

CAMBRIDGE NATIONALS

Examiners' report



ENGINEERING MANUFACTURE

J832, J842

R110 (moderated)
R111 (moderated)
R112 (moderated)
Summer 2018 series

Version 1

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Introduction

Our Lead Moderators' reports are produced to offer constructive feedback on centres' assessment of moderated work, based on what has been observed by the moderation team. These reports include a general commentary of accuracy of internal assessment judgements; identify good practice in relation to evidence collation and presentation and comments on the quality of centre assessment decisions against individual Learning Objectives. This report also highlights areas where requirements have been misinterpreted and provides guidance to centre assessors on requirements for accessing higher mark bands. Where appropriate, the report will also signpost to other sources of information that centre assessors will find helpful.

OCR completes moderation of centre-assessed work in order to quality assure the internal assessment judgements made by assessors within a centre. Where OCR cannot confirm the centre's marks, we may adjust them in order to align them to the national standard. Any adjustments to centre marks are detailed on the Moderation Adjustments report, which can be downloaded from Interchange when results are issued. Centres should also refer to their individual centre report provided after moderation has been completed. In combination, these centre-specific documents and this overall report should help to support centres' internal assessment and moderation practice for future series.

General overview

It is important for moderators to receive candidate work from centres by the deadline date. There were isolated cases of work not being received by this date. Moderators will then need to contact centres to enquire when it will be sent. Delayed submission of samples slows down the moderation process, and the resolution of issues should they arise during moderation.

Centres should check carefully what sample work is being requested and ensure that the correct sample of candidates is sent to the moderator.

A completed Unit Recording Sheet (URS) is required for each candidate in the requested sample. If a URS is not included for every candidate, the moderator will contact the centre and request them to be sent. Without a correctly completed URS for each candidate moderation cannot take place and will be delayed.

Clerical errors

Check the addition of marks on the URS and once they are transcribed to Interchange. If they are incorrectly totalled, we will need to reconfirm them with centres at moderation. This introduces delay to the moderation process.

A copy of the IMS1 mark sheet produced by Interchange should be sent along with the sample to your moderator so they can check the sample sent is correct.

Standard of assessment by centres is mostly consistent for this series. Where this is not the case, the assessment tended to be too generous or variable. Detailed reasons for this are highlighted in the separate Report to Centre provided to the centre for that unit. Generic comments for this unit are included in the next section of this report.

Teacher commentary on the URS

Teacher commentary on the URS, along with clear indication of how the mark credited is derived, helps greatly with the moderation process. Page numbers of where evidence can be found in the candidate evidence is also extremely useful. Candidate work can also be directly annotated showing where each learning outcome and mark band is being addressed.

Centres are reminded that work cannot be double counted, and if used as evidence for one learning outcome should not be used for others. This is also the case for work that overlaps more than one unit within the qualification. Work that is double counted might be discounted if found during moderation, thereby disadvantaging the candidate.

If more than one marker is marking a cohort of work, it is crucial to standardise marking across markers. Internal standardisation ensures that the marks presented are accurate and consistent, and that the rank order of marks is maintained. Rank order errors are referred back to the centre by the moderator and often require the centre to remark work, thereby delaying the moderation process.

Photographic evidence should be annotated by the candidate to explain what is being presented. It should also clearly identify the candidate using their candidate number.

Authentication

It is essential that candidate work is authentic. This means that it is individual, and that sources of information are referenced. This is not only good practice but avoids the risk of penalties being applied. Moderators check for authenticity during moderation, referring any suspected cases to OCR for further investigation. This will delay moderation and may have serious consequences for the centre and candidate.

Centres are encouraged to use the witness statements included with the Live Assessments to support and corroborated candidate-generated evidence. They can also be used to support any other Learning Outcomes as appropriate.

Witness statements

Witness statements are used to support and corroborate evidence produced by candidates and are useful where this evidence is difficult to show directly. Examples include working independently, working safely and producing high quality finished items. They cannot be used as a sole source of evidence and must only be used to support other candidate-generated evidence. Moderation will impose penalties where a witness statement is presented without this additional evidence.

R110 Comments by LO

LO1 – Be able to plan for the making of a pre-production product

LO1a requires interpreting 2D and 3D drawings and identifying all relevant details required to make a pre-production product. Candidates could provide evidence of this through a written interpretation of a supplied drawing (e.g. by annotating the drawing). It would help if centres could supply the drawing that candidates have interpreted if this is not the case.

For LO1b candidates are required to produce a production plan. Where done, this was often quite detailed. In a few cases, only basic plans had been produced. The plan should identify the sequence of operations, tools, equipment, manufacturing processes, health and safety requirements and quality control checks. Coverage of all these points is required to ensure access to the higher mark bands.



AfL

Candidates could be provided with a blank tabulated planning template to complete for this LO

LO2 – Be able to use processes, tools and equipment safely to make a pre-production product

LO2a requires candidates to demonstrate the safe use of hand and machining practices to make an item using the production plan. Please note that the intention here is to use hand tools and manual machining processes, and not CNC machining processes. Annotated photographic evidence is an effective way to show each step of the process. In some cases, only finished items were shown meaning that it was difficult to assess the process. This LO can be appropriately supported using a witness statement.



OCR support

Witness statements:

Please ensure that the witness statement is correctly used to support and corroborate candidate-generated evidence.

If you are unsure, please refer to the OCR CPD Hub website for many free face to face and online training events.

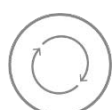
LO2b requires candidates to review the quality of the component made using appropriate quality control checks. Again, documentary evidence supported by photos and a witness statement here are all reliable ways of demonstrating this. The review should include dimensions and processes etc. should be clearly compared back to the requirements of the initial drawing and plan.



AfL

Review:

An important part of many of the units is the ability to review a plan, product or personal performance. Centres could provide further guidance on techniques required to produce an effective review.



AfL

Synoptic teaching and learning:

Candidates are required for this LO to draw upon skills/knowledge/understanding from other units in the specification and it would be useful if this was made explicit within their responses.

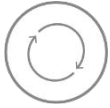
LO3 – Be able to modify a production plan for different scales of production

For LO3 candidates should reflect on the production plan and make modifications appropriate to an increased scale of production. It was evident that some candidates simply said the use of a CNC machine was sufficient, which is not a fully satisfactory response. To access the higher mark bands attention should also be given to other implications such as batch operations for certain operations (e.g. cutting to length, facing off, drilling a hole etc.), sequencing of operations, materials supply and use of standard components etc. to give a more comprehensive and convincing answer.

R111 Comments by LO

LO1 – Be able to plan the production of components on Computer Numerical Control (CNC) machines

Most candidates attempted LO1 and were able to produce plans for the production of components using a CNC machine. The plans sometimes require more detail in order to access the higher mark bands.



AfL

Reference should be made to the unit specification for details of what the plan should include. Candidates could be given a blank planning template with headings for them to complete.

Please refer to the Assessment Guidance in Appendix B of the Specification document, and read this in conjunction with the Marking Criteria and the Unit Specification to see what is required.

LO2 – Be able to interpret information from Computer Aided Design (CAD) to manufacture components on CNC equipment

LO2 requires candidates to interpret a CNC program and to demonstrate program operations. There was often limited evidence of this interpretation thereby restricting access to the higher mark bands. Evidence could include annotated G code (or similar), or a set of annotated screen shots showing in detail how the CNC program operates.

LO3 – Be able to set-up and use CNC equipment to manufacture components

LO3a and b require candidates to set up and use a CNC machine to manufacture components. There was often good evidence of this taking place, but in some cases only the final item was shown thereby not securing access to the higher mark bands. One way in which to demonstrate this is by annotated photographic evidence supported by a witness statement showing all stages of the CNC process (including setting up the machine, loading the material stock, performing programming and machining operations and the final items produced).



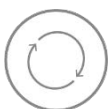
OCR support

Witness statements:

Please ensure that the witness statement is correctly used to support and corroborate candidate-generated evidence.

If you are unsure, please refer to the OCR CPD Hub website for many free face to face and online training events.

LO3c requires candidates to make a comparison between manual and CNC produced components, and one effective way seen of doing this was to compare components made in Unit R110 with those in R111. Suitable commentary with a comparison should then be made.



AfL

Synoptic teaching and learning:

While this LO offers the opportunity for synoptic teaching, learning and assessment please remember that evidence used within one unit cannot be double counted and used again verbatim within another unit. In this case measurements taken from products manually produced in R110 can be used as part of the comparison with CNC produced products in R111.

LO4 – Know about applications of computer control processes used to manufacture products

LO4 requires candidates to explore the wider application of computer-controlled processes. Most candidates could identify suitable processes with examples and so access the full range of mark bands was achieved. Please refer to the Unit Specification for examples of a range of different computer-controlled processes.



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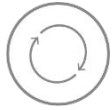
Referencing:

This LO provides an excellent opportunity to develop and demonstrate skills at referencing materials found. Further guidance on referencing is available from the OCR website.

R112 Comments by LO

LO1 – Understand the importance of quality control

LO1 requires candidates to describe, using suitable and relevant examples, the reasons for implementing quality control in production. This LO was often well attempted, with no shortcomings identified.



AfL

Referencing:

This LO provides an excellent opportunity to develop and demonstrate skills at referencing materials found. Further guidance on referencing is available from the OCR website.

LO2 – Be able to assess product quality from inspection and quality control techniques

To access the higher mark bands, LO2 requires comprehensive quality control checks to be performed during stages of production. One way of demonstrating this is for candidates to perform actual quality control checks using measuring equipment. An effective way for candidates to demonstrate this is in the form of annotated photographs supported by a witness statement. Measurements taken can be tabulated and compared against expected values. Centres are encouraged to provide candidates with the opportunity to undertake a range of different quality checks including visual checks and measurements (e.g. using a rule, Vernier caliper, micrometre, gap gauge etc.). This practical activity could be linked to quality checking work produced in other units e.g. R110 and R111. Please remember, however, that work cannot be directly double counted across units.



OCR support

Witness statements:

Please ensure that the witness statement is correctly used to support and corroborate candidate-generated evidence.

If you are unsure, please refer to the OCR CPD Hub website for many free face to face and online training events.



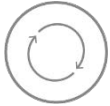
AfL

Synoptic teaching and learning:

While this LO offers the opportunity for synoptic teaching, learning and assessment please remember that evidence used within one unit cannot be double counted and used again verbatim within another unit. In this case measurements taken from products produced in R110 and R111 can be used as part of undertaking comprehensive quality control checks.

LO3 – Know how modern technologies can be used in quality control

This LO requires a description of the application of modern technologies used in quality control. While there was some good evidence of this, some candidates misinterpreted this and provided a description of the application of modern technologies in manufacturing rather than their application in quality control. Suitable examples include computer visual inspection, co-ordinate measurement and automated test equipment (ATE) etc. Further techniques include advanced NDT methods such as ultrasonic testing and X-Ray crack detection.



AfL

Reference should be made to the unit specification for a full list of modern technologies used in quality control.

Please refer to the Assessment Guidance in Appendix B of the Specification document and read this in conjunction with the Marking Criteria and the Unit Specification to see what is required.

LO4 – Know the principles of lean manufacturing

For LO4 candidates are required to provide a description of the categories of waste and methods used to reduce waste in lean manufacturing. Most candidates could identify each area of TIMWOOD and explore them in detail. Some were able to extend this by exploring Design for Manufacturing Assembly (DFMA), which secures access to the higher mark bands.

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For further details of this qualification please visit the subject webpage.

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