

# Examiners' Report/ Principal Examiner Feedback

June 2011

GCSE

Application of Technology in Engineering  
and Manufacturing

Unit 5EM03 Paper 3E

Electrical and Electronics,  
Process Control, Computers,  
Telecommunications

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## Chief Examiner's Report

There were two qualifications examined in this series at GCSE level.

GCSE Engineering (Double Award) 2EG02 and

GCSE Manufacturing (Double Award) 2MN02

Unit 3: Application of Technology in Engineering and Manufacturing (5EM03)

The award of this unit was split into six sectors with an individual paper for each;

5EM03/3A Printing and Publishing Paper and Board

5EM03/3B Food & Drink, Biological & Chemical

5EM03/3C Textiles and Clothing

5EM03/3D Engineering and Fabrication

5EM03/3E Electrical and Electronic, Process Control, Computers,  
Telecommunications

5EM03/3F Mechanical, Automotive

All six papers were harmonised for structure and difficulty.

Each paper had two sections. Questions in Section A related generally to information about the chosen sector. Section B illustrated a product from the chosen sector and questions were related to that product. The product was pre-released in September/October 2010 and acted as a focus for research in preparation for the exam. Again this year a Support Paper was available to help centres prepare for the exam. This paper was attached to the pre-release material so every centre had access to this. Candidates were able to take their own research notes into the examination, but these were not to be submitted with the examination paper for marking. A very few centres did submit this work which caused problems for the processing of their scripts. This action may cause a delay in the marking and therefore issuing of results so centres are strongly warned not to include the pre-release work when submitting scripts. The question paper within both sections was ramped in difficulty throughout although in some papers an unusual pattern emerged where higher achievers failed to gain "easy" marks.

All Principal Examiners' reports indicate that all the questions within the respective paper were accessible to their intended candidature, although all indicated that lower achievers often gave generic answers throughout the paper. A feature of this year, different to the predecessor qualification, was that some sector papers (mainly sectors 3B and 3E) had a significant number of blank spaces. Also most Principal Examiners' reports indicate that marks could be obtained from questions 13 but question 14 which involved assessment of Quality of Written Communication (QWC) was difficult for most.

Generally speaking those candidates who had had opportunities to study and research the target product answered well. It was clear in their responses that they understood the process of manufacturing/engineering when applied to their product and sector. Good candidates were also able to give variety in their responses across the range of questions. Some responses led the examining team to suspect that in some centres candidates were allowed to take in information from previous examination papers or mark schemes as often their answers were duplicates from these previous mark schemes. In these cases often the answer was not in the context of the question and the candidate was not able to score high marks and therefore were disadvantaged by having this information within their pre-release notes and sketches. Candidates are not allowed to have these documents in the examination room as part of their pre-release work.

In general terms a typical grade F candidate was able to identify products from a given sector, name and describe, with some exceptions in some sectors, the use of components/equipment etc and in nearly all cases link applications of technology to key areas of technology. In a range of other questions where explanations and descriptions were required often candidates were only able to give one word if not simple answers. Variations in answers throughout the paper were limited. Application of technology was also limited throughout their responses. Often no responses were suitable for the latter questions in the paper particularly when the question asked for explanations of a term such as 'systems and control' and 'automation'. They showed limited recall and application of knowledge and understanding.

In general terms a typical grade C candidate was able to gain a range of marks from the same areas and aspects of the paper as a grade F candidate, but with further detail in their responses to those questions demanding an explanation or description. They were able to explain benefits of using CAD and CAM. Their responses when explaining the implications of the use of information and data handling were limited. Good responses were given when explaining the aspects of the product through sketches and notes. Some were still unsure of the stages in manufacture, particularly what happens in some of the stages of manufacturing.

In general terms a typical grade A candidate was able to access marks for many aspects of the paper including most of those achieved by grade C candidates. Their explanations and descriptions were complete and had many references to the "real" manufacturing and application of technology of their product. Throughout the papers candidate responses evidenced a variety of applications of technology. Many candidates at this level understood what SMART materials are and knew all about the application of automation. Often their evaluations on the use and impact of modern materials and processes were well presented.

All of these points were considered during the awarding of the results.

# **Unit 5EM03\_3E**

## **Electrical and Electronic, Process Control, Computers, Telecommunications**

### **General Comments**

Overall, this paper produced a good range of responses, the majority of candidates attempted all questions and this year empty spaces were noticeable as the questions ramped up in section B.

Lower ability candidates often gave generic responses to questions, such as 'quick/fast/cheap' which gained limited marks. The more demanding questions, especially at the end of Section B, were difficult for many candidates and consequently a proportion gave poor responses. The format of the last question has highlighted a need to inform centres of developing the concepts of sustainability.

Most candidates have demonstrated being taught examination skills and techniques, some of the low ability still had problems understanding the questions in section B.

### **Section A**

#### **Question 1**

The majority of candidates correctly identified the products belonging to the Electrical and Electronics sector in Q1(a) and the Computer sector in Q1(b).

#### **Question 2**

The majority of candidates correctly identified both components used in the manufacture of products, namely the resistor and battery. Q2(b) was well attempted with the majority of candidates gaining some marks. Surprisingly many candidates incorrectly identified the potentiometer as a switch.

#### **Question 3**

A straightforward and generally well answered question with a high proportion of candidates gaining full marks.

#### **Question 4**

Good responses to Q4(a) included products used in the pre-release materials for past papers or specimen assessment materials. In Q4(b)(i), candidates generally provided answers of steel or plastics. Responses in Q4(b)(ii), were of a very varied standard with many low order responses, but most got the benefit. Q4(c) was poorly answered by the majority of candidates, with confusion about smart materials and modern materials. Hence Q4(c)(ii) was only answered well by those taught about smart materials.

### **Question 5**

The majority of candidates scored quite well for Q5(a)(i) giving two appropriate low responses. Good responses in Q5(b)(i) with very few repeating. In Q5(b)(ii) there were poor responses for the benefit, a lot selecting the quality and not many identifying the how. In this question there was still a tendency for the low response of "cheap", "reliable".

### **Question 6**

Q6(a) attracted a reasonable response, many gave examples to show their understanding. Candidates that answered Q6(b)(i), well, recognised examples of systems and control technology and hence in Q6(b)(ii), the traditional method it replaced. The responses to Q6(b)(iii) were of low response and few managed to get full marks and again the benefit was recognised but not the how.

### **Question 7**

This question required an ability to provide specific responses, by drawing upon specialist knowledge. Candidates were asked to provide answers that related to marketing and materials supply when using Information and Data handling. Q7(a) was generally a well answered question, although some candidates provided highly generic responses, such as, sales info and advertising. Responses that scored full marks had an explanation or were qualified such as 'Because of surveys providing feedback for informing advertising and stored with other customer information'. Q7(b) was also a generally well answered question; again, some candidates provided generic responses, such as JIT or 'stock levels', without qualification, but there was some proportion of good responses, such as, 'automatic ordering as stock levels reduced'.

## **SECTION B – based upon the mass produced PCB drills pre-release material**

### **Question 8**

A reasonably well answered question for all parts. Candidates were able to effectively explain, using notes and sketches, the function of the chuck, motor casing and the Rocker switch. The vast majority of candidates had clearly undertaken some research based upon the pre-release material. A number of responses with drawing failed to annotate 3 points on the drawing so not achieving full marks.

However, it should be noted that full marks can only be attained with both notes and sketches; a significant number of candidates omitted one or the other.

### **Question 9**

For Q9(a)(i), many candidates gained at least 2 marks. The correct sequence of stages is clearly outlined in the specification and centres should refer to it. Q9(b)(ii) was again generally well answered, with marketing or stage 2 being mentioned.

### **Question 10**

Q10(a)(i) was well answered with mainly specific and appropriate materials being stated. Q10(b)(i) elicited a varied response; answers that gained the full 3 marks were few, with many candidates not correctly understanding the term production processes. For Q10(b)(ii), those candidates that had studied injection moulding were able to offer some detailed responses. Some excellent responses were seen for Q10(c), with a high proportion of candidates gaining 3 marks with answers that matched the typical mark scheme answers.

### **Question 11**

For Q11(a), simple responses were still evident, but generally there was understanding of the term automation. Many candidates gave correct answers to Q11(b)(i), but many of the low responses only related to the production stage. In Q11(b)(ii) responses that were popular and correct centred on a description of how the production process could reduce cost and how quality is improved. For Q11(c), the responses were good and most realised the difference between automation and mechanisation.

### **Question 12**

Q12(a) and Q12(b) were generally answered well by the majority of candidates. For Q12(a)(i), text messages and internet are an example of a typical correct low response answer. For Q12(a)(ii), there were many correct responses for benefit but not the how. Q12(b)(i) and Q12(b)(ii) tested knowledge about quality checks and many achieved a couple of low responses with an exceptional few gaining full marks. Benefits to the end user in Q12(b)(iii) were covered well but only to two marks in most cases.

### **Question 13**

This question asks for the impact on the workforce and the working environment. Many attempted the question and achieved some low response marks with many getting 2 low responses, some could identify both changes on the workforce and the environment. As a ramped question the more able had covered and identified the key points.

### **Question 14**

The majority of candidates sitting the examination paper this year attempted this final question. This is pleasing as it is good examination technique for candidates to attempt all questions, even if the response is an informed or 'educated' guess. Responses indicated that many candidates did not understand the term sustainability, most candidates only achieved between 1 or 2 marks. As a ramped question it clearly differentiates and the marking scheme focuses on ensuring more than one issue is developed to gain full marks. Centres clearly need to develop a better understanding of sustainability.

## **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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