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Examiners' Report

Summer 2010

Principal Learning

Engineering Level 2 Controlled Assessments

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Principal Learning Engineering

Level 2 Introduction

In general much of the work submitted has been of a good standard and has been graded correctly by centres. The work submitted by these centres usually followed a logical format with a well developed and prepared 'brief' which was clear to candidates and allowed them to access marks across all Mark Bands.

As in previous series, aspects of centre administration were not properly addressed; however, some improvement was noticed. OPTEMS/EDI must be included with samples. Front sheets should be correctly filled in with centre number, candidate number, candidate signatures etc.
When centres submit the required sample they must also include the highest and lowest achieving candidate.

It would greatly help the moderation process if candidate work is annotated to indicate where and which Mark Bands have been allocated along with the number of marks awarded.

Some marking was lenient across all units. Centres must ensure they allocate marks in accordance with the Marking Grid and gain further clarification of mark allocation from the 'guidance for allocating marks' section of the unit specification.
In future, when centres are designing the unit assignment brief they would benefit by referring to the published Tutor Support Material as this gives clear guidance on how to present tasks so that candidates are able to focus on what evidence should be presented, particularly with reference to gaining scores in Mark Bands 2 and 3.

Evidence presented for Marking Grid B was also variable. Good centres were able to provide evidence in the form of annotated photographs, detailed and individualised observation records as well as signed candidate work.

A significant number of centres are still not fully aware of the requirements regarding submission of samples for moderation- particularly centres submitting for the first time this summer. Several centres, who submitted incorrect samples, incorrectly completed CRS's or missed the extended cut-off date. They continue to cause the same problems for moderators this time around.

Many did not understand that zero is not acceptable as the lowest mark and that where the maximum and minimum candidates have not been selected by the computer they should send in 10+2 = 12 samples.

A significant number of samples were late arriving with moderators and this led to delays in moderation.
Where moderators received samples by the published date all moderated marks and E9 reports were entered online by the due date.

Assignment briefs were not always included with the evidence portfolios and this made the process of moderation more complex and time consuming.

Level 2 Unit 1 Exploring the Engineering World

General comments
On some scripts the candidates did not seem clear on how to meet all the assessment criteria, particularly at Mark Bands 2 and 3. At some centres it seemed that the teaching and learning had not thoroughly covered all assessment criteria. Candidates showed some difficulty understanding the meaning of the action verbs used in the assessment criteria.
In some centres there was evidence of employers being involved in assessment activities though this was generally not evident.
It would aid the moderation process if marks awarded by assessors could be directly attributed to a specific Mark Band for ay particular Learning Outcome.

Standard of assessment
The standard of assessment was generally fair. Assignment briefs had not always been included with the evidence portfolios. Good centres providing good portfolios often had well written assignment briefs.

Learning Outcome 1
Most candidates had chosen two sectors. Candidates marks were generally fairly allocated but more depth of explanations would have improved the marks and accessed the higher bands.

Learning Outcome 2
Most candidates had identified four job opportunities. Descriptions of the Engineering Council were much improved on the previous series - although in some cases it could have been expanded. There was also limited evidence - in many cases - of qualifications required and progression opportunities. It was evident in several cases that candidates had provided quite generic job descriptions. There was also evidence of some commentary on progression opportunities and evaluation of the reasons for professional registration. This was an area well covered by most candidates.

Learning Outcome 3
Most candidates had covered developments from three centuries, with mention on current technology such as Bluetooth which was very good. MB1 marks were covered well with the social and economic factors improved from the previous series.
At the highest mark band the work submitted sometimes lacked a clear understanding of how engineering developments had directly led to socio-economic improvements.

Learning Outcome 4
While most candidates had attempted this Learning Outcome, some did not describe the main responsibilities of employees and what employers can undertake to encourage them to work. Some had correctly identified a few of the rights and responsibilities of employers and employees, but this was more general and no direct link to engineering. More in-depth comments on rights and responsibilities and employer encouragement would give further access to the higher mark bands.

Level 2 Unit 2 Investigating Engineering Design

General comments
Overall the standard of performance appears to be the same as in previous series. There was the usual wide variation in marks between centres which understood the principles of delivery and assessment (probably through training) and those who appeared to have little knowledge. Some centres which had entered candidates last summer and produced poor results did not seem to have learnt anything from the experience and were still not hitting the target.
Generally candidates that did well were from centres which had structured activities against the learning outcomes rather than giving free reign to the production of over complex and improbable ideas.
Where the given design brief related to a straightforward focused requirement which could be translated into a clear specification then candidates tended to produce good design proposals.

Standard of assessment
Assignment briefs were not always included with the evidence portfolios and this made the process of moderation more complex and time consuming. A number of moderators raised serous concerns about the lack of annotation of candidate scripts.

Learning Outcome 1
Generally answered well by most candidates. Many portfolios followed good practice and were supported by observation statements. Evidence of dismantling/reassembling an engineered product or system and describing its construction, function, mode of operation. An evaluation of its range of performance and fitness for purpose. Detailed writing, sketching, system block diagram, images and witness statement.

Learning Outcome 2
Both strands of this Learning Outcome were covered reasonably well. Identification of the physical constraints in a given design brief and presentation of a product design specification. Identification of performance requirements and reliability indicators. The design specification should include references to economic and manufacturing issues.

Learning Outcome 3
Three design proposals which take account of own and other's ideas. Ideas to be clearly presented. Selection of a design idea for further development- decision to be justified and based on comparisons made between the three initial design proposals.

Learning Outcome 4
Most candidates achieved Mark Band 1. Production and submission of a design solution. Can be drawings, sketches, circuit diagrams or flow charts supported by a commentary. Must be a development of one of the three proposals and not just a simple re-presentation.

A detailed design report which links back to the specification and presents a solution which addresses the requirements of the design brief. To include mathematical and scientific calculations. There were some good portfolios from centres which had given candidates a structure to work to and followed the guidance in the unit specification.

Level 2 Unit 3 Engineering Applications of Computers

General comments
Most centres provided learners with tasks which were accessible to the full range of candidate ability.

An example of a good choice of topic for LO2 (solve a given problem) was to design a simple component using a CAD system and to follow up with CNC machining. Finished product then checked for dimensional accuracy – some centres linked this LO to Unit 6 (Application of manufacturing technique in engineering) LO3 set up and use CNC equipment. An example of a poor choice of topic was when the solution only involved working on-screen with a computer - difficult to award marks for safe working.

Standard of assessment
Most centres were accurate and consistent in applying the marking criteria. Those that did not mark accurately were over-generous but consistent. A common error was to award full marks for LO2 mark band 1 when there was no observation record or witness statement to support setting up and using equipment and learners had not provided photographs or written description. Some were over generous with LO2 mark band 3 and gave marks for generic justifications for using computers rather than reasons linked to the problem which the learner had solved.
Assessors also wrongly awarded for LO4 mark band 3 by giving full marks for really detailed descriptions of computers being used in maintenance/diagnostic situations but containing no evidence that the learner had interpreted generated data and proposed a course of action.

Most centres used the full range of marks for all assessment criteria. Those that did not tripped up in three ways:
LO2 - by not setting up an engineering problem which would enable learners to carry out an activity which could easily gain marks for safe working. Many learners could not be awarded the five marks for choosing and setting up an appropriate piece of computer based equipment because the centre had done this for them.
LO3- mark band 1- some learners put a lot of wasted effort into describing the internal architecture and operation of a microprocessor. The focus of the unit should be on computers/microprocessors being used as control devices.
mark band 3- learners not guided to apply a microprocessor system to another product.
LO4- by not providing learners with the means to generate and interpret computer generated diagnostic data. Many centres took learners into vehicle workshops and let them investigate engine diagnostics. Good descriptions were presented but learners did not then go on to look at actual data.

Learning Outcome 1
There was evidence of the application of computers in process control, but in most candidates the comparison is rather weak and there is little evaluation. This would give access to the higher mark bands.

A significant number of candidates did not fully appreciate the meaning of the key words ‘compare’ and ‘evaluate’. All found an example of a process control and a manufacturing application, many describing them detail and gaining full marks for Mark Band 1. Evidence for band 2 was not so robust and many candidates had difficulty with Mark Band 3.

Learning Outcome 2
It was evident across centres that the candidates had used a computer-based system to solve a given problem. Access to the higher marks bands can be achieved by further demonstrating safe use (which was not always evident), and justifying the decision to use that particular equipment in order to come to a solution.

Centres that gave candidates access to equipment such as a small bench robotic arm or sorting conveyor generally achieved much better results.
Justifications and appraisals for Mark Band 3 were in many not covered well.

Learning Outcome 3
The description of the use of microprocessors was limited in many cases and the examples were not always suitable. Access to further marks can be gained by describing more clearly two systems, identifying the component parts of the system and suggesting how such a system might have another application.

Learning Outcome 4
Whilst two maintenance systems were described by most candidates there was little evidence of the type of fault diagnostic data that could be obtained or how it might be interpreted. This would give access to the higher mark bands.

Level 2 Unit 4 Producing Engineering Solutions

General comments
Overall the scripts received from most s were neatly organised with clear page references indicating each learning outcome. The explanation and breakdown of marks for each learning outcome from centres was mostly well laid out and easy for moderators to understand the marks given for each band in the LO.

Standard of assessment
On some scripts the candidates did not seem clear on how to meet all the assessment criteria, particularly at Mark Bands 2 and 3. At some centres it seemed that the teaching and learning had not thoroughly covered all assessment criteria. Candidates showed some difficulty understanding the meaning of the action verbs used in the assessment criteria.

It was good to see the inclusion of assignment briefs with most candidate portfolios in this series.

Learning Outcome 1
The candidates identified Health & safety procedures but no standards. The reason why risk assessment is necessary was not done by some centre candidates. The responsibilities of self and others were also described by some candidates. Risk assessments were carried out with most candidate identifying hazards. Drawing comparison between duties of self and others was barely attempted or not at all by candidates.

Learning Outcome 2
Most candidates were able to produce a plan showing processes, materials and in some cases timescales. Access to the higher mark bands could have been obtained by justifying the sequence on the plan, and by making a review and evaluation (along with improvements). This was carried out by candidates in some cases.

Learning Outcome 3
This was attempted by most candidates. Access to the higher mark bands would be achieved by justifying the selection of the materials or components, and relating this to the article being made. Justification was given why the materials and component were chosen but more could be done in this area to achieve higher mark in this band.

Learning Outcome 5
Evidence for this learning objective was the weak. Some candidates at some centres had made no attempt at providing evidence. However, the better centres had provided records of comprehensive inspection and testing.

Learning Outcome 4 (Marking Grid B)
It is noted that some centres provided witness statements to support the evidence, which included photographs.

Level 2 Unit 5 Electrical and Electronic Circuits and Systems

General comments
The provision of witness evidence, in any form, was very poor from some centres, making it very difficult to give candidates proper credit when moderating. For some centres there was a statement for Marking Grid B. Generally more needs to be done by centres to provide suitable evidence for Mark Grid B.

Standard of assessment
Generally teacher assessment was accurate with a few exceptions.
This unit is clearly written and considerable guidance is provided for assessment strategies. The assignment briefs/tasks set by most centres was good but as in the previous series some centre tasks were poor.
Calculations in LO1 are often confused and vague and not clear to learners.
LO2 is straight forward and was generally handled well by centres but tasks to allow access to the higher bands was variable.
Generally the LO3 descriptive work was not tackled well by centres and candidates had problems describing the function of circuits chosen and operation of individual components.

Learning Outcome 1
Candidates were asked to demonstrate safe working practises and the calculation of electronic components. MB1 was achieved by most students. There was good range of calculations provided by the learners clearly showing how to work out the value of current through to fuses. Evidence from current working standards and electrical safety legislation was not investigated or included.

Learning Outcome 2
This was met by most learners. Identification of components tended to be in the form of a chart and/or photographs. MB2 and 3 were not so well achieved by candidates. Centres often failed to provide suitable circuits or were too lenient in their marking.

Learning Outcome 3
Generally candidates received good marks. There was high quality work produced by learners evidenced with annotated photographs. The descriptions though lacked detail with the function of each being poorly explained.

Learning Outcomes 3 and 4 (Marking Grid B)
It is noted that some centres provided witness statements to support the evidence, which included photographs. It appears that many statements did not properly support evidence being presented for the higher Mark Bands and would have been an issue if Marking Grid B evidence were subject to moderation.

Level 2 Unit 6 Application of Manufacturing Techniques in Engineering

General comments
Most centres provided learners with tasks which were accessible to the full range of candidate ability.
Example of a poor choice of topic for LO1:
Learners were given a bridge building exercise that involved the use of paper and straws. Although the given exercise was about team building it did not fulfil the requirements of the assessment criteria because learners were unable to reflect on their performance/contribution for LO3 (Grid B) and LO4.

Standard of assessment
Most centres were accurate and consistent in applying the marking criteria. Those that were over-generous tended to do this for LO1- particularly awarding from mark band 3 when there was no evidence of analysing own contribution to the team, recognising strengths and weaknesses and improving performance.
Most centres used the full range of marks for all assessment criteria.

Learning Outcome 1
Most candidates were able to provide a very brief description of their role in the team, and had identified limited strengths and weaknesses. Some had also suggested ways in which their performance could be improved. Each section requires more detail in order to gain better marks.

Learning Outcome 2.1
Some candidates had identified several pieces of production information and there was some evidence of interpretation. In some cases it was not evident that they had identified the four required and a little more detail is required in order to gain further marks.

Learning Outcome 2.2
Some candidates had produced a basic plan which had some detail, but these require more detail in order to gain further marks. Candidates had failed to justify the plan which is required for access to the higher mark bands.

Learning Outcome 4
This was perhaps one of the weakest LO's for across centres and candidates. Three quality control (QC) techniques are required, one of which must be statistical. For access to the higher mark bands, candidates also need to analyse the results against the specification, and comment about the production process. There was some evidence of QC techniques being applied but the methods being used were not always clearly explained.

Level 2 Unit 7 Applications of Maintenance Techniques in Engineering

General comments
Most centres provided learners with tasks which were accessible to the full range of candidate ability.

Examples of good/poor choices of topic/task- none were specifically identified in the E10's forwarded to the PM. However, it was noticed that learners performed better in LO1.1 where centres asked them to describe and explain maintenance types with greater contrast then did centres asking them to investigate similar maintenance systems.

For LO4 some learners just wrote generic descriptions of what the risks might be in an engineering situation, or presented lists of issues without suggesting of ways in which risks could be managed.

Standard of assessment
Most centres were accurate and consistent in applying the marking criteria.
Many centres were unable to use the full range of marks for all assessment criteria because many learners presented weak evidence for mark band 3 across all LO's.
Some assessors incorrectly gave full marks for LO4 mark band 3. Usually it was where a learner had produced a detailed and impressive looking risk assessment but had failed to make reference to H&S regulations and warning signs.

Learning Outcome 1.1
Most candidates had identified two types of maintenance techniques, but these were not always relevant or appropriate. To gain access to the higher mark bands requires a statement on the appropriateness of the particular technique, and some justification. Candidates failed to do this.

Learning Outcome 1.2
This LO requires the analysis of data to look at trends and to calculate reliability information such as MTTF. Candidates had mostly presented data which was not relevant to maintenance and therefore to this LO.

Learning Outcome 2.2
This LO requires the candidate to produce a maintenance plan to include timescales, tools, safety procedures etc. The maintenance plan produced by many candidates failed to address all of these points. Candidates thus failed to access marks in the higher bands.

Learning Outcome 3.1
For this LO candidates are required to describe and justify the implications for undertaking poor maintenance. Whilst some candidates had attempted this, they made no justification and the examples used were not always appropriate making this difficult.

Learning Outcome 3.2
This LO requires that the candidate identify spare parts and calculate the required stock levels. This can be lined to MTTF. Many candidates had failed to address this LO fully. Full calculations, selection of spare parts and a suitable justification are required.

Learning Outcome 4

Whilst most candidates had produced a risk assessment, access to the higher mark bands was limited. This can be achieved by addressing H&S legislation, discussing PPE and its correct storage, and by considering warning signs. The latter items were not always evident across centres.

Statistics

Level 2 Unit 1 Exploring the Engineering World

	Max. Mark	A*	A	B	C
Raw boundary mark	60	53	43	33	24
Points Score	10	8	6	4	2

Level 2 Unit 2 Investigating Engineering Design

	Max. Mark	A*	A	B	C
Raw boundary mark	60	54	44	34	24
Points Score	10	8	6	4	2

Level 2 Unit 3 Engineering Applications of Computers

	Max. Mark	A*	A	B	C
Raw boundary mark	60	52	42	33	24
Points Score	10	8	6	4	2

Level 2 Unit 4 Producing Engineering Solutions

	Max. Mark	A*	A	B	C
Raw boundary mark	60	54	44	34	25
Points Score	10	8	6	4	2

Level 2 Unit 5 Electrical and Electronic Circuits and Systems

	Max. Mark	A*	A	B	C
Raw boundary mark	60	54	44	34	25
Points Score	5	4	3	2	1

Level 2 Unit 6 Application of Manufacturing Techniques in Engineering

	Max. Mark	A*	A	B	C
Raw boundary mark	60	52	43	34	25
Points Score	10	8	6	4	2

Level 2 Unit 7 Application of Maintenance Techniques in Engineering

	Max. Mark	A*	A	B	C
Raw boundary mark	60	53	43	33	24
Points Score	5	4	3	2	1

Notes

Maximum Mark (raw): the mark corresponding to the sum total of the marks shown on the Mark Scheme or Marking Grids.

Raw boundary mark: the minimum mark required by a learner to qualify for a given grade.

Please note: *Principal Learning qualifications are new qualifications, and grade boundaries for Controlled Assessment units should not be considered as stable. These grade boundaries may differ from series to series.*

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