

Examiners' Report/  
Principal Examiner Feedback

Summer 2015

Pearson Edexcel GCSE  
in Manufacturing & Engineering

5EM03 Paper 3F

Mechanical/Automotive

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Summer 2015

Publications Code UG041338

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**5EM03\_3F**  
**Mechanical, Automotive**

**General Comments**

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

Although to a lesser degree this year lower ability learners often gave generic responses to questions, such as 'quick/fast/cheap', which gained limited marks. Despite advice in Examiners Reports, some learners based their responses on an incorrect context and therefore did not gain marks. Disappointingly this was, again, the case in this series. The more demanding questions, especially at the end of Section B, were difficult for many learners, and consequently a large proportion gave inappropriate responses and there were some questions not attempted.

Again, as in previous years, it was extremely pleasing to see that the majority of learners attempted all questions and empty spaces were kept to a minimum throughout the paper.

Like any other external assessment, learners 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 learners 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 learners correctly identified the products belonging to the Mechanical sector in Part (a). However a number of learners failed to get both answers correct for Part (b), although there appeared to be no one distractor causing the problem for learners.

**Question 2**

Although the majority of learners correctly identified both tools used in the manufacture of Mechanical/Automotive products in Part (a), there was, however a number of learners who were unable to identify the 'tap wrench', often referring to it as a 'die' or 'tap'. Also, in Part (b), many learners were unable to fully describe the use of the 'angle plate', often guessing it had something to do with angles, but often about bending angles.

**Question 3**

A straightforward and generally well answered question. Knowing that 'computer integrated engineering (CIE)' was 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. Again this year this question required two responses and it was pleasing to see that learners had not responded with the excluded product, the low voltage circuit tester, as the subject for the question. In Part (b) (i), it was appropriate that many learners were able to state a modern material, this gave 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 learners were able to at least give benefits of using the material they had stated, with better responses being linked to explaining the benefit to the consumer. Part (c) was either answered very well or they found it difficult to give a SMART material which inhibited the opportunity in part (c) (ii).

### **Question 5**

In the main for part (a) learners gave answers that included an example, although this lacked an engineering focus, of the internet, however they found it difficult to gain full marks, and a disadvantage to a manufacturer of using the internet. These responses were often about 'corruption', 'viruses' or 'security'. Part (b) gave a good opportunity for those who knew about the range of communications technology and the beneficial uses to a distributor.

### **Question 6**

Many were able to give a way in which robots may be used in part (a) (i), although often this was about assembly work. A range of responses were given in part (a) (ii), such as issues about maintenance or hazardous working or high initial costs. One interesting response suggested the robot may corrupt the person operating it. In part (b) it was very disappointing that learners found it difficult to describe or even mention the main features of a CIM system. Many gave generic answers about advantages of CNC or CAM etc.

### **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 learners. This question required an ability to provide specific responses, by drawing upon specialist knowledge of handling information in a context of materials supply and control. The answer needed a linked response and many were unable to achieve this. Some gave advantages and did not describe the use. A previous mark scheme showed the advantages and some appeared to be quoting responses from this. Centres are reminded that the learners are only allowed to take in their own notes and sketches from their research and work on the pre-release product. In part (b) many answers were restricted to advertising type activities.

## **Section B – based upon the 'mass produced low voltage circuit testers' pre-release material**

### **Question 8**

There is an opportunity for all learners to display their knowledge and understanding of the pre-release product through sketching and notes relating to the functions of various parts of the low voltage circuit tester. In

the main all three parts were well answered and it was obvious that most centres had let the learners investigate the product in a practical manner. Learners were able to effectively describe, using notes and sketches, the function of the crocodile clip, end cap and the main body. The vast majority of learners 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, all not asked for. Whilst it was very pleasing to see that the vast majority of learners were producing both notes and sketches, centres and learners are reminded that both notes and sketches are required to be able to access full marks. Some learners only provided notes and therefore limited the marks they could gain.

### **Question 9**

Most learners gave correct answers for Parts (a) (i) and (ii). The correct sequence of stages is clearly outlined in the specification and centres should refer to it. Parts (b) and (c) were also well answered; some responses centred on activities associated with general manufacturing activities rather than design in Part (b). Often responses in part (c) gained the marks from a range of low level responses rather than a detailed linked response; although many good linked responses were also seen.

### **Question 10**

Part (a) was well answered, with those achieving at the lower end doing as well as the higher achievers as there were few materials that would be suitable for the main body of the low voltage circuit tester. Part (b) (i) elicited a range of usually acceptable processes. For Part (b) (ii), those learners 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 the low voltage circuit testers. Part (c) was a difficult question for most and very few gained maximum marks as they missed the real reason. Some actually mention steel being appropriate as it was a good conductor.

### **Question 11**

Part (a) (i) proved difficult for a lot of learners as they were not able to give uses. Often responses involved robots, which unless phrased correctly gained minimum marks. With Part (a) (ii), many learners did not give their answer using the correct terminology. Some answers were however very good and it was obvious that these were from centres where the learners had either visited companies who had good visible use of control technology or were taught well in this respect. In Part (b) there were many generic type responses that attracted the mark for identifying a benefit but were unable to follow this through with a linked response.

### **Question 12**

This was one of the poorly answered questions on the paper. Part (a) (i) often attracted a guessed answer and was along the lines of a normal meaning of 'lean'. Those who were unable to answer this first part also struggled to gain any marks for Part (a) (ii) and those who did answer often forgot about the context of the distributor and there were a lot of blank

responses. Some answers for Part (b) (ii) were disadvantages and not benefits (again a previous mark scheme showed the disadvantages and some appeared to be quoting responses from this). Centres are reminded that the learners are only allowed to take in their own notes and sketches from their research and work on the pre-release product.

### **Question 13**

This question proved very challenging for all learners. Many didn't understand the question; they talked about the general selection and use of materials in the product. These gained little credit as the context of processing materials sustainably was ignored.

### **Question 14**

This question looked at QWC as well as impact of 'automation on the quality of products'. Where learners scored well, there were coherent sentences produced relating to automation clearly linking the impacts in relation to improved quality. A lot of misguided responses were about profits and speed of manufacture, and lost the focus of impact on quality. Some learners used bullet points to respond to this question and therefore failed to 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>

