National 5
Coursework
Assessment Task

National 5 Practical Electronics
Practical activity
Assessment task

Valid from session 2017–18 and until further notice.

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Contents

Introduction

This document contains instructions for teachers and lecturers, marking instructions and instructions for candidates for the National 5 Practical Electronics practical activity. It must be read in conjunction with the course specification.

This practical activity is worth 70 marks. The marks contribute 70% of the overall marks for the course assessment.

This is one of two course assessment components. The other component is a question paper.

Instructions for teachers and lecturers

General information

This information applies to the practical activity for National 5 Practical Electronics.

The purpose of the practical activity is to assess candidates' ability to apply electronic knowledge and skills to solve an appropriately challenging practical problem, and is designed to allow candidates to demonstrate the ability to work independently.

The practical activity gives candidates an opportunity to demonstrate the following skills, knowledge and understanding:

- analysing a problem
- designing an electronic solution to the problem
- simulating a solution to the problem
- constructing a solution to the problem
- applying safe working practices
- testing the solution
- reporting on and evaluating the solution

A bank of practical activities is provided, and there is choice from this bank.

The assessment instructions for candidates are provided in each practical activity brief and must be detached and given to the candidate.

Guidelines for the practical activity include questions/tasks/prompts which lead candidates through the task in clear stages.

The practical activity has five stages:

- analysis and design
- simulating a solution
- construction using safe working practices
- testing the solution
- reporting on and evaluating the solution

This assessment is a single assessment event.

Assessment should take place when candidates are ready to be assessed. It is not advisable to undertake the practical activity too early as it is important that candidates are adequately prepared in the skills needed to undertake all parts of the practical activity.

Conditions of assessment

Setting, conducting and marking the practical activity

Setting

The practical activity is:

- set by SQA; a bank of practical activities is provided, and there is choice from this bank
- set at a time appropriate to the candidate's needs

Conducting

The practical activity is:

- an individually produced piece of work from each candidate
- started at an appropriate point in the course
- conducted under some supervision and control

Full instructions for candidates are contained within each task.

The practical activity is carried out under open-book conditions, but supervised to ensure that the work presented is the candidate's own.

Marking

Marks are awarded for:

♦ analysis and design	7 marks
♦ designing and simulating a solution	7 marks
♦ constructing the solution using safe working practices	44 marks
♦ testing the solution	7 marks
♦ reporting on the solution	5 marks

The practical activity is internally marked by centre staff in line with SQA's marking instructions.

The teacher or lecturer may give candidates support and guidance to help them progress through each stage of the activity. Where any significant amount of support is provided, this should be reflected in the marks awarded.

The practical activity is designed to discriminate between candidates and therefore is expected to provide a wide range of marks. Stronger candidates should be able to complete the activity successfully with minimal support and guidance. Weaker candidates may not be able to complete all aspects of the activity within a reasonable time, or may require significant assistance, and so would achieve a lower mark.

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

All marking is quality assured by SQA.

Assessment conditions

Controlled assessment is designed to:

- ensure that all candidates spend approximately the same amount of time on their practical activities
- prevent third parties from providing inappropriate levels of guidance and input
- mitigate concerns about plagiarism and improve the reliability and validity of SQA awards
- allow centres a reasonable degree of freedom and control
- allow candidates to produce an original piece of work

There are two levels of control.

Under a high degree of supervision and control	Under some supervision and control
♦ the use of resources is tightly prescribed ♦ all candidates are within direct sight of the supervisor throughout the session(s) ♦ display materials which might provide assistance are removed or covered ♦ there is no access to e-mail, the internet or mobile phones ♦ candidates complete their work independently ♦ interaction with other candidates does not occur ♦ no assistance of any description is provided	♦ candidates do not need to be directly supervised at all times ♦ the use of resources, including the internet, is not tightly prescribed ♦ the work an individual candidate submits for assessment is their own ♦ teachers and lecturers can provide reasonable assistance

The practical activity is conducted under some supervision and control.

As this is an open-book assessment, there are no restrictions on the resources that candidates may have access to.

Candidates must undertake the assessment independently. However, reasonable assistance may be provided prior to the formal assessment process taking place.

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 and teachers and lecturers need to be aware that this may be going beyond reasonable assistance.

Candidates may seek clarification on 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.

Teacher or lecturer 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 judged/marked fairly.

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

Where candidates are observed to be following unsafe working practices, the teacher or lecturer must intervene.

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, for example, due to faulty components rather than any shortcomings in the candidate's construction techniques.

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

The following candidate evidence is required for the assessment:

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

Evidence must be retained for quality assurance purposes.

Marking instructions

Marks are to be allocated on completion of each section. Candidates should be given guidance after each section in order to be able to pick up maximum marks for each subsequent section.

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

Maximum marks available for section — 7 marks

	0 marks	1 mark	2 marks	3 marks	4 marks
Detailed schematic diagrams.	**Significantly incomplete** system/ sub-systems diagram, with **significant missing/ incorrect** inputs, process and outputs.	**Incomplete** system/ sub-systems diagram, with **considerable missing/ incorrect** inputs, process and outputs.	**Incomplete** system/ sub-systems diagram, with **some incorrect** inputs, process and outputs.	**Complete** system diagram with **minimal inaccuracies**, showing all inputs, process and outputs.	**Complete and correct** system diagram, showing all inputs, process and outputs **correctly annotated**.
Detailed list of components.	**Inaccurate** component list with **considerable mistakes/ omissions**.	Component list with **some mistakes/ omissions**.	Component list with **minimal mistakes/ omissions**.	**Complete, accurate and detailed** component list.	

Designing and simulating a solution: component layout diagrams using ECAD software

Maximum marks available for section — 7 marks

	0 marks	**1 mark**	**2 marks**	**3 marks**	**4 marks**
Complete and correct working simulation.	Simulation with **significant** errors.	**Partial** working simulation demonstrated.	Simulation **mostly working** and complete.	**Complete and correct** working simulation.	
Detailed component layout diagrams.	**Significantly incomplete**/ **inaccurate** component layout diagrams with **significant missing/ incorrect** inputs, process and outputs.	**Incomplete** component layout diagrams with **considerable missing/incorrect** inputs, process and outputs.	**Incomplete** component layout diagrams, with **some incorrect** inputs, process and outputs.	**Complete** component layout diagrams with **minimal inaccuracies**, showing all inputs, process and outputs.	**Complete** and **correct** component layout diagrams, showing all inputs, process and outputs and **correctly annotated**.

Constructing the solution: input system
Constructing the solution: process system
Constructing the solution: output system

Maximum marks available for section — 31 marks

	0 marks	1 mark	2 marks	3 marks	4 marks
Fully constructed **input** sub-system circuits.	Construction **significantly incomplete**.	Construction **partially incomplete**.	Layout **fully constructed** but with fitting of components **unreliable**.	Layout **fully constructed**, fitting components with **minimal inaccuracies**.	Layout **fully constructed** and fitting all components **accurately**.
Fully constructed **process** sub-system circuits.	Construction **significantly incomplete**.	Construction **partially incomplete**.	Layout **fully constructed** but with fitting of components **unreliable**.	Layout **fully constructed**, fitting components with **minimal inaccuracies**.	Layout **fully constructed** and fitting all components **accurately**.
Fully constructed **output** sub-system circuits.	Construction **significantly incomplete**.	Construction **partially incomplete**.	Layout **fully constructed** but with fitting of components **unreliable**.	Layout **fully constructed**, fitting components with **minimal inaccuracies**.	Layout **fully constructed** and fitting all components **accurately**.
Soldering to an acceptable standard.	Soldering **significantly** uneven or unreliable.	Soldering **partially** uneven or unreliable.	Soldering to an **acceptable** even and reliable standard.	Soldering to a **high and reliable** standard.	

	0 marks	1 mark	2 marks	3 marks	4 marks
Neatness of sub-system layout.	**No** relation to planning stage and **no** convention followed.	Planning layouts **not** followed but standard conventions used.	Planning layouts **largely** followed with standard conventions followed.	Planning layouts followed with **good** use of standard conventions.	
Labelling of sub-systems.	**No** labelling used.	**Some attempt** at labelling.	**Each** sub-system labelled.	**Each** sub-system and **major components** labelled.	
Use of test points.	**No** test points used.	**Minimal** test points inserted.	**Each** sub-system input and output has test points.	**Each** sub-system input and output and **some** testing stages have test points.	**Each** sub-system input and output and **main** testing stages have appropriate test points.
Working safely.	**Significant guidance** required with regard to personal safety and the safety of others when using tools and equipment.	**Some guidance** required with regard to personal safety and the safety of others when using tools and equipment.	**Minimal guidance** required with regard to personal safety and the safety of others when using tools and equipment.	Adheres to **all safety requirements** with due regard to others.	
Working independently.	Requires **significant** guidance.	Requires **some** guidance.	Requires **minimal** guidance.	**Works independently**.	

Constructing the solution: wiring and assembly

Maximum marks available for section — 13 marks

	0 marks	**1 mark**	**2 marks**	**3 marks**	**4 marks**
Wiring and assembly complete, electrically reliable.	Wiring and assembly **significantly incomplete**.	Wiring and assembly **partially incomplete**.	Wiring and assembly **complete** but **insecure** with **some inaccuracies**.	Wiring and assembly **complete** and **secure** with **minimal inaccuracies**.	Wiring and assembly **complete**, electrically **reliable** and **secure**.
Neatness of construction.	Construction **significantly** uneven or unreliable.	Construction **partially** uneven or unreliable.	Construction to an **acceptable** standard.	Construction to a **high** standard.	
Working safely.	**Significant guidance** required with regard to personal safety and the safety of others when using tools and equipment.	**Some guidance required** with regard to personal safety and the safety of others when using tools and equipment.	**Minimal guidance required** with regard to personal safety and the safety of others when using tools and equipment.	Adheres to **all safety requirements** with due regard to others.	
Working independently.	Requires **significant** guidance.	Requires **some** guidance.	Requires **minimal** guidance.	**Works independently**.	

Testing the solution

Maximum marks available for section — 7 marks

	0 marks	1 mark	2 marks	3 marks	4 marks
Test planning.	**No** test plan.	**Incomplete** test plan.	Test plan **complete** with **some errors**.	Test plan is **logical, thorough and complete**.	
Testing and subsequent repair.	Testing carried out **without** planning or **without** any fault analysis.	Testing carried out with **minimal** planning and fault analysis.	Testing carried out with planning but **incomplete/ inaccurate** fault analysis and repair.	Testing carried out with planning, **some faults diagnosed** (if any) and **subsequent required repairs** carried out.	Testing carried out with planning, **all faults diagnosed** and **all required repairs** carried out.

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

Maximum marks available for section — 5 marks

	0 marks	**1 mark**	**2 marks**	**3 marks**
Record of progress and testing.	Record of progress **significantly incomplete**, unclear or inconsistent, with no record of testing.	Record of progress **incomplete**, lacking clarity and consistency, with little record of testing.	Record of progress **mainly complete** and consistent but lacking clarity, with limited record of testing.	Record of progress **complete, consistent and clear**, with full record of testing.
Evaluation.	**No** real evaluative comments.	**Some** evaluative comments.	**Reasoned and accurate** evaluation.	

Instructions for candidates

The instructions for candidates specific to each practical activity in the bank can be found in the appropriate practical activity brief.

Administrative information

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History of changes

Version	Description of change	Date
1.1	Minor amendments have been made to the marking instructions on page 8 — the word 'design' has been removed from the construction section.	October 2018

Security and confidentiality

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