

Examiners' Report/
Principal Examiner Feedback

Summer 2013

GCSE

Application of Technology in Engineering
and Manufacturing

Unit 5EM03 Paper 3D

Engineering Fabrication

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Unit 5EM03_3D Engineering Fabrication

General Comments

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

Lower ability students are still giving responses such as 'accurate/fast/cheap' which gained limited marks. Some students continue to misread or misinterpret questions therefore missing out on 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.

Questions that required a term to be defined, again worked as an excellent differentiator. The majority of students continue to attempt all questions and empty spaces were kept to a minimum throughout the paper. It appears that most centres have taken on board information from last series' examiner's report as there was a significant improvement in students abilities to respond to 'describe', 'explain' or 'discuss' questions without using bullet points. Centres are clearly teaching appropriate examination skills and techniques to minimise this.

Section A

Question 1

The majority of students correctly identified the products belonging to the Engineering Fabrication sector in both parts of this question.

Question 2

Students had the opportunity to use their knowledge and understanding to correctly identify some tools and components this year. The majority of students were clearly able to identify both in part (a), however, some students identified the second tool as being a 'hand vice' which was clearly incorrect. It was very pleasing to see students able to describe both components to access full marks.

Question 3

A straightforward and generally well answered question. However a number of students thought that 'embedded computers' was linked to 'Information Communication Technology' whereas the correct Key Area was 'Control technology'.

Question 4

Good responses to part (a) included products used in the pre-release materials for past papers or sample assessment materials. This question again required two responses and it was pleasing to see that students had not responded with the excluded product, the office stapler, as the subject for the question.

In part (b), this proved more problematic. Many students did not identify a stage in manufacturing but rather stated a process within the manufacture such as 'using CAD to design the product'. Students need to respond to the question clearly as the seven stages of manufacturing are listed in the specification. However, it was very pleasing to see that students were able to identify an appropriate material for

their chosen product and describe its characteristics with enough detail to attract both marks.

Question 5

The majority of students scored well for part (a) with answers centred around application within the sector such as 'the use of CNC lathes' or 'automated assembly'. This question was well answered and it was very pleasing to see that students are clearly able to distinguish between benefits of CAM for the manufacturer and the consumer. However, some students did not read part (b) correctly and gave uses of CAD that were related to modifying existing products rather than additional uses of CAD.

Question 6

Again part (a) proved to be a challenge for a number of students. Students were required to define the term 'spreadsheet'. This continued a similar theme through past series with most students able to provide enough of a detailed response to score well. It is clear that centres are recognising the need to teach 'databases' and 'spreadsheets' in the context of engineering/manufacturing.

Question 7

Centres are reminded that the paper is ramped in difficulty and the latter questions in each section are aimed at the more able students. This question required an ability to provide specific responses, by drawing upon specialist knowledge of programmable logic controllers.

Part (a), many students scored well here focussing responses around their ability to monitor systems and the quick reaction time to dangerous situations therefore preventing injury.

Part (b) proved a little more challenging but students scored well with responses that related to accurate control of processes with good waste control and cost effective production.

Section B – based upon the 'mass produced office stapler' pre-release material

Question 8

The paper continued to create a greater opportunity for all students to display their knowledge and understanding of the pre-release product through detailed sketching and notes relating to the functions of various parts of the office stapler. Most students were able to effectively explain, using notes and sketches, the function of the anvil and the magazine/carrier. However, the pin/fulcrum proved to be a good differentiator as a number of students found this difficult to sketch. The vast majority of students had clearly undertaken research based upon the pre-release material. Some students are still producing notes only and this does not allow them access to full marks for each part of this question.

Question 9

For part (a), nearly all students were able to correctly identify the missing stages in the list. There was a significant improvement in correct responses compared with last series.

Part (b) most students scored higher with a description of 'Design' as opposed to 'Marketing'. Responses for 'Design' centred around 'initial design concepts', 'the use of CAD to develop designs' and 'development of the design specification'.

Whereas responses for 'Marketing' centred around market research activities such as 'gathering customer opinions through the use of surveys/questionnaires'.

Question 10

Part (a)(i) proved quite challenging for most students and reward was given to the students that recognised a need for a steel that had been hardened or had a higher strength than mild steel or low carbon steel. Good examples included 'medium carbon steel', 'stainless steel' and 'hardened steel'.

Part (b)(i) produced a better response than last series with popular correct answers such as 'injection moulding' and 'press forming'.

For part (b)(ii), those students that had studied the pre-release material were able to offer detailed responses in relation to why stamping is a suitable process used during the manufacture of the magazine/carrier. Popular answers centred around 'the low cost per unit' and the 'ability to create the shape repeatedly'.

For part (c), many responses focused around polymers being used to make the stapler light weight and warm to the touch with significant improvement to the staplers aesthetics.

Question 11

Part (a) again proved quite challenging for a many of the students. Students were required to define 'process control'. A number of students simply reworded the term by stating 'something that controls a process' which contained insufficient detail to award any marks. Students scored well when they responded with answers that mentioned key words such as 'monitoring', 'intervention' and 'data collection' in coherent sentences. However, it was clear that many students were able to explain reasons why manufacturers use process control in part (a)(ii) with responses such as 'efficient production', 'reduced waste' and 'reliable parts' all linked to improving customer satisfaction.

For part (b) many students were able to give quality control responses that mainly focused around checking the size/dimensions of parts of the stapler using a range of measuring equipment.

Question 12

Part (a)(i) responses were slightly disappointing with many students failing to read the question and giving a change in 'size' of workforce rather than a change in 'type'. Incorrect responses centred around 'using robots which reduces the workforce' as opposed to a correct responses such as 'a workforce that is highly skilled'.

For part (a)(ii), again many students did not read the question and responded with answers that described production efficiencies rather than a production environment that could be much cleaner, safer and quieter as a result of the use of modern technology.

Part (a)(iii) followed on with the environmental theme and students scored much better here with responses clearly linked to the global environment and the need to reduce waste and pollution.

Question 13

The majority of students sitting this examination paper made a very good attempt at this question. It was very pleasing to see that students were comfortable about the impact of modern materials and the link with customer satisfaction. Again there were responses that referred to material 'aesthetics', 'strength to weight', 'properties' and an appropriate response linked to the use of an 'elastomer' that prevented the stapler from slipping on the work surface.

Question 14

This question looked at QWC as well as issues of 'the effects of marketing and sales to improve production and profitability'. Where students scored well, there were coherent sentences produced relating to issues surrounding 'modern materials producing high quality staplers' and 'using systems and control technology to produce efficient production' with clear links to increased profit and investing in marketing opportunities through the use of ICT. However, there were still a significant number of students who did not link production processes and profitability with marketing and sales and gave confused responses to this question. It was pleasing to see however, the reduced number of students responding with bullet points. There were clear improvements in QWC for this question.

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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