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# Examiners' Report/ Principal Examiner Feedback

## Summer 2013

GCSE

Application of Technology in Engineering and Manufacturing

Unit 5EM03 Paper 3F

Mechanical, Automotive

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# Unit 5EM03_3F
# Mechanical, Automotive

## General Comments

Overall, the two sections within this paper produced a good range of responses.

Lower ability students often gave generic responses to questions, such as 'quick/fast/cheap' which gained limited marks. Despite advice in Examiners Reports some students based their responses on an incorrect context and therefore did not gain marks. The more demanding questions, especially at the end of Section B, were difficult for many students and consequently a large proportion gave inappropriate responses. The approach taken where questions required a term to be defined was answered well by higher achievers and not so well be lower achievers.

It was extremely pleasing to see that the majority of students attempted all questions and empty spaces were kept to a minimum throughout the paper, although the odd student left almost the whole paper blank and without response.

Like any other external assessment, students would benefit from being taught examination skills and techniques, as in this case often they did not read the questions properly, and 'describe', 'explain' or 'evaluate' questions were answered using bullet points as opposed to the 'state with additional text that describes, explains or evaluates'. This was sometimes the case in Q14 where students are tested on their quality of written communication (QWC) and would therefore find it difficult to gain high marks.

## Section A

### Question 1

The majority of students correctly identified the products belonging to the Mechanical sector in Part (a). However a significant number of students failed to get both answers correct for Part (b) with the 'fuel cap' causing problems for students who often selected the 'domestic heating control'.

### Question 2

The majority of students correctly identified both components used in the manufacture of Mechanical/Automotive products in Part (a). However there were a number of students who were unable to identify the 'machine vice' and some said the 'scriber' was a picker. Also, in Part (b), many students were unable to describe the use of the 'socket head cap screw' thinking it was a bolt mainly used with a nut as opposed to the machine screw type application.

### Question 3

A straightforward and generally well answered question. Knowing that 'embedded computers' were part of control technology was key to achieving full marks.

## Question 4

Good responses to Part (a) included products used in the pre-release materials for past papers or sample assessment materials. Again this year, this question required two responses and it was pleasing to see that students had not responded with the excluded product, the triple leg reversible pullers, as the subject for the question.
In Part (b)(i), it was concerning that many students had not recognised that a stage was needed for this response, often they quoted a process of procedure which gained no marks and affected the opportunity to answer Part (b)(ii). A broad range of answers in the mark scheme meant that generally a range of marks were awarded as students were able to give detailed responses to explain the benefits of using ICT. Part (c) was answered well.

## Question 5

In the main students gave answers that confused CAM with CAD as they tried to answer Parts (a) and (b). This meant a wide range of marks were seen across these two parts.
In Part (c) many students did not answer the question. Many gave benefits in general, which were not related to the consumer. Where answers were in context high marks were gained.

## Question 6

Part (a) was a question relating to defining a term associated with engineering, 'spreadsheet', there were similar questions in the Sample Assessment Material provided for centres. Many knew of this software and were able to relate to its use to help them describe the term.
Responses in Part (b)(i) were often related to engineering practices such as the use of logbooks or materials lists.
Part (b)(ii) gave students the opportunity to demonstrate what they knew about the application of databases between the manufacturer and the distributor; higher achievers scored well and took this opportunity. A favourite response to Part (b)(iii) was about computer failure but students often failed to give the expansion to their answer.

## Question 7

Centres are reminded that the paper is ramped in difficulty and the latter questions in each of the two sections are aimed at the more able students. This question required an ability to provide specific responses, by drawing upon specialist knowledge of systems and control technology. For Part (a), many students scored well, focussing responses around having sensors in place to stop the danger.
In Part (b), many students did not grasp the concept that this question was about systems and control technology and not automation or application of robots per se.

## Section B - Based upon the 'mass produced triple leg reversible puller' pre-release material

### Question 8

There is an opportunity for all students to display their knowledge and understanding of the pre-release product through sketching and notes relating to the functions of various parts of the 'triple leg reversible puller'. In the main, all three parts were well answered and it was obvious that most centres had let the students investigate the product in a practical manner. Students were able to effectively describe, using notes and sketches, the function of the yoke, thrust bolt and the reversible leg. The vast majority of students had clearly undertaken research based upon the pre-release material; those that provided incorrect responses often confused the requirement of the question, which was about function, with a need to state all they knew about the product and described the materials used and gave manufacturing details, which was not required.
Whilst it was very pleasing to see that the vast majority of students were producing both notes and sketches, centres and students are reminded that both notes and sketches are required to be able to access full marks.

### Question 9

For Part (a)(i), a small number of students were unable to correctly identify the missing stages in the list. Some answers were not a stage. The correct sequence of stages is clearly outlined in the specification and centres should refer to it.
Part (b)(i) was generally well answered; responses centred around 'where the drawings for the puller were done and ideas developed' and many students gained at least 2 marks.
Part (b)(ii) was again generally well answered and slightly better than the question about the design stage, with many students gaining full marks. Most correct responses focused around 'the stage where advertising is carried out or the gathering of customer opinions'. Some responses from students in individual centres were very similar for these questions, and centres are reminded that students are allowed to take into the examination their own notes and sketches based on their investigation into the pre-released product, and not teaching notes.

### Question 10

Part (a) was well answered, with well founded answers.
Part (b)(i) elicited a mixed response, which was surprising. Answers that gained the full 3 marks were not as many as expected, with some students stating a stage. Some students misread the question and gave 'other forging processes'; which was the exclusion stated in the question. The impression given is that many students just quoted any process they knew.
For Part (b)(ii), those students that had studied the pre-release material were able to offer detailed responses in relation to why forging is a suitable process used during the manufacture of the reversible leg for the puller. The most popular answers centred on the advantages of 'improvement of strength characteristics and the ability to produce a 3D shape'. Some students only gained 1 mark for generic responses such as 'quick and easy to do'.
Part (c) included a variety of responses which spread across the marks available. Some answers were very impressive where students had obviously seen this process.

## Question 11

Part (a)(i) clearly differentiated the students with only the higher achievers able to define the term 'process control'.
With Part (a)(ii), many students did not give their answer in the context of the application during automated stages of manufacturing. Some answers were however very good and it was obvious that these were from centres where the students had either visited companies deploying process control or watched videos about automated manufacturing.
In Part (b) many students clearly found it difficult to give an accurate answer in context. The question asked for a description of two examples of quality control, but often students gave the benefits which had been the context given in previous papers.

## Question 12

Part (a) was generally not answered in the right context.
For Part (a)(i), there was some repetition in responses and often the answers were about the size of the workforce and not the type. Where students responded well to Part (a)(ii), answers often had a balanced view of negative and positive changes. Some answers strayed into the responses expected for Part (a)(iii) when statements were mentioned about environmental issues such as global warming. The question was about the production environment.
Part (b) of this question is centred around the use of bar codes. Responses again often missed the context of the advantages of using bar codes in the packaging and dispatch stage and therefore gained little reward.

## Question 13

The majority of students sitting the examination paper this year attempted this question. This is pleasing as it is good examination technique for students to attempt all questions, even if the response is an informed or 'educated' guess. The response mainly fell into one of three categories. Those who realised the context of customer satisfaction and gained full marks; those who knew why modern materials are used but omitted the context; and those who knew little about the impact of using modern materials.

## Question 14

This question looked at QWC as well as issues of 'improvements in production and efficiency and the effects on other parts and activities in an engineering organisation'. Where students scored well, there were coherent sentences produced relating to issues clearly linking the improvements to what happens in marketing and selling. Many students discussed improvements that could be made but made no attempt to say what impact this would have on marketing and selling the pullers. Although the paper is ramped, it did give most students the opportunity to test the knowledge of how manufacturers should think about improvements in efficiency. However, many students used bullets points to respond to this question and therefore did not score highly on QWC.

**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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