

Moderators' Report/  
Principal Moderator Feedback

January 2012

Principal Learning

Engineering  
Level 1 Controlled Assessments

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## Introduction

During this series, the centre marking for the internal units was generally appropriate. It was clear that one person had completed the candidate assessment (for a given centre/consortia/unit) in most cases, and hence internal standardisation was rarely an issue in this series; however, centres/consortia are advised that such a process is very important when multiple assessors mark the same unit. 'Annexe E' in the Principal Learning specification gives guidance as to how this should be conducted. Pleasingly, there was evidence from a number of centres/consortia that internal verification procedures had been used to check assignment briefs and assessor marks, and this is considered good practice.

In general, most aspects of administration for the internal units were good, with the correct samples being provided (including the work of those candidates with the highest and lowest non-zero mark for each unit). Generally, a Candidate Record Sheet (CRS) was signed by each candidate and the tutor, and centre marks were recorded correctly, on the CRS; however, candidate and centre numbers were often incorrect or missing, and centres are reminded that these are vital pieces of information if the moderation process is to operate smoothly.

Further, centres should ensure that the marks for Learning Outcomes 2.1, 2.2, 2.3 and 2.4, for EG105, are noted separately on the relevant CRS; in some instances, the marks for these learning outcomes were combined (to provide a mark out of 28), which presented moderation difficulties.

Most candidate work was organised in such a manner that it was reasonably straightforward for the moderator to locate the evidence for each learning outcome; however, centres should: a) encourage candidates to number each page of their work; and b) note these page numbers, for each learning outcome, on the CRS. Centres should recognise that if candidate evidence is provided in an organised fashion, by learning outcome, this greatly assists internal standardisation, as well as external moderation.

Centres are reminded where appropriate the EDI print out should be included and that marks on the EDI print out (via Edexcel Online) should match those on the CRS.

In this series, as in previous series, candidates were not given credit for implicit evidence. Candidates and/or centres must provide explicit evidence for each learning outcome, and hence centres should endeavour to assess each learning outcome in a similar manner. It would be advisable, and very helpful, for all assessors to annotate candidate work, in order to clearly identify where marks have been awarded, linked to the appropriate Marking Grid (some good examples of this type of annotation were seen in this series), with page numbers noted on the CRS. Centres are reminded that each unit specification has a section entitled 'Guidance for allocating marks', which should be referred to when designing/completing summative assessments.

Furthermore, centres may find it useful to refer to the Tutor Support Materials for this qualification when setting assignments that are to be internally assessed and externally moderated, in order to ensure that candidates have the opportunity to address all of the assessment requirements, in each of the three marking bands, for each learning outcome. This will often involve the use of annotated photographs and Candidate Observation Records (the latter completed by the teacher/tutor), especially for Marking Grid B and other practical evidence, which centres are actively encouraged to submit as supplementary evidence/assessment affirmation for the candidate in question.

Centres should also be aware that, at this level, the use of templates is actively encouraged when the summative assessment approach is improved by their use - please see the comments regarding Learning Outcome 5 for EG102, and the comments in the Principal Moderator reports for EG104, EG105 and EG106.

Centres were given individual feedback by a moderator, via an E9, with comments noting possible areas where the summative assessment approach could be improved.

## **Unit EG102\_1A**

### **Practical Engineering and Communication Skills**

#### **Learning Outcome 1 (Marking Grid B)**

In this series, the majority of candidates provided evidence of being able to identify and apply the requirements of working safely with colleagues in a familiar and unfamiliar context, explaining why key aspects of relevant health and safety legislation are necessary.

This learning outcome was approached in a different manner across centres; nonetheless, it was pleasing to note that the vast majority of assignment briefs allowed candidates to access Mark Band 3. For example, a number of candidates were required to complete a health and safety worksheet and were then observed carrying out tasks in the workshop; some were required to provide written responses in order to demonstrate that they understood the difference between their 'own responsibilities', and those of 'others', when considering health and safety legislation, in addition to identifying risks and citing some control measures; others were required to complete written and practical health and safety tests, where, for the latter, the tutor wrote a candidate observation record qualifying the ability of the candidate to carry out a different types of engineering procedure safely etc.

In future series, centres may wish to combine aspects of the controlled assessment for this learning outcome with Learning Outcome 3 (see below), in order to further contextualise the assessment approach (i.e. candidates could demonstrate they are working safely [Learning Outcome 1] when dismantling an engineered product [Learning Outcome 3]). In addition, it was noticeable that fewer candidates provided, in an explicit manner, evidence that they could identify and apply the requirements of working safely with colleagues in an unfamiliar context; as a result, centres may wish to ask candidates what they would do to ensure safe working if they were going to perform a given task for the first time, and this evidence could be captured using a Candidate Observation Record.

#### **Learning Outcome 2 (Marking Grid A)**

The majority of candidates in this series were clearly able to describe two cutting processes, two forming processes and a joining process (for Mark Band 2). A smaller number of candidates just identified the aforesaid processes (Mark Band 1) and fewer still compared the cutting and forming processes (Mark Band 3). However, a pleasing number attempted to relate each process to an industrial application.

Considering future series, it would be more appropriate for candidates to state examples of cutting/forming/joining processes that are more akin to industrial manufacturing (although better examples were seen in this series as compared to earlier series). Whilst 'sawing' is a cutting process, a better example would be to describe, for example, the use of a laser or water jet

cutter. This comment is also applicable to the identification of a joining process, such as 'gluing', although this could still be used if the description was more elaborate. The two cutting and forming processes identified/described should be sufficiently different, ie 'boring a hole' and 'milling a block', rather than 'cutting with a flip saw' and 'cutting with a circular saw'. Some candidates provided good sketches/imagery of the processes they identified/described and this is to be encouraged, as it provided a simple means of comparison.

In some centres this learning outcome was evidenced by the use of a table, which required the candidate to identify a specific process that may apply to a series a given tasks. This allowed the candidate to show that they knew the difference between cutting, forming and joining processes, and this was followed by a series of short questions requiring the candidate to describe the various processes and then compare two of them. Centres should also note that good descriptions of, for example, numerous joining processes, will still only generate the marks allocated to this particular piece of candidate evidence. Candidates need to provide evidence that they can identify/describe/compare cutting, forming and joining processes, not just one of the aforementioned.

### **Learning Outcome 3 (Marking Grid B)**

As in earlier series, the majority of candidates in this series provided evidence of being able to dismantle a product, clean and lay out the component parts and consequently reassemble the product. A smaller, but still sizeable, number of candidates provided evidence of using documentation to select equipment when dismantling the product. A minority of candidates identified parts needing replacement and fewer still compiled a report including parts for replacement and reasons for replacing them. Several candidates wrote a report, but generally such reports were a retrospective narrative of the procedure carried out. Some centres made good use of annotated photographs and Candidate Observation Records covering the strip, clean, layout, check and rebuild of various engineering devices, and this is to be encouraged/commended for capturing evidence of the practical activities. This type of evidence was clear, comprehensive and easy to follow, and it provided a means of detailing the level of assistance provided to each candidate, thereby justifying the allocation of marks. Such photographs would have also been appropriate as evidence for aspects of Learning Outcome 1 (see above), if the candidate followed the appropriate health and safety procedures/precautions.

In future series, centres should provide candidates with a product that does require replacement parts. Further, centres may wish to provide candidates with documentation (possibly in the form of a template) that includes an area for reflection/review after each stage of disassembly, with a further area for candidates to note parts requiring replacement. The aforementioned could then be used as a basis for compiling a reflective report that includes parts for replacement and reasons for replacing them.

## **Learning Outcome 4 (Marking Grid A)**

In this series, the majority of candidates produced sketches of an engineered product in orthographic 1<sup>st</sup> and 3<sup>rd</sup> angle projections. Most candidates also produced an isometric view of the same product, and all of these sketches were, in the main, correctly dimensioned. Most candidates had clearly put some time and effort into their work for this learning outcome. Fewer candidates produced a correct oblique view; however, it was pleasing to note that many candidates were able to provide evidence of centre lines and/or hatching and/or common drawing conventions and layouts (eg a title block). The majority of centre assignment briefs are now a better interpretation of the Marking Grid for this learning outcome, which allows more credit for the scope/accuracy of the drawings rather than the detail required.

Considering future series, centres must note that the product to be sketched should allow candidates the opportunity to generate all 3 elevations (side, front and plan), when considering the orthographic projections; a single view is not acceptable.

## **Learning Outcome 5 (Marking Grid A)**

For this learning outcome most candidates compiled a plan of operation to produce an engineered product. A small number of candidates reviewed the success of the plan, and fewer still explained how changes to their plan would lead to improvements in planning or manufacture; as a result, this prevented many candidates from accessing Mark Band 3. Some candidates still provided their plan of operation as a written narrative, rather than using a table format, and this often meant key elements of the plan, such as materials or tools required, were missing. The majority of candidates subsequently provided evidence of manufacturing the engineered product, through the use of annotated photographs and Candidate Observation Records. A notable number of candidates had again written the plan retrospectively; centres/consortia are advised that no credit can be awarded for this.

In future series, centres are advised to provide candidates with a blank plan of operation table/template, with columns headed 'sequence of operations', 'materials', 'tools and equipment', 'health and safety' etc, perhaps with an area for reflection/review at the end of each row. In some centres, candidates were required to complete a reflective production diary, including suggestions for improvements, as evidence of reviewing their plan (not their product), and this is considered to be good practice. A reflective diary is also appropriate confirmation that the candidate actually undertook the manufacture of an engineered product, if supplemented with a Candidate Observation Record and/or annotated photographs to capture the practical evidence of manufacture. Centres are advised that candidates cannot access Mark Band 2 or Mark Band 3 marks unless a review of the plan of operation (not the product) is evident.

## Unit EG103\_01

### Introduction to Computer Aided Engineering

During this series, it was pleasing to note that many centres required candidates to complete a single controlled assignment based upon a simple engineered item (such as a turned/tapered shaft or a milled/routed block) for this unit. This is good practice, as candidates were able to access Mark Band 3 for all learning outcomes. Concentrating on a single, simple item, for all three learning outcomes, helps to contextualise the assessment and allows candidates to focus on producing the necessary evidence as stated in the Marking Grid.

Centres should note that Candidate Observation Records alone are not sufficient evidence for any of the learning outcomes for this unit.

#### Learning Outcome 1

The majority of candidates produced a dimensioned drawing of an engineered component in line with BS:8888 and a circuit diagram in line with BS:3939 complete with some annotation (for Mark Band 1). A significant number of candidates provided evidence of preparing a template for these drawings, but some did not include important elements, such as a title block and/or the truncated cone symbol. Many candidates did not provide explicit evidence that they had used separate layers for the dimensioning, annotation etc (via a colour print out), but often a Candidate Observation Record was provided by the assessor to confirm they were utilised. It was again clear that many candidates had put time and effort into their work for this learning outcome; however, candidates were still sometimes required to produce a drawing (BS:8888) that was unrelated to the engineered item to be manufactured for Learning Outcomes 2 and 3, and both drawings (BS:8888 and BS:3939) were still somewhat complex at times, which was unnecessary (see below).

In future series, centres should ask candidates to print out their template (and/or a screen shot) prior to any drawings being added to it. Similarly, screen shots and/or print outs, that show, for example, the dimensioning in a different colour, would be appropriate to provide explicit evidence of the use of layers. Furthermore, some centres/consortia should ask candidates to produce less complex drawings, to ensure that time is available to attempt all the elements within the Marking Grid for this learning outcome. It should be recognised that the summative assessment for this learning outcome is as much about the process of generating correct CAD drawings as it is about the final outcome, and as a result, centres may also wish to provide supplementary procedural evidence in the form of Candidate Observation Records. However, centres are advised that Candidate Observation Records alone are not sufficient evidence for this Learning Outcome.

## **Learning Outcome 2**

As in earlier series, the majority of candidates in this series were able to provide evidence that they had used CAM software and cutting information to convert CAD drawing geometry into a machine tool cutter path (including tool set-up); further, most candidates were able to provide evidence that they had the ability to process the cutter path data into a coded CNC operating program (for Mark Band 1). It was again pleasing to note that most centres then provided candidates with the opportunity to identify and amend errors in program operation (often by modifying the original item), and a good percentage of candidates evidenced their fault finding and rectification, although a much smaller number of candidates provided evidence of re-running the cutter path graphic simulation. Most candidates used screen shots with some annotation (and program code print outs) when providing evidence for this learning outcome, and this is to be commended, as such evidence was clear and easy to follow.

In future series, centres may wish to provide a guide for candidates to ensure that each element of the Marking Grid for this learning outcome is covered. For example, another screen shot with simple annotation would suffice to provide evidence of using cutter path graphic simulation, yet this was still seen infrequently. Further, centres could provide candidates with a template or framework into which they could note details relating to the introduced error/s (ie a description of the problem). A further screen shot/s showing the cutter path graphic simulation being re-run, following amendments by the candidate, with brief annotation noting how effective the changes were, would allow candidates to access the top of Mark Band 3. Three pages of A4, with five to six large screen shots covering all elements of the Marking Grid, including associated annotation/details, would suffice for this learning outcome. Candidate Observation Records could also be used to support evidence of candidates undertaking the necessary tasks to the required standard; however, centres are advised that Candidate Observation Records alone are not sufficient evidence for this learning outcome.

## **Learning Outcome 3**

The majority of candidates provided evidence of loading a CNC program into the controller, and of setting work datums and tool offset values. The majority of candidates also provided evidence of executing the program to produce a first-off component, safely (often via annotated images, perhaps showing the candidate wearing PPE or traversing the workpiece away from the tool in order to unload). Fewer candidates provided evidence of using feed and speed override controls to gain optimum performance, or of editing the program to incorporate override values. However, a greater number of candidates compiled a basic inspection report including reasons for non compliance and actions, which mainly resulted from centres requiring candidates to complete, review and reflect upon an inspection sheet that recorded the dimensional accuracy of the item in question. The majority of centres required candidates to annotate images/photographs, or print screen shots, when providing evidence for this learning outcome,

which again is to be commended; such evidence was clear and easy to follow.

Considering future series, centres may again wish to provide a guide for candidates to ensure that each element of the Marking Grid for this learning outcome is covered. For example, another annotated photograph, providing evidence of candidates experimenting with either physical or VDU-based feed and/or speed override controls, would have enabled many candidates to gain access to Mark Band 3, as opposed to Mark Band 2. Further, another screen shot with simple annotation would have sufficed to provide evidence of editing the CNC program to incorporate the optimum override values. Candidate Observation Records could again be used to support evidence of candidates undertaking the necessary tasks to the required standard; however, centres are advised that Candidate Observation Records alone are not sufficient evidence for this Learning Outcome.



## **Unit EG104\_1A**

### **Developing Routine Maintenance Skills**

#### **Learning Outcome 1.1 (Marking Grid A)**

In this series, most candidates were able to state three types of maintenance procedures carried out in industry. Further, most candidates were able to state why the procedures are used, but some struggled to submit sufficient evidence in relation to how the procedures are carried out.

In future series, centres should ensure that they require candidates to link the three types of procedure to an industrial application, so they are able to attain full marks from Mark Band 1.

#### **Learning Outcome 1.2 (Marking Grid A)**

Almost all candidates were able to state two types of documentation that can be used, and most were able to cite a maintenance task that can be carried out. However, the majority of candidates did not submit sufficient evidence associated with what the documentation covers and where/how it would be used.

In future, centres should consider using a framed template for both parts of Learning Outcome 1; this will assist candidates to present the full range of appropriate evidence. Centres should also note the natural link between Learning Outcomes 1.1 and 1.2, and could consider combining the two when writing an appropriate assignment brief for this unit.

#### **Learning Outcome 2 (Marking Grid B)**

All centres used a practical setting to allow candidates to provide evidence for this Learning Outcome. A range of tasks were seen, which was pleasing; however, the use of annotated photographs and Candidate Observation Records was not consistent across centres. It is recommended that centres consider how they can evidence whether each candidate has been provided with guidance, limited guidance etc, which is a key indicator that restricts access to the higher Mark Bands for this learning outcome. This 'process type' evidence can be appropriately referenced using the Candidate Observation Record.

#### **Learning Outcome 3 (Marking Grid A)**

The majority of candidates were able to devise a simple plan to see if the product (or piece of equipment or system) might fail in service. They were also able to demonstrate the ability to use simple tools and equipment. Most candidates recorded key measurements as part of this process. However, the majority of candidates had difficulty reviewing the plan in relation to its effectiveness, and struggled to make improvements to it. This situation could be improved if centres revisited and gave more thought to the assignment task setting and subsequent guidance given to

candidates, as this could enable access to Mark Band 3. Centres should consider allowing candidates to discuss the possible reasons of failure, such as age, wear, corrosion, operating environment, lubrication failure and inherent design faults.

## **Unit EG105\_1A**

### **Introduction to Engineering Materials**

#### **Learning Outcome 1 (Marking Grid A)**

This learning outcome was evidenced to a good standard by the majority of candidates. In most cases, material properties were stated and definitions were given. It was apparent that a large proportion of candidates had a good understanding of the link between material properties and applications.

Centres are reminded that in order to gain full marks a candidate needs to state four material properties, define three of them, and then explain how the applications of two materials are influenced by the properties of these materials.

#### **Learning Outcome 2.1 (Marking Grid A)**

This learning outcome was generally addressed well by candidates, with many producing some appropriate evidence. Most candidates were able to: a) identify three ferrous metals; b) state an appropriate forming process and an engineering application for the identified ferrous metals; and c) describe the properties of two of the identified ferrous metals.

However, few candidates justified the use of the stated forming processes for two of the identified ferrous metals. Furthermore, it is not appropriate to consider three steels with different levels of carbon content; centres should require candidates to consider a wider range of materials, such as cast iron, stainless steel and high speed steel.

Some centres made good use of writing frames and tables for this learning outcome, in order to encourage candidates to generate Mark Band 3 evidence.

#### **Learning Outcome 2.2 (Marking Grid A)**

As with Learning Outcome 2.1, this learning outcome was generally addressed well by candidates, with many producing some appropriate evidence. Most candidates were able to: a) identify three non-ferrous metals; b) state an appropriate forming process and an engineering application for the identified non-ferrous metals; and c) describe the properties of two of the identified non-ferrous metals. However, few candidates justified the use of the stated forming processes for two of the identified non-ferrous metals.

Again, some centres made good use of writing frames and tables for this learning outcome, in order to encourage candidates to generate Mark Band 3 evidence.

### **Learning Outcome 2.3 (Marking Grid A)**

The majority of candidates provided some appropriate evidence for this learning outcome. Pleasingly, almost all candidates considered an elastomer and therefore provided information associated with two, rather than three, thermoplastics (as has been the case in previous series). It is a requirement of all three mark bands that two thermoplastics and one elastomer are considered, and this improvement in the provision of candidate evidence is welcomed. However, few candidates attempted to justify the use of the stated forming processes for a thermoplastic/elastomer (Mark Band 3).

### **Learning Outcome 2.4 (Marking Grid A)**

The majority of candidates produced some appropriate evidence for this learning outcome, with work across Mark Bands 1 and 2 evident. However, candidates should be required to provide a range of appropriate processes in relation to the three identified thermosetting plastic materials; it is not appropriate to state 'lay-up' or 'injection moulding' for two or more materials. Centres should note that it is advisable to provide candidates with a selection of materials from which to choose, which would allow for a range of forming methods to be identified.

As with Learning Outcome 2.3, there was little evidence of candidates attempting to justify the use of the stated forming processes for two thermosetting plastics (Mark Band 3).

### **Learning Outcome 3.1 (Marking Grid A)**

In this series, most candidates could describe what three different material abbreviations meant (Mark Band 1). Some centres provided suitable documentation, such as parts lists or drawings, from which most candidates could identify two further materials (Mark Band 2). However, in some instances these materials were the same as those provided for the Mark Band 1 assessment task, which is not appropriate. Mark Band 3 work was also evident; nonetheless, some candidates were still not able to identify forms of raw material and their dimensional requirements (as was the case in previous series).

### **Learning Outcome 3.2 (Marking Grid B)**

In most cases, the evidence for this learning outcome consisted of reports, tables of results and Candidate Observation Records, which were appropriate and generally supported the marks awarded. Some centres provided very good photographic evidence for this outcome, which was commendable. It is suggested to centres that a comprehensive Candidate Observation Record is useful supplementary evidence to support the marks awarded for Marking Grid B work.

### **Learning Outcome 3.3 (Marking Grid A)**

Most candidates presented material testing reports for this learning outcome. In general, candidates carried out two tests on two different

materials, but there was little evidence that they had selected appropriate tests (Mark Band 3). However, many candidates made a good attempt at comparing their results/outcomes from the material tests; importantly, this comparison was linked to mechanical properties in some cases.

The evidence for this learning outcome could have been enhanced by the use of annotated photographs, although in some cases the centre use of a Candidate Observation Record supported the marks which had been awarded. Often, the Candidate Observation Record supplemented the written work submitted by the candidates themselves, and this is considered to be good practice.



## **Unit EG106\_1A**

### **Electronic Circuit Construction and Testing**

#### **Learning Outcome 1 (Marking Grid A)**

Most candidates were able to identify six components from a given circuit diagram, and a further four other components. Centres should note that the further four symbols should be identified from a selection of physical components (for Mark Band 2). Most candidates were able to state some key features of components, but examples of what a key feature was varied across centres. Tolerances, working voltages, power ratings, maximum current and temperature ranges are typical key features that could be cited by candidates.

In summary, most candidates were able to access Mark Bands 2 and 3 due to appropriate assessment tasks. This learning outcome was addressed well, yielding some high marks.

#### **Learning Outcome 2 (Marking Grid A)**

In this series, almost all candidates were able to sketch an electronic circuit diagram, including six symbols. Mark Band 2 calls for candidates to reproduce the sketch using a computer software package. This did not pose too many problems for the vast majority of candidates. The issue that arose during the moderation process was the lack of evidence provided to enable confirmation that the drawing had been saved. This was also the case for Mark Band 3. It was difficult to confirm retrieval of the saved file, modification, and resave. Centres are advised to state file pathways, and provide associated screen shots.

In summary, most candidates were able to access Mark Band 3.

#### **Learning Outcome 3 (Marking Grid A)**

For this learning outcome evidence to justify planning, or working within a team, was not consistent across centres. At Level 1, candidates require more detailed guidance and direction from tutors that will enable them to fully understand the requirements of this learning outcome. A detailed set of meeting minutes could highlight what planning was discussed, and the contribution made by each member of the team. A meeting template proforma could be given to each candidate. Some centres did attempt to adopt this approach, but they were in the minority.

It was clear that candidates had built the circuit, in its various forms, as most centres provided photographs; however, some of these showed far more detail than others.

It is imperative in future series that centres provide clear evidence of the candidate working safely. Suitable annotated photographs would suffice, and/or a Candidate Observation Record could be provided.

In summary, almost all candidates accessed Mark Band 2, and some were able to access Mark Band 3.

#### **Learning Outcome 4 (Marking Grid B)**

In this series, most candidates were able to use a software simulation package to undertake basic tests. The requirement to undertake six measurements did challenge some candidates. Centres are advised that the six measurements do not all have to be waveform outputs. Voltage tests will also suffice.

Evidence of the use of physical test equipment to take measurements was apparent during this series, although not from every centre. Some centres generated Candidate Observation Records, and the use of annotated photographs was also more prevalent. Providing both of the aforementioned forms of evidence is considered to be good practice.

Some candidates provided very basic statements about the advantages/disadvantages of using physical test equipment. In general, the requirement to compare results and advantages/disadvantages of computer based tests, versus physical tests, was not answered well.

In summary, most candidates accessed Mark Band 2; very few accessed Mark Band 3.

## **Unit EG107\_01**

### **Engineering the Future**

During this series it appears that numerous candidates were not awarded suitable marks by the assessors for evidence that was creditable. Centres are reminded that the unit specification has a section entitled 'Guidance for allocating marks', which should be referred to when assessing candidate evidence.

#### **Learning Outcome 1**

Candidates were able to state appropriate materials in most cases; polymorph, shape memory alloys, phosphorescent pigments and carbon fibre composites were amongst the most prevalent. However, there was a tendency to describe the properties and applications of the said materials in a very limited manner, and hence Mark Band 3 scores were rare for this learning outcome.

Centres are reminded that marks should be awarded for the identification of materials by the candidate; hence, the provision of these in the assignment brief will have the effect of restricting the attainment of candidates, as a maximum of three marks will be available from Mark Band 1.

#### **Learning Outcome 1.2**

In this series, most candidates identified three new engineering technologies, and were then able to state brief examples of how they are used. However, the majority of candidates did not give enough information about the application of each technology, or they did not credit their sources (from the internet), and lost marks as a result. Nonetheless, it was noted that technologies such as smart windows and self healing polymers added variety to assignments and were of interest to the candidates. As in previous series, there was little consideration of social and environmental issues associated with the technologies, which is why many candidates were unable to attain a Mark Band 3 score.

#### **Learning Outcome 2**

Most candidates were able to give examples of appropriate recyclable and non recyclable materials/products and how they can be disposed of. Typically, candidates were able to demonstrate an understanding of a range of recycling processes, with glass, paper, aluminium cans and related products being considered. Some of the higher scoring candidate samples were in the form of information leaflets or presentations, aimed at the general public or peers. Similarly, candidates provided solid evidence in relation to materials/products that cannot be recycled. In the majority of cases this evidence included a sound commentary associated with methods of safe disposal.

The benefits of recycling were identified in most cases; however, many candidates could have gained more marks if their evidence had included a more in-depth explanation of why some products are recycled whilst others are not.

### **Learning Outcome 3**

In general, candidates were able to identify two sources of renewable energy. Typically, these were solar or wind sources; however, a substantial number of candidates considered HEP, geothermal or tidal energy. In most instances candidates were able to state, in a basic fashion, the environmental impact of using the sources/how the energy can be stored.

Descriptions of how energy is generated (from the identified sources) were poor during this series, although an increasing number of centres encouraged candidates to include diagrams to exemplify their descriptions, which is to be commended. Candidates who attained a score from Mark Band 2/3 tended to do so by producing a presentation that included most of the necessary information. Compared to previous series, candidates provided minimal evidence of appropriate storage methods for energy.

As with previous series, there were once again omissions in the candidate evidence seen for this learning outcome. Few candidates compared the positive and negative environmental impacts of the identified renewable energies, and no candidate gave an indication of the benefits and disadvantages of storing the said energies. These are areas which centres should consider addressing in more detail, at the unit delivery stage, in order to promote the provision of Mark Band 3 evidence.

## **Grade Boundaries**

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