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CAMBRIDGE NATIONALS

Examiners' report

PRINCIPLES IN ENGINEERING AND ENGINEERING BUSINESS

J830, J840

R102 (moderated)
R103 (moderated)
R104 (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.

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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 awarded 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 leaning 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.

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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.

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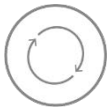
R102 Comments by LO

LO1 – Know about engineering sectors, their products and services

LO1 was generally well attempted. Most candidates identified three sectors, and a range of products and services from these sectors. Higher mark bands can be accessed by providing a more comprehensive coverage of the sectors and identifying a wider range of products and services.



AfL

Candidates should cover at least three engineering sectors.

Please refer to the Assessment Guidance in Appendix B of the Specification document.

LO2 – Understand how engineering companies operate

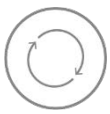
This LO was generally well attempted by candidates. Two and sometimes more companies were identified, and their structure analysed. Relationship to other companies, both suppliers and customers, was also evident in most cases. Ideally, the investigation for this LO would be carried out in conjunction with that for LO1 and include diagrams of company structure.

LO3 – Know about employment in engineering

Job opportunities within engineering were also often well covered, as were sources of career and job information. Some candidates did not include entry routes e.g. qualifications and progression in their job opportunities. Candidates often provided a clear description of the Engineering Council. Rights and responsibilities of employers and employees were mostly well covered. All of these elements are required to ensure secure access to the higher mark bands.

LO4 – Understand innovation and technical advances in engineering

LO4 was generally well attempted with most candidates being able to identify innovations (often two or more). Sometimes the innovation aspect of the item was a little difficult to see. Innovations should clearly be related to the world of engineering. Candidates could improve their responses to ensure access to the higher marks bands by providing more detailed explanation of the social and economic impact the innovation has made.



AfL

Candidates should choose one recent engineering innovation and/or innovation from their overall selection to study in more detail and assess the impact it has had in terms of: material/resources; design and production methods; sustainability of process; product efficiency; cost to producers and users.

Please refer to the Assessment Guidance in Appendix B of the Specification document.

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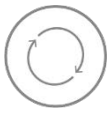
R103 Comments by LO

LO1 – Know about the sustainability of engineering materials and products

Candidates were clearly able to identify materials and components from engineered products but sometimes focused more on the properties of these materials rather than implications of their use for sustainability and the environment. Some candidates had touched upon the use of finite raw materials and had also tried to reference the 6Rs in their analysis.



AfL

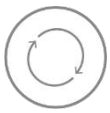
Candidates should focus on the application of materials and components with reference to sustainability and environmental impact in order to access the full range of mark bands.

Please refer to the Assessment Guidance in Appendix B of the Specification document.

LO2 – Know about sustainable design for engineered products

Candidates often made a good attempt at this LO by considering design features such the energy usage during operation, energy used during manufacture and how it could be maintained. Other factors candidates could consider are materials selection, product life cycle, and design for obsolescence.

Although candidates often identified a range of relevant points, the depth of coverage relating to the design process requires more detail. It is essential for this LO that the impact on the design process is considered. Considering all of these points allows access to the higher mark bands.



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 – Understand the impact of global manufacturing

Again, candidates made a good attempt at this LO, identifying local labour markets, transport costs and their effect on carbon foot print. While a range of excellent considerations were identified the depth of coverage was sometimes a little weak. To access the higher mark bands candidates must demonstrate a comprehensive understanding of the impacts of global manufacturing and show clear appreciation of both the positive and negative impacts it brings.

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R104 Comments by LO

LO1 – Understand why engineering systems and products are designed and maintained for optimum performance

LO1a was often well covered albeit sometimes not explicitly in terms of all its elements. It was evident in most candidates' work that they understood how systems and products require maintenance, but not always the reasons for this (e.g. why perform maintenance?).

LO1b was also often implicitly covered by candidates. It was evident that all understood the connection between undertaking maintenance and enabling optimum performance of a system or product (e.g. changing oil or air filter, tensioning a belt etc.). The link between reasons for maintenance and optimisation of performance needs to be clearly made to ensure secure access to the higher mark bands.

LO2 – Know methods used in engineering sectors to maintain optimum performance

Candidates often addressed LO2 with a range of methods through which optimisation is undertaken (through checking of components and replacement). There were no shortcomings identified for this LO.

LO3 – Understand factors that contribute to system/product failure

Most candidates had illustrated using a table or photos different failure modes of components and the implications of this failure. Again, this LO was often well attempted with few shortcomings.

LO4 – Be able to perform simple procedures to optimise product/system performance

Candidates often presented a clear description with photographs of undertaking maintenance on a mower engine or similar, and in some case also on other systems such as an air compressor. Other examples of undertaking maintenance are permissible, so long as they offer sufficient technical challenge. The evidence provided by candidates was often detailed.

Centres are encouraged to use the witness statement pro-forma supplied with the Live Assessment to record how safely and competently candidates worked, and how much assistance was required. This should be in addition to the evidence provided by the candidate (e.g. both candidate-generated evidence such as photos and also a witness statement is required).

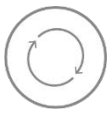
Please also ensure for this LO that candidates demonstrate how they have worked safely to perform maintenance operations.

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

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