BTEC

L2 Lead Examiner Report 1901

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L2 Qualification in Engineering

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Grade Boundaries

What is a grade boundary?

A grade boundary is where we set the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade, at Distinction, Merit and Pass.

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the external assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries – this means that they decide what the lowest possible mark is for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Awarding grade boundaries is conducted to ensure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in external assessments

Each external assessment we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries for each assessment, because then it would not take accessibility into account.

Grade boundaries for this, and all other papers, are on the website via this link:

http://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

Unit 38: Materials Used in Engineered Products

Grade	Unclassified	Level 1 Pass	Level 2		
			Pass	Merit	Distinction
Boundary Mark	0	11	21	31	41

Introduction

For this there was a reduction in the number of learners completing the assessment which follows the trend of previous series. The format of the paper was again similar to other traditional examinations in the BTEC Level 2 Engineering programme, namely Unit 9, therefore some comparisons to the approach taken by learners for that paper can also be made.

Introduction to the Overall Performance of the Unit

Question 1 concerns materials and materials properties, and in the main the individual parts of the question were answered well.

Q1a – this question was a short open response question. This question was well answered by the majority of learners in the cohort, with the majority of learners being able to name one example of a ferrous metal.

Q1b – this was a multiple response question on the paper. A large number of learners were correctly able to identify at least one characteristic of metals. Where learners selected one only one correct option, this tended to be grain structure as opposed to crystal growth.

Q1c – in this question, learners were asked to give two examples of composite materials. Many learners were able to identify at least one example of a composite, with carbon fibre and fibre glass being common responses provided by learners.

Q1d – this was another example of a multiple response question. Learners needed to identify two examples of chemical and durability properties from those listed in the specification. Many learners achieved at least one mark for this question, commonly identifying corrosion resistance.

Q1e – this was another open response question and followed a similar format to questions on previous papers, with the focus being on one of the material properties

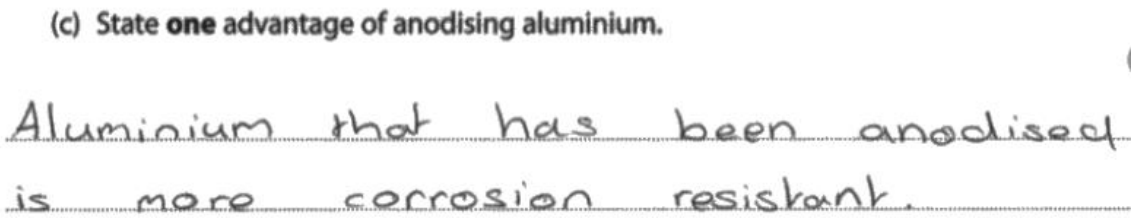
which are stated in the unit content in Topic A1. A large proportion of learners were able to name density as the required property.

Question 2 is a multipart question that considers a range of topics from the specification and assess learner's knowledge of these.

Q2a - learners were required to identify one factor related to the processing of raw materials from the options given in this multiple choice question. A significant number of learners correctly identified 'energy use' as the correct answer.

Q2b – this question tested learner's knowledge of the products manufactured by some specific sectors. The majority of learners were able to identify that body panels are manufactured by the automotive engineering sector and anchors by the marine sector. It is important that learners are familiar with the products and sectors listed in Learning Aim D.

Q2c - this question asked learners to give one advantage of anodising aluminium. Common correct answers tended to relate to the improvements to the corrosion resistance of the aluminium, as seen in the example below.


(c) State **one** advantage of anodising aluminium.

Aluminium that has been anodised is more corrosion resistant.

Question 3 followed a similar format to Question 2, with a number of areas of the specification being assessed through short answer and multiple choice questions.

Q3a – learners in general performed well on this multiple choice question. It was encouraging that there seemed to be a greater knowledge of composite materials in general, and a significant proportion of learners were able to select the correct answer from the options available.

Q3b - learners performed with mixed success on this question. It is common for some questions to include barred responses, in other words some examples are given in the

stem of the question. In this question where learners were asked to state two forms of supply for polymer materials, two had been stated in the question - sheets and tubes. Although many learners were able to achieve marks for this question, a number did repeat the examples already stated and thus did not achieve marks.

Q3c - this question was answered well by the majority of learners, who were able to identify correctly that an engine block would most likely be manufactured from aluminium whilst a brake pedal pad would be made from an elastomer. Common errors included chromium for the engine block and nylon for the brake pedal pad.

Question 4 was the first question in the paper to introduce a scenario; learners are expected to be able to apply knowledge of materials in familiar contexts. As such, a scenario allows learners to demonstrate deeper understanding of materials and their uses in an engineering context.

Q4a – this question was answered well by the majority of learners, who were able to identify correctly that aircraft are manufactured by the aerospace sector. There were some common incorrect answers, for example 'aircraft' that were offered by a minority of learners but was simply a repetition of the question.

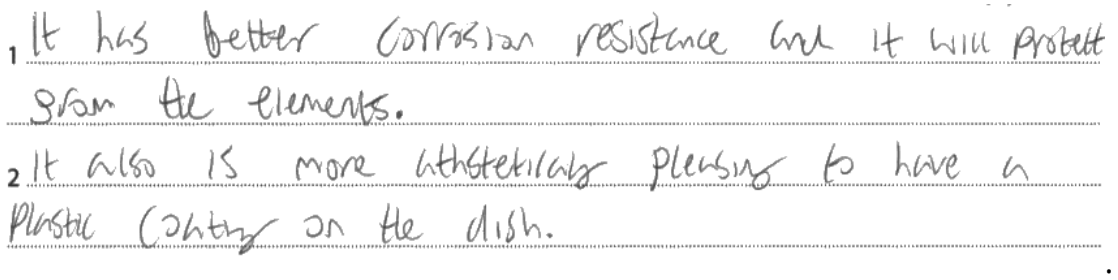
Q4b - this question was answered well by the majority of learners. These learners generally stated at least one property of duralumin that makes it a suitable material for use in aircraft engines. One of the most frequent answers related to the low mass/lightweight properties of the material, however resistance to corrosion was also stated by a number of learners.

Q4c - a significant number of learners only achieved relatively low marks for this question as their responses did not link the form of supply, sheet form, to advantages related to the manufacture of the engine casings. Where learners did achieve marks, this tended to result from some recognition that sheet materials can be easier to store and handle in a manufacturing environment.

Question 5 was another example of a scenario based question, in this case related to an engineering organisation that manufactures portable satellite receivers.

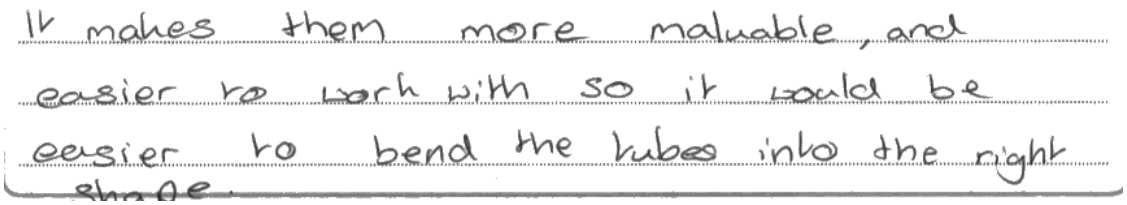
Q5a - the majority of learners were able to identify that shape memory alloys change their form due to changes in temperature.

Q5b – the performance of learners with regard to this question was good, with a significant number of learners being awarded both of the marks available. Typically, learners would make reference to the plastic coating improving the corrosion resistance of the dish, and also improving the aesthetics, as is seen in the example below.



Q5c – learners tended to have some understanding of the advantages of annealing ferrous metals. Whilst many of the answers were of a relatively simplistic in nature, they were nonetheless accurate and made reference to increased workability or making it easier to bend the tubes.

In the example shown, the learner has achieved two marks. The learner has correctly stated that annealing makes the tubes more malleable which in turn makes it easier to bend the tubes.



Q5d - Learners found this question to be challenging. The focus was on the cast base of the satellite receiver and asked learners to explain disadvantages. Whilst some learners were able to identify one or two disadvantages, they tended not to expand on these with a justification. Common answers tended to revolve around the costs related to casting, or the weight of a solid base. In a minority of cases learners stated an advantage - it is important that learners read questions in full and identify whether a question is asking for advantages or disadvantages.

The focus of question 6 was on an engineering organisation that manufactures televisions.

Q6a - learners tended to perform with success for this question. Learners stated one property of thermosetting polymers that would make them suitable for use in a television; typically, this would relate to the material being an electrical insulator.

Q6b - most learners identified at least one reason why care would be needed when disposing of the materials used in a television. In many cases this included a reference to some materials being able to be recycled whilst others may be hazardous and need to be disposed of using specialist equipment. Commonly learners recognised that materials would need to be separated and sorted.

Q6c - only a small number of learners achieved more than two marks for this question. The focus of the question was on the use of electrochromic materials for a television screen. Where learners did achieve marks, this tended to result from recognising the increased costs or that picture quality may not be as good as alternatives.

In the example below, the learner has identified two disadvantages but has not justified these statements.

(4)

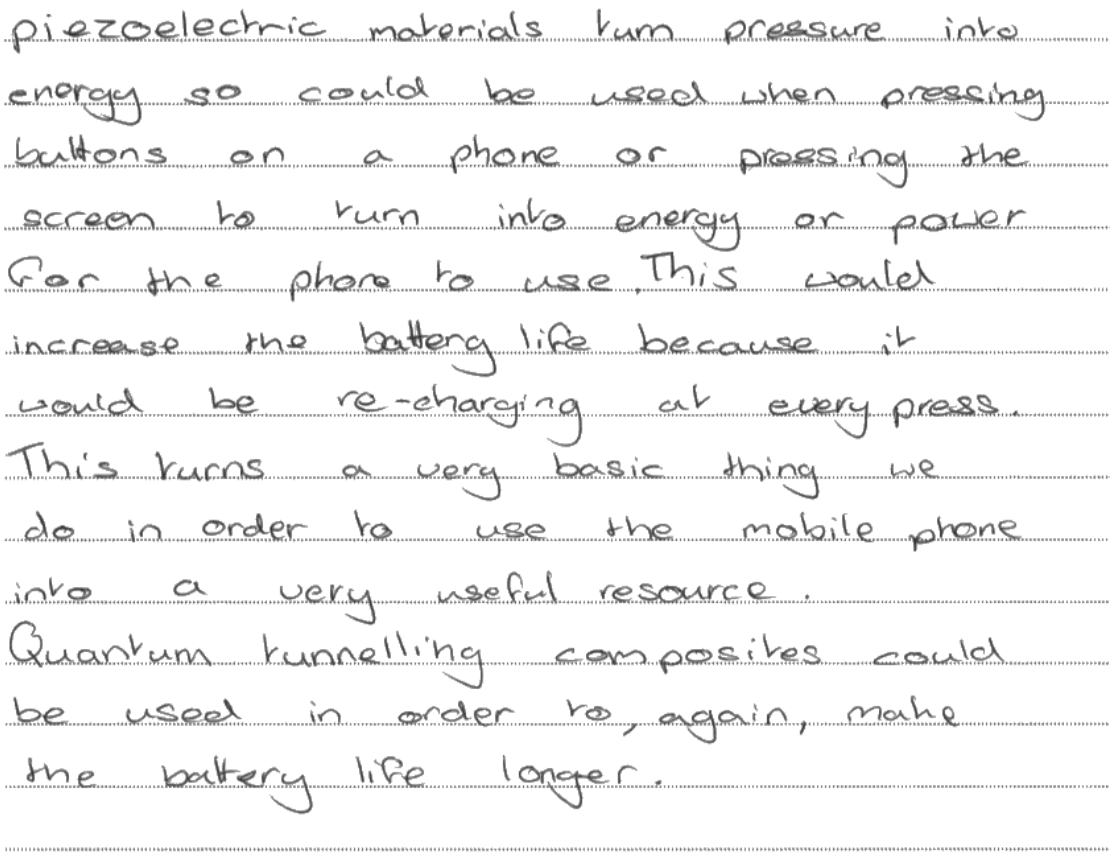
1 It would massively increase the price of the t.V so therefore less people would buy the t.V

2 It would ~~distr~~ distort the image.

Question 7 is an extended writing question where learners were asked to discuss the potential use of quantum tunnelling composites and piezoelectric materials in a mobile phone.

Whilst learners seem to have a good understanding of mobile phone technologies, and to a lesser extent smart material, they did not always link these together in their answers.

In many cases where learners achieved marks in the middle mark band for this question as they were able to consider both types of smart material and suggest ways in which these materials would improve the performance of mobile phones.


piezoelectric materials turn pressure into energy so could be used when pressing buttons on a phone or pressing the screen to turn into energy or power for the phone to use. This could increase the battery life because it would be re-charging at every press. This turns a very basic thing we do in order to use the mobile phone into a very useful resource. Quantum tunnelling composites could be used in order to, again, make the battery life longer.

Those learners who performed well tended to consider a range of factors including the potential to use pressure from touching the screen to help recharge the battery, or that the technologies could be used to reduce the weight of the phones.