

Moderators' Report/
Principal Moderator Feedback

January 2012

Principal Learning

Engineering
Level 2 Controlled Assessments

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Introduction

As in previous series it was pleasing to see that advice given, via moderation reports, has been adopted by the majority of centres. Work seen was in the main, of good quality and addressed the unit specifications. Centre assessment of candidate work was largely accurate and fair.

Centre administration showed an improvement over previous series. OPTEMS/EDI forms were included with samples. The majority of centres included front sheets which were correctly filled in with centre number, candidate number, candidate signatures etc. as well as information on where to find work within the candidate portfolios. Highest and lowest achieving candidate work was generally included in the sample and the majority of centres submitted samples before the deadline date.

The moderation process was greatly helped where candidate work was annotated to indicate where and which mark bands have been allocated along with the number of marks awarded.

As in previous series' 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. There is a great deal of useful information supplied with the unit specifications about delivery methods and assessment – please encourage assessors to use this information as it will greatly help when designing assessment strategies.

There has again been a heavy reliance on 'observation records'. These are being used in place of hard candidate evidence. Centres are reminded that the evidence submitted for Marking Grid A must be hard evidence produced by the candidates in the form of written work, photographs etc.

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.

Unit EG201_01

Exploring the Engineering World

Two sectors had been chosen by the majority of candidates, and the basic function of products from these areas was identified. A wide range of sectors was chosen and included aeronautical, automotive, electrical and mechanical engineering. Job roles were investigated and there was some good work based around visits and real jobs. Three centuries' achievements were identified but Employment Rights and Responsibilities were generally weak and concentrated on Health and Safety Act only.

The standard of assessment was generally good and accurate but a little lenient in some cases.

Assignment briefs had not always been included with the evidence portfolios.

A large proportion of the work seen was internet based – this is not surprising given the type of evidence being asked for, but the work should be referenced if quotes are used instead of the candidate's own words.

Most centres provided candidates with a good breakdown of the assessment focus for each learning outcome – this helped to direct each candidate to each mark band.

The samples of work were generally well organised and structured which enabled candidates to access most learning outcomes.

Learning Outcome 1

Most candidates had chosen two sectors. Candidates marks were fairly allocated but more depth of explanations would have improved the marks and accessed the higher bands. Candidates should choose their sectors then explore products or services and describe function and operation of those products and services.

Good centres had provided their candidates with clear guidance and this was reflected in the evidence provided by the candidate.

Learning Outcome 2

Most candidates had identified four job opportunities but these were sometimes quite generic and lacked depth. Descriptions of the Engineering Council were much improved on the previous series - although in some cases it could have been expanded. There was also improved evidence of qualifications required and progression opportunities. There was also evidence of some commentary on progression opportunities and evaluation of the reasons for professional registration. This area was well covered by most candidates.

At the higher mark bands, descriptions of the Engineering Council were much more detailed and included descriptions of the ECs roles and also some comment on professional institutions such as the IEE etc. The job descriptions were thorough and included qualifications required as well as progression routes.

Learning Outcome 3

Most candidates had covered developments from three centuries, with comments on current technology which was very good. Mark Band 1 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 but again there was some very good work that met the requirements fully.

It is important for centres to ensure that the achievements considered by candidates are in fact major engineering feats and inventions and not trivia.

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 with no direct link to engineering. Candidates should also be able to link the responsibilities of employers to legislation. More in-depth comments on rights and responsibilities and employer encouragement would give further access to the higher mark bands. Discussion of employment legislation was weak and mainly included discussion of Health and Safety.

Unit EG202_01

Investigating Engineering Design

There was a wide variation in marks between centres which understood the principles of delivery and assessment and those who appeared to have little knowledge of how to apply the specification's marking grid or follow the 'guidance for allocating marks'. A few centres which had entered candidates in earlier series still do not appear to have acted upon guidance presented in their E9 report (Report to Centre by the moderator). Most centres provided candidates with tasks which were accessible to the full range of candidate ability.

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.

Candidates who produced good design proposals seemed to be those who had been given design briefs relating to a straightforward, focused requirement which could be translated into a clear, structured specification.

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 serious concerns about the lack of annotation of candidate scripts and the difficulty of confirming assessor marks.

Most centres used the full range of marks for all assessment criteria. When they did not, this was for reasons such as: Learning Outcome 2.1- not providing candidates with a design brief so that they chose their own product/system which in most cases was inappropriate (for example re-design a mobile phone) and offering little scope for development and then going straight into a design specification (Learning Outcome 2.2) so missing out on evidence for Learning Outcome 2.1; not making clear to candidates the difference between a design brief and a PDS; Learning Outcome 4- not guiding candidates to present mathematical or scientific calculations for Mark Band 2.

Some centres could have supported their candidates better by providing a suitable design brief i.e. one that had development possibilities appropriate for a level 2 candidate. They should also have linked the learning outcomes throughout the unit (from design brief, to PDS, to three designs, to justifying one and then presenting a solution).

It is pleasing to note that an increasing number of centres, operating as a consortium, are carrying out internal standardisation between assessors or with a domain assessor.

Learning Outcome 1

Most candidates presented good evidence for the practical part of this learning outcome. Many portfolios followed best practice with photographs and written description supported by observation records. An error that some assessors made was to award marks for the dismantling/reassembling of the product (Mark Band 1) when there was no real hard evidence for the moderator to reassess. For example, just an observation record but with no other written or photographic evidence presented by the candidate. This unit has a single

marking grid and the guidance given in the specification (page 161) about assessing non-ephemeral evidence must be followed.

A significant number of candidates did not understand the proper meanings of 'function' and 'mode of operation'. For example, the function of a car is to get from A to B in reasonable comfort, safety and time. Its mode of operation is the conversion of chemical energy into kinetic energy through the burning of fuel and the movement of mechanical parts.

Learning Outcome 2

Both strands of this learning outcome were covered reasonably well when candidates were given a sensible design brief by their centre; they were able to identify the physical constraints and convert them into a design specification. Identification of performance requirements and reliability indicators presented more of a challenge. Many candidates were unable to access Mark Band 3 of Learning Outcome 2.2 because they did not take account of economic and manufacturing considerations e.g. cost of materials, deciding on the most appropriate manufacturing processes based on production quantities.

Learning Outcome 3

Three design proposals which take account of own and others' ideas are required for this learning outcome. Candidates who did well were those who produced design ideas which had significant variations. Weaker performance came from those who proposed simple variations on a theme, for example red, blue and yellow surface finishes for a box.

Some centres allowed candidates to produce more than three design proposals (usually very sketchy) and then incorrectly gave marks for all of them. A small number of centres allowed their candidates to develop ideas which did not have much engineering content and were more like a CDT project eg carpentry based.

Many candidates struggled when trying to justify their choice of a design to develop. Some centres encouraged their candidates to use a matrix comparison chart which in most case was not useful because the numerical parameters had not been specified. For example, using a marking scale of 1 to 10 for each parameter but not saying what the numbers meant. Others used simplistic tick boxes. The best responses were those where the candidate used free writing supported by simple sketches in order to convey their thoughts about the three designs.

One centre allowed candidates to work in teams of three with each member presenting a design proposal for discussion. The problem with adopting this approach is that candidates can only be awarded marks for their single idea whereas the marking grid requires 3 design ideas to be put forward. As a result the moderator had to reduce the marks across the bands because there was no hard evidence to support design ideas 2 and 3. Candidates commented about discussing design ideas with colleagues and deciding which one to develop further but most of this writing had to be disallowed because the three designs are not presented in the portfolio.

Learning Outcome 4

Most candidates achieved Mark Band 1 which is to prepare and submit a design solution. Some assessors incorrectly gave credit for work which was just a re-presentation of one of the Learning Outcome 3 design proposals, with little or no additional annotation and description. An error noted by moderators was assessors not guiding candidates to present a design log and mathematical/scientific calculations for Mark Band 2. Another common error was to award full marks for Learning Outcome 4 Mark Band 3 for a verbal presentation and a written report which was simply a print out of the slides used e.g. PowerPoint. For the centre which allowed candidates to work in groups, team presentations were made and the moderator found it difficult to pick out exactly what each candidate's contribution was.

Unit EG203_01

Engineering Applications of Computers

There was a wide variation in marks between centres which understood the principles of delivery and assessment and those who appeared to have more difficulty in applying the specification's marking grid and following the 'guidance for allocating marks'. A few centres which had entered candidates in earlier series still do not appear to have acted upon guidance presented in their E9 report (Report to Centre by the moderator). Most centres provided candidates with tasks which were accessible to the full range of candidate ability. For some centres it was apparent that the candidate did not fully understand the meaning of the action verbs presented in the marking grid, for example justify and appraise; this restricted their access to Mark Band 3. This unit must be assessed under controlled conditions but it is perfectly acceptable for the assessor to remind candidates of the generic meanings of these verbs and the format of evidence required.

An example of a good choice of topic for Learning Outcome 2 (solve a given problem) was to design a simple component using a CAD system and to follow up with CNC machining. The finished product could then be checked for dimensional accuracy – some centres linked this learning outcome to Unit 6 (Application of manufacturing techniques in engineering) Learning Outcome 3 - 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 – which made it difficult to award marks for safe working.

Most centres were accurate and consistent in applying the marking criteria. Those that did not mark accurately were lenient but consistent. A common error was to award full marks for Mark Band 1 of Learning Outcome 2 when there was no observation record or witness statement to support setting up and using equipment, and candidates had not provided photographs or proper written description. Practical tasks which are moderated must be supported with hard evidence which a moderator can reassess (see detail presented about this in the 'assessment guidance' section of the unit specification). Some assessors were lenient with Learning Outcome 2 Mark Band 3 and gave marks for generic justifications for using computers rather than reasons linked specifically to the problem which the candidate had solved. For example, some candidates said they used computer based equipment because it was easy to use, reliable and fast in operation- this should attract no marks.

Assessors also incorrectly awarded marks for Mark Band 3 of Learning Outcome 4 by giving full marks for really detailed descriptions of computers being used in maintenance/diagnostic situations but containing no evidence that the candidate had gathered data, interpreted it and proposed a course of action.

Most centres used the full range of marks for all assessment criteria. Those that did not erred mainly in three ways:

Learning Outcome 2 - asking candidates to carry out an activity which would not allow them easy access to marks for safe working e.g. giving them a CAD exercise. When this did happen the moderator did allow the marks if the candidate had proved that they could start up the software, set up folders and

close down software and the computer in a properly controlled, sensible way of working. Many candidates 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.

Learning Outcome 3 - Mark Band 1 - some candidates put 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 - candidates not being guided to applying a microprocessor system to another product.

Learning Outcome 4 - by not providing candidates with the means to generate and interpret computer generated diagnostic data. Many centres took candidates into vehicle workshops and let them investigate engine diagnostics. Good descriptions were presented but candidates did not then go on to interpret actual data.

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 serious concerns about the lack of annotation of candidate scripts and the difficulty of confirming assessor marks.

It is pleasing to note that an increasing number of centres, operating as a consortium, are carrying out internal standardisation between assessors or with a domain assessor.

Learning Outcome 1

There was generally good evidence about the application of computers in process control and manufacturing but for many candidates comparisons and evaluations were rather weak so restricting 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 process control and a manufacturing application, many describing them in detail and gaining full marks for Mark Band 1. Evidence for Mark Band 2 was not so robust and many candidates had difficulty with Mark Band 3.

Learning Outcome 2

It was evident across many 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 cases not covered well.

Learning Outcome 3

In many cases the descriptions of the use of microprocessors was fairly limited and the examples of products not always suitable, for example mobile phones, computers and gaming systems. Candidates that described applications such as

washing machines and microwaves which do have clearly defined peripheral components did much better. 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 - this proved difficult for some candidates. Most candidates correctly adopted a 'black box' approach to this learning outcome, focusing on the control aspects of a microprocessor rather than the internal architecture of the microprocessor.

Learning Outcome 4

Two maintenance systems were described by most candidates but in a number of cases there was little evidence of the type of fault diagnostic data that could be obtained or how it might be interpreted and used. This would have given access to the higher mark bands. Candidates did understand that maintenance operations in an engineering context are the only ones which can attract marks for this learning outcome; it was pleasing to see that they did not incorrectly consider non-engineering type maintenance - for example maintaining stock levels on the shelves of a supermarket. Mark Band 3 proved to be a challenge with many assessors giving full marks when there was no real evidence of interpreting computer generated data - for example, identifying fault codes from a car engine test, checking against the manufacturer's data base and then proposing a course of action.

Unit EG204_1A

Producing Engineering Solutions

The scripts received from centres were generally neatly organised with clear references indicating each learning outcome. The annotation of marks within scripts was helpful for moderators to understand where marks were awarded for each band in the learning outcome.

The performance for Learning Outcome 1 was mostly good. Most candidates were able to identify H&S procedures. Access to the higher marks for describing responsibilities for self and others was a little patchy. The risk assessment was carried out well with many centres adopting a standard approach.

Learning Outcome 2 was well done. The majority of candidates had adopted a tabular approach to the plan and the better candidates had populated each box with a lot of information and whilst the poorer candidates had less information, it did help them score well.

Learning Outcome 3 could be better approached by allowing candidates to describe how they prepared materials and then backed up by Observation Records and photographs.

Learning Outcome 4 was well done by those candidates who attempted it. Again there were sections that addressed specific points that are identified in the guidelines. The work was good and scored marks at each of the levels.

The standard of assessment was generally good throughout. Clearly assessors have read the guidelines from previous series and applied them well. It was good to see the inclusion of assignment briefs.

The samples of work were generally well organised and structured which enabled candidates to access most learning outcomes.

Learning Outcome 1 (Marking Grid A)

In general candidates identified Health & Safety procedures but not necessarily standards which limited the marks awarded. In most cases candidates were able to state why a risk assessment was necessary. The responsibility of self and others was in some cases weak as in the last series. Risk assessments were carried out to a good standard with most candidates identifying hazards and control measures.

Learning Outcome 2 (Marking Grid A)

Most candidates were able to produce a plan showing processes, materials and tools and in some cases timescales. Access to the higher mark bands was generally better than in previous series, with justifications of the sequence of the plan, and by completing a review and evaluation (along with improvements).

Learning Outcome 3 (Marking Grid A)

This was attempted by most candidates. However, as in previous series this was perhaps the most poorly attempted learning outcome for many centres. There was little evidence of identifying and selecting materials relevant to the plan. The preparation of the materials was only really evident from the photos in some cases, and not at all in others. It is also required to justify why the materials were used. By considering these items candidates could access the higher mark bands.

Learning Outcome 4 (Marking Grid B)

It was good to see that some centres provided observation records to support the evidence - which included photographs.

Learning Outcome 5 (Marking Grid A)

There was limited evidence by some candidates of being able to identify inspection techniques and only on the plan in some cases. There was a lack of review of the techniques used, or suggestions for improvements. Considering the latter would give access to the full range of mark bands.

Unit EG205_1A

Electrical and Electronic Circuits and Systems

There is a wealth of guidance supplied with this unit and it is pleasing that the majority of centres are following that guidance. The majority of candidate work was of good quality and presented in a very clear and logical format. It is pleasing to see that candidates have consistently performed well in this unit. The sample of work was generally very well organised and structured, which enabled candidates to access most of the learning outcomes. Mark record sheets and the scripts were generally not well annotated with evidence for each assessment criterion that had been awarded.

Learning Outcome 1 was well executed by candidates with the majority scoring well. Learning Outcome 2 is straight forward and was generally handled well by centres but tasks to allow access to the higher bands was variable. Generally the Learning Outcome 3 descriptive work was addressed well by centres and candidates.

The samples of work were generally well organised and structured which enabled candidates to access most learning outcomes.

Learning Outcome 1 (Marking Grid A)

Candidates were asked to demonstrate safe working practices and the calculation of electronic components. There was good range of calculations provided by the candidates clearly showing how to work out the value of current through to fuses. In the better centres candidates had provided detailed descriptions of safety procedures and then backed that up with observations signed by assessors and candidates (as well as photographs of candidates using safety equipment).

Learning Outcome 2 (Marking Grid A)

This was met by most candidates. Identification of components tended to be in the form of a chart and/or photographs. Mark Bands 2 and 3 were not so well achieved by candidates. Centres sometimes did not provide suitable circuits and there should be some use of manufacturer data sheets or suppliers catalogues.

Learning Outcome 3 (Marking Grid A)

Generally there was high quality work produced by candidates, evidenced with annotated photographs. The descriptions however, lacked detail with the function of each component being poorly explained.

Learning Outcomes 3 and 4 (Marking Grid B)

It is noted that some centres provided observation records 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 this would have been an issue if Marking Grid B evidence were subject to moderation.

Unit EG206_1A

Application of Manufacturing Techniques in Engineering

There was a wide variation in marks between centres which understood the principles of delivery and assessment and those who appeared to have more difficulty in applying the specification's marking grid and following the 'guidance for allocating marks'. A few centres which had entered candidates in earlier series still do not appear to have acted upon guidance presented in their E9 report (Report to Centre by the moderator). Most centres provided candidates with tasks which were accessible to the full range of candidate ability. There were a significant number of cases where it was apparent that the candidate did not fully understand the meaning of the action verbs presented in the marking grid, for example analyse and justify. This unit must be assessed under controlled conditions but it is perfectly acceptable for the assessor to remind candidates of the generic meanings of these verbs and the format of evidence required.

Most centres were accurate and consistent in applying the marking criteria. Those that were lenient tended to do this for Learning Outcome 1 - 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 - something which can only be done after the other learning outcomes have been completed. In some cases the evidence was too general and not specifically related to own role in the team. Most centres used the full range of marks for all assessment criteria.

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 serious concerns about the lack of annotation on candidate scripts and the difficulty of confirming assessor marks.

It is pleasing to note that an increasing number of centres, operating as a consortium, are carrying out internal standardisation between assessors or with a domain assessor.

Learning Outcome 1 (Marking Grid A)

Most candidates were able to provide a very brief description of their role in the team, and had identified limited strengths and weaknesses. Some also suggested ways in which their performance could be improved but a fuller explanation is required if the higher bands are to be achieved. Most candidates presented focused evidence for this learning outcome and did not fall into the trap (seen in earlier series) of producing a lengthy DVD showing people sitting around a table but doing very little. In many cases accessing Mark Band 3 was poorly done because the candidate must present a holistic view of how they performed across the whole unit, something many did not do.

Learning Outcome 2.1 (Marking Grid A)

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 pieces required and a little more detail is required in

order to gain further marks. Some candidates described in a generic way the production information that can be found in drawings and documentation; what they should have done was focus on a given engineered product so producing a link between Learning Outcomes 2.1 and 2.2. There were a number of instances of excellent correct interpretation so gaining marks from Mark Band 3.

Learning Outcome 2.2 (Marking Grid A)

Many candidates correctly understood the difference between a plan and a schedule; however, others were unable to distinguish between the two. Most candidates were able to produce a plan, which had details of the process and timings. Some candidates did not understand how to specify or use milestones. Justification of the sequence of operations and schedule (where presented) tended to be weak and this restricted the number of marks which could be awarded from Mark Band 3.

Learning Outcome 4 (Marking Grid A)

A number of candidates presented weak evidence for Learning Outcome 4. Three quality control (QC) techniques are required, one of which must be statistical and this is quite challenging for a level 2 candidate. Although some data had been analysed it was unclear how this data had been obtained and what the analysis meant. For access to the higher mark bands, candidates also need to analyse the results against the specification, and comment about the production process. Some comment about production was evident in a few cases, although this had only weak links to quality control.

A good number of candidates realised that by using relatively simple 'yes'/'no' tests, for example recording dimensional data and checking compliance with a drawing, they could get into Mark Band 2.

Unit EG207_1A

Applications of Maintenance Techniques in Engineering

There was a wide variation in marks between centres which understood the principles of delivery and assessment and those who appeared to have more difficulty in applying the specification's marking grid and following the 'guidance for allocating marks'. A few centres which had entered candidates in earlier series do not seem to have followed guidance presented in their E9 report (Report to Centre by the moderator). Most centres provided candidates with tasks which were accessible to the full range of candidate ability. There were a significant number of cases where it was apparent that the candidate did not fully understand the meaning of the action verbs presented in the marking grid, for example explain and justify. This unit must be assessed under controlled conditions but it is perfectly acceptable for the assessor to remind candidates of the generic meanings of these verbs and the format of evidence required.

Most centres provided candidates with tasks which were accessible to the full range of candidate ability. It was noticed that candidates performed better in Learning Outcome 1.1 when centres asked them to describe and explain maintenance types with greater contrast rather than asking them to investigate similar maintenance systems.

For Learning Outcome 4 some candidates just wrote generic descriptions of what the risks might be in an engineering situation, or presented lists of issues without suggesting ways in which risks could be managed.

Many centres were accurate and consistent in applying the marking criteria; some were unable to use the full range of marks for all assessment criteria because many candidates presented weak evidence for Mark Band 3 across all learning outcomes. Some assessors incorrectly gave full marks for Mark Band 3 of Learning Outcome 4. Usually this was where a candidate had produced a detailed and impressive looking risk assessment but had failed to make proper reference to health and safety regulations and warning signs.

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 serious concerns about the lack of annotation on candidate scripts and the difficulty of confirming assessor marks.

It is pleasing to note that an increasing number of centres, operating as a consortium, are carrying out internal standardisation between assessors or with a domain assessor.

Learning Outcome 1.1 (Marking Grid A)

Most candidates had identified two types of maintenance techniques, but these were not always relevant or appropriate; they must be ones which are set in an engineering/manufacturing context. Access to the higher mark bands requires a statement on the appropriateness of the particular technique, and some justification; many candidates did not do this.

Learning Outcome 1.2 (Marking Grid A)

This learning outcome requires the analysis of data to evaluate trends and to calculate reliability indicators. For Mark Band 2 the calculation is 'Mean Time to Failure (MTTF)' but candidates were given credit if they calculated 'Mean Time between Failure (MTBF)' because the process is essentially the same. It was pleasing to see that in this examination series candidates were doing much better than in previous ones when presenting evidence for Mark Band 1 and particularly for band 3.

Learning Outcome 2.2 (Marking Grid A)

This learning outcome requires the candidate to produce a maintenance plan which includes timescales, tools, safety procedures etc. The maintenance plan produced by many candidates did not address all of these points and they were unable to access marks in the higher bands.

Some candidates confused maintenance schedule with maintenance procedure. A schedule would be the servicing booklet for a car- what needs to be done at particular mileage intervals e.g. replacing spark plugs. A maintenance procedure is the sequence of tasks carried out when changing the plugs e.g. identify and source correct replacement parts, find correct extraction tool, 'lock off' engine start, etc.

Learning Outcome 3.1 (Marking Grid A)

For this learning outcome candidates are required to describe and justify the implications of poor maintenance - what happens if equipment is not properly maintained; this could be lack of maintenance or poor maintenance routines. Many candidates presented reasonable evidence for Mark Bands 1 and 2 but Mark Band 3 proved difficult when trying to explain and justify a way of reducing the impact of improper maintenance.

Learning Outcome 3.2 (Marking Grid A)

Many candidates achieved full marks for Mark Band 1 as it was just a case of presenting a list of spare parts for a given maintenance task. Mark Band 2 was also reasonably well done. To achieve Mark Band 3 the candidate must identify spare parts and calculate the required stock levels; this can be linked to MTTF (Learning Outcome 1.2).

Learning Outcome 4 (Marking Grid A)

Most candidates produced a risk assessment but access to the higher mark bands was limited because they did not properly consider health and safety legislation, discuss PPE and its correct storage, or consider warning signs. There were some very good, tabulated risk assessments based on the Health and Safety Executive (HSE) recommended format.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

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