test plans from my teacher.</i></p>
<p>Evidence I have produced, and where and how it is stored:</p> <p><i>The photos are finishedcircuit.jpg and finishedcircuit2.jpg. They are in MyDocuments on the network, with the other photos I took earlier.</i></p>

Administrative information

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History of changes

Version	Description of change	Authorised by	Date
1.1	Requirement to produce circuit layout using ECAD removed. Task brief and Marking Instructions amended to reflect this.	Qualifications Development Manager	June 2013
1.2	Evidence Requirements clarified to indicate need for assessor observation notes	Qualifications Development Manager	July 2013

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