

Examiners' Report/  
Principal Examiner Feedback

Summer 2012

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 candidates often gave generic responses to questions, such as 'quick/fast/cheap' which gained limited marks. Despite advice in Examiners Reports relating to the previous specification some candidates 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 candidates 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 by lower achievers.

It was extremely pleasing to see, as with the previous specification, that the majority of candidates attempted all questions and empty spaces were kept to a minimum throughout the paper.

Candidates 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 candidates 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 candidates correctly identified the products belonging to the Mechanical sector in part (a). However a significant number of candidates were unable to get both answers correct for part (b) with the 'dipstick' causing problems for candidates who often selected the 'logbook'.

##### **Question 2**

The majority of candidates correctly identified both components used in the manufacture of Mechanical/Automotive products in part (a). However there were a number of candidates who were unable to identify the 'engineers square' and some said the 'drill bit' was a 'screw'. Also, in part (b), many candidates were unable to describe the use of the 'vernier calipers' thinking it was to hold things.

##### **Question 3**

A straightforward and generally well answered question.

#### **Question 4**

Good responses to (a) included products used in the pre-release materials for past papers or specimen assessment materials. Again this year, this question required two responses and it was pleasing to see that candidates had not responded with the excluded product, the 'inline ignition spark tester', as the subject for the question. In some cases though, the product included the word metal such as 'metal box' which was incorrect and was concerning that the candidate either did not know the difference between metal and a polymer or had not read the question properly.

In part (a)(ii), it was pleasing to see many of the candidates providing a specific material for one of the named products. Some though, gave a family of materials such as thermosetting polymer or composite and a few gave a product which made the gaining of marks for (a)(iii) difficult. A broad range of answers in the mark scheme meant that generally good marks were awarded as candidates were able to give detailed responses to the reasons for using the named polymer. Part (b)(i) specifically asked for a stage, however responses often did not state a stage, they stated a use. Candidates were able to gain marks in part (b)(ii) if they were able to explain an advantage of an application of using systems and control technology, but some were confused as they answered about the use of ICT and such techniques as the use of spreadsheets which were incorrect.

#### **Question 5**

The majority of candidates scored very well for part (a) with answers such as 'modelling virtual products' and 'modifying existing designs'. It was very pleasing to see a range of responses of the contribution of CAD, with respect to new product development. Some candidates listed CAD software and one interesting response stated 'doesn't have to drive a car to work every day'. Part (b) proved to be another fairly well answered question, with most answers focussing on efficiency or safety issues.

#### **Question 6**

Part (a) was a question relating to defining an engineering term, 'electronic mail', there were similar questions in the Sample Assessment Material provided for centres. It was pleasing to see that although a number of candidates were unable to define the term, they were able to be rewarded marks when their answer was an expansion of a use of e-mail. Responses in part (a)(ii) had to directly relate to e-mail and not just computer problems to be awarded maximum marks. Part (b) was answered quite well with many well thought out responses such as 'can be recorded' and 'the advantage of playing back for clarification'.

#### **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 candidates. This question required an ability to provide specific responses, by drawing upon specialist knowledge of information and data handling systems. Part (a), many candidates scored well focussing responses around having materials information. Part (b), many candidates scored well with responses centred on automatic

tracking of goods. Many candidates did not grasp the concept that this question was about information and data handling systems. One interesting response stated that 'the information is kept a secret'.

## **Section B - Based upon the 'mass produced inline ignition spark tester' pre-release material**

### **Question 8**

There is an opportunity for all candidates to display their knowledge and understanding of the pre-release product through sketching and notes relating to the functions of various parts of the inline ignition spark tester. In the main all three parts were well answered and it was obvious that most centres had let the candidates investigate the product in a practical manner. Candidates were able to effectively describe, using notes and sketches, the function of the rubber sleeve, probe (in some centres this was referred to as the spike) and the internal compression spring. The vast majority of candidates 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. Whilst it was very pleasing to see that the majority of candidates were producing both notes and sketches, centres and candidates are reminded that both notes and sketches are required to be able to access full marks.

### **Question 9**

For part (a), a number of candidates 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 inline ignition spark tester is advertised' and many candidates gained at least 2 marks. Part (b)(ii) was again generally well answered, with many candidates gaining at least 2 marks; most correct responses focused around 'the stage where the materials would be ordered and put into stock'. Some responses from candidates in individual centres were very similar for these questions, centres are reminded that candidates 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. Their own investigation, notes and sketches would enable the candidate to describe the stages in a better context and more likely to have access to the full mark range.

### **Question 10**

Part (a) was well answered, with 'steel' the most popular (correct) answer. 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 candidates stating a stage. Some candidates misread the question and used 'injection moulding' as a process; which was the excluded process. The impression given is that many candidates just quoted any process they knew. For Part (b)(ii), those candidates that had studied the pre-release material were able to offer detailed responses in relation to why injection moulding is a suitable process used during the manufacture of inline ignition spark testers. The most popular answers centred on the advantages of high volume methods, the repeatability and the quality of

finish on the tester. Some candidates only gained 1 mark for generic responses such as 'quick and easy to do'. For part (c), many responses focused around materials being used in a general sense and did not give the detail relative to the development of the manufacturers products.

### **Question 11**

Part (a)(i) clearly differentiated the candidates, with the higher achievers able to describe two examples of quality control. Those who did not attract many marks did not set their answer in the context of packaging and dispatch, they instead gave general applications. With part (a)(ii), many candidates again did not give their answer in the context of the application of automation during packaging and dispatch. Some answers were however very good and it was obvious that these were from centres where the candidates had either visited companies deploying automatic packaging techniques or watched videos about automation in packaging and dispatch. In part (b) many candidates clearly found it difficult to give a less restrictive answer than accuracy. The question needed answering with a context of application of quality control during automated stages.

### **Question 12**

Part (a) was generally answered well by the majority of candidates. For part (a)(i), although there was some repetition in responses, often two of the three marks were gained. Where candidates responded well to part (a)(ii), answers often had a balanced view of negative and positive impacts. Some answers strayed into the responses expected for Question 14 when statements were mentioned about 'turning off the lights'. Those who failed to gain any marks were those who answered in the context of the global economy which was in a previous examination. Part (b) of this question is centred around the use of ICT at different stages in manufacturing or further uses in the supply chain. Response in part (b)(ii) again often missed the context of the assembly and finishing stage and therefore gained little reward. The responses to part (b)(iii) often had little bearing on the activity of the distributor.

### **Question 13**

The majority of candidates sitting the examination paper this year attempted this 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. Many correct responses were about the control of guarding and that fewer humans would be around. Many candidates also coupled this with responses such as 'safer', 'cleaner' and 'quieter' working environment. Where candidates did not score well, it was a result of not combining responses to safety in the manufacturing environment.

### **Question 14**

This question looked at QWC as well as issues of 'energy consumption'. Where candidates scored well, there were coherent sentences produced relating to issues surrounding 'energy consumption'. Many candidates discussed inconceivable ideas relating to energy saving such as; 'reduce the voltage to the machines' or 'work at night as electricity is cheaper' or 'turn the lights out as robots can work in the dark'. Although the paper is ramped, it did give most candidates the opportunity to test the knowledge of how manufacturers should

think about energy consumption. However, many candidates used bullets points to respond to this question and therefore failed to score highly on QWC.

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