

Engineering Science

The Qualifications Team

Dave Main

Qualifications Manager

Julie Kobiela

Qualifications Officer

Diet 2019

Changes to documents following Diet 2019

We have made some minor alterations to the following documents:

- ◆ Data booklets (all levels) — we have republished these to correct minor errors and to ensure consistency:
 - we removed the value of Pi (π) — candidates must use the value from the Pi (π) button of their scientific calculators
 - the value of the specific heat capacity of water is $4180 \text{ J kg}^{-1} \text{ K}^{-1}$ in all data booklets
 - we removed op-amp saturation values — these will be given in questions, if required
 - we added a column 'Maximum bending moment' to the 'Bending of Beams' table in the Advanced Higher booklet
- ◆ Course specification (Advanced Higher) — we replaced the term 'product lifecycle' with 'project lifecycle'.
- ◆ Specimen coursework assessment task (National 5) — we made minor alterations to the marking instruction to avoid ambiguity.

Please ensure you use the current, published coursework assessment tasks and specimen question papers.

Course reports

Please read the annual course report for Engineering Science. We produce these reports following the exam diet and they provide information on how candidates performed in course assessment for National Qualifications.

Course reports include a summary of areas candidates performed well in and areas candidates found demanding. They also contain advice on preparing candidates for future assessment, and statistical data relating to grade boundaries. Course reports are available from the subject pages of our website at www.sqa.org.uk/nqsubjects.

Coursework

Assignment at National 5 and Higher

Following the introduction of an externally assessed assignment at National 5 and Higher, here are some reminders:

- ◆ Candidate responses must be submitted as single-sided A4 sheets of paper, with the task number clearly labelled (the back of each page must have the candidate name, date of birth, SCN, centre name and centre number). This helps keep responses clear and identifiable, and also supports our electronic marking processes.
- ◆ Candidate responses must not have anything glued (or similar) to the pages. If photographs are used, these should be printed directly as part of the page and not stuck to the page.
- ◆ Candidate responses and printouts must be clear and easy to read. Markers can only award marks when the response is unambiguous.
- ◆ Candidate responses must be packaged in task order and all mandatory paperwork completed correctly.
- ◆ Candidates must use the assignment for the current academic session (issued at the end of January each session). Nothing else is valid or can attract marks (for example using a previous session's assignment or a centre-devised task).
- ◆ You must follow the conditions of assessment at all times — these are clear and are detailed in both the course specification and the assignment.
- ◆ You must ensure that any practice tasks and/or activities do not inform candidates of the specific content of the current assignment.

Project at Advanced Higher

We reviewed the course assessment at Advanced Higher, by considering various possibilities and seeking the views of a group of deliverers. The conclusion was that the project could not be externally assessed without either changing the agreed aims and rationale of the course or changing the assessment to one that doesn't reflect Engineering Science.

Although we have changed the mark allocation and marking instructions, the project is very similar to previous years — the major difference is that it now includes both ‘electronics and control’ and ‘mechanisms and structures’ sub-systems.

Information and guidance

Exam technique

You must ensure that candidates are familiar with how to respond to the question paper. The command word used in each question informs the response that is required:

- ◆ Draw — the candidate will have to draw a diagram or symbol of some kind. It must be clear, but it is not the same as a technical drawing seen in subjects such as Graphic Communication. For example, ‘Draw the NAND equivalent of the given circuit.’ or ‘Draw the symbol for a diode.’
- ◆ Calculate — the candidate will have to perform some form of calculation using the information in the question and skills learned throughout the course. For example, ‘Calculate the current in the given circuit.’
- ◆ State or Name or Give — the candidate will have to write a short answer — this could be one word or a short sentence. For example, ‘State the direction of rotation.’
- ◆ Describe — the candidate will need to detail or define a situation or the consequence of an action. This will be a fuller response, with more depth, than that of State or Name or Give. For example, ‘Describe the operation of the pneumatic circuit.’ or ‘Describe an economic impact of the change.’
- ◆ Explain — the candidate will need to demonstrate why something has happened, consider the cause and effect of a situation, or establish a relationship between different things. This will be a fuller response, with more depth than that of State or Name or Give. For example, ‘Explain why friction needs to be minimised.’ or ‘Explain why material x is more suitable than material y.’

Units

The units that previously contributed to the National 5, Higher, and Advanced Higher courses are still available for centres to use on a freestanding basis. There is no longer a hierarchy with the National 4 units.

National 4 added value unit assessment

Throughout the last academic session, we received a number of queries from centres asking if the National 5 assignment could be used to assess the National 4 added value unit.

The answer is no, National 4 candidates **cannot** be given the National 5 assignment to use as an added value unit assessment. This assessment would not be valid, as it does not cover the National 4 content, skills or demand.

You can assess units in any way you choose, provided that the content is covered and the assessment standards are met. You can use our unit assessment support packs (UASPs), adapt the UASPs, or develop an assessment of your own.

Using this rationale, you could take the National 5 assignment and rework the content and demand to make it valid for a National 4 candidate (for example removing National 5 skills, processes and components, and replacing them with National 4 skills, processes and components). Candidates would then be assessed against the assessment standards of the National 4 unit. While this approach is feasible, we would not recommend it and suggest you would be better using an existing UASP.

Exemplification

Following the first year of the revised course assessment at Higher, we are producing a range of exemplification materials (covering both question paper and assignment).

You can access these Understanding Standards materials via the 'Understanding Standards' tab on the [subject page](#) of our website.

Calculators

In Engineering Science courses, scientific calculators are permitted and are necessary, however, the following conditions must be met:

- ◆ Calculators are not permitted if they have been designed, or adapted, to offer any of the following facilities:
 - language translators
 - symbolic algebra manipulation
 - symbolic differentiation or integration
 - communication with other machines or the internet
- ◆ Calculators are not permitted if they have retrievable information stored in them (including databanks, dictionaries, and mathematical formulae).

Significant figures

In the question paper, candidates must give a final answer to the correct number of significant figures — this is the same number as the lowest data value given in the question. If not, the final answer will be incorrect and will not attract marks.

Internal assessment appeals

Once internal assessment is complete, you must let candidates know their project mark (for Advanced Higher) or unit result (for units at any level). You must tell them their result is provisional, as it is subject to external verification by SQA. Following external verification, you must inform candidates of their final mark or result.

The Advanced Higher project assessment only permits a single attempt within an academic session, so no re-assessment is possible. If candidates do not achieve their desired result, either in the Advanced Higher project or in units at any level, you must inform them of your centre's internal assessment appeals process and what options are available to them.

National Qualifications Support Team (NQST)

We have the NQST (Design and Technology) that acts as an advisory group for this subject (and other technology subjects), primarily commenting on assessment. We are looking to expand the membership of this team; if you are interested, you can find more information about [National Qualification Support Teams](#) on our website, together with an [application form](#).

Appointment opportunities

From time to time we advertise appointee opportunities. Becoming an appointee is a rewarding and useful experience, and we would encourage applications from all who meet the role criteria. You can find out more about [appointees](#) from our website.

Advanced Higher

Online resources to help you prepare for Advanced Higher assessment

As part of our Understanding Standards programme, we are providing a range of supportive resources to help you develop your understanding of the standards required in the revised course assessments for Advanced Higher. This may include audio presentations, published candidate evidence and commentary materials, and webinar recordings, which we have tailored to meet the needs of each subject.

You can access these Understanding Standards materials via the 'Understanding Standards' tab on the [subject page](#) of our website.

Units that were previously part of the Advanced Higher courses

The units that were previously part of the Advanced Higher courses are now available as freestanding units at SCQF level 7. These units no longer contribute to the Advanced Higher courses. We have removed references to Advanced Higher courses from the freestanding unit specifications, which are available from the freestanding units web page for each subject. There is a link to the freestanding units page from the 'see also' section on the [subject page](#).

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Contact us

Please contact our Customer Support Team:

Tel: 0303 333 0330

Fax: 0345 213 5000

Email: mycentre@sqa.org.uk