

Examiners' Report/
Principal Examiner Feedback

Summer 2012

GCSE

Application of Technology in
Engineering and Manufacturing

Unit 5EM03 Paper 3D

Engineering Fabrication

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Summer 2012

Publications Code UG032059

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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 candidates are still giving responses to questions, such as 'quick/fast/cheap' which gained limited marks. Some candidates misread or misinterpreted questions 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. Questions that required a term to be defined again worked as an excellent differentiator.

The majority of candidates continue to attempt all questions and empty spaces were again kept to a minimum throughout the paper.

A recurring theme from the last series is the need to teach appropriate examination skills and techniques, as 'describe', 'explain' or 'discuss' questions were answered using bullet points as opposed to the 'state, describe, explain' method. This was sometimes the case in Q14 where candidates are tested on QWC.

Section A

Question 1

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

Question 2

Candidates were introduced to tools and equipment for the first time with the majority correctly identifying both tools in part (a). However there were a number of candidates who were giving incorrect responses such as 'set square' and 'drill head' for the 'engineers square' and 'drill bit' respectively. Also many candidates were unable to describe the use of the 'vernier calipers' with enough detail to access both marks.

Question 3

A straightforward and generally well answered question. There was a marked improvement on responses compared to last year.

Question 4

Good responses to part (a) included products used in the pre-release materials for past papers or specimen assessment materials. This question again required two responses and it was pleasing to see that candidates had not responded with the excluded product, the lawn sprinkler, as the subject for the question. In Part (b), it was pleasing to see many of the candidates providing a specific polymer for one of the named products. However, far too many candidates provided generic responses such as 'thermoplastic', 'thermoset' or simply 'plastic'.

For (b)(ii) 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 benefits of using the polymer named. This question, along with, part (c), was a very good differentiator within the paper. Candidates who scored well across the whole paper were able to identify a stage where systems and control technology would be used generally and gave very good responses to the advantage of its use.

Question 5

The majority of candidates scored very well for part (a) with answers centred around 'easy to modify drawings' and 'an ability to model designs in 3D'. It was very pleasing to see good responses to the benefits of CAM over traditional methods of manufacture. It is very pleasing to see an increasing number of candidates clearly able to distinguish between CAD and CAM.

Question 6

Part (a) again proved to be quite challenging for a number of candidates. Candidates were required to define 'electronic mail'. This followed a similar theme to last series and the majority of candidates scored well. The second part of (a) looked at a disadvantage of using email and candidates who scored well across the whole of the paper responded well here. Part (b) was answered very well by the majority of candidates and video conferencing as a communications technology they appeared relatively familiar with.

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 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 accurate sales information leading to instant feedback. Part (b), proved a little more challenging with candidates responding with answers linked to 'product tracking' and 'fast distribution'.

Section B - Based upon the 'mass produced shopping trolley' pre-release material

Question 8

The paper continued to create a greater 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 lawn sprinkler. All three parts were generally well answered. Candidates were able to effectively explain, using notes and sketches, the function of the turbine and the spray tube. However, the crank proved to be a good differentiator as a number of candidates found this difficult to sketch. The vast majority of candidates had clearly undertaken research based upon the pre-release material.

Question 9

For part (a), most candidates were able to correctly identify the missing stages in the list. However, some answers still related to 'quality control' as a stage. The

correct sequence of stages is clearly outlined in the specification and centres should refer to it. Part (b) most candidates scored much higher with a description of 'Marketing' as opposed to 'Materials supply and control'. Responses centred around market research activities 'gathering customer opinion through the use of questionnaires' or 'the stage where materials are ordered and inspected prior to production' for marketing and materials supply and control respectively.

Question 10

Part (a)(i) was well answered, with 'aluminium' the most popular (correct) answer. Part (b)(i) produced a mixed response; answers that gained the full 3 marks saw many candidates stating manufacturing processes such as bending, pressing and drilling. Some candidates misread the question and used 'injection moulding' as a process; which was the excluded process. 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 turbine. The most popular answers centred on the advantages of 'easiest/quickest method', 'low cost per unit' and 'ability to mould complex shapes repeatedly'. Poor answers explained how the process of injection moulding was undertaken. For part (c), many responses focused around materials being used that make the lawn sprinkler strong/durable along with corrosion resistance.

Question 11

For part (a)(i), many candidates did not gain full marks as they responded with answers that centred around quality control at the assembly and finishing stage rather than packaging and dispatch. However, part (a)(ii) has a greater response with candidates clearly able to show knowledge and understanding of a range of automated processes at the packaging and dispatch stage. Good responses included the use of conveyor systems and automated wrapping machines through to remote operated vehicles that speed up processes enabling faster distribution. Part (b) was generally answered well and it is good to see that centres are preparing their candidates for most aspects of quality control.

Question 12

Part (a)(i) was generally answered well by the majority of candidates. Many responses discussing higher skill levels required and the reduction of labour as a result of automated machinery being used. For Part (a)(ii), candidates very rarely achieved full marks as responses were not detailed enough. Typical responses referred to the reduction of waste and lower carbon emissions. Part (b) examined information communication technology at a number of stages in manufacture. Part (b)(i) was answered well by the majority of candidates, however poor responses were produced when the candidate did not link the use of ICT to the marketing stage and simply stated one word answers such as 'spreadsheet' or 'databases'. For part (b)(ii) candidates also responded well with answers focussing on electronic monitoring processes and another very pleasing point in part (b)(iii) was the fact that candidates were able to distinguish between the manufacturer and the distributor when looking at the benefits of ICT.

Question 13

The majority of candidates sitting the examination paper made a good attempt at this question. This was again pleasing as it is good examination technique for candidates to attempt all questions. It was clear to see that candidates are very comfortable about issues surrounding control technology and safety. Many discussed the issues of machines being able to perform hazardous operations and therefore minimising the workforce to such dangerous tasks. However, incorrect responses saw some candidates simply describe a range of personal protective equipment that should be worn.

Question 14

This question looked at QWC as well as issues of 'reducing energy consumption'. Where candidates scored well, there were coherent sentences produced relating to issues surrounding 'using alternate energy sources' and 'improving machine or manufacturing efficiencies'. Some candidates discussed the need to source local materials therefore reducing transport distances. However, far too many candidates discussed issues about the need to reduce the number of machines and replace with manual labour but with no justification. This would possibly reduce energy consumption but probably increase waste and inconsistency in product manufacture ultimately leading to many more needing to be produced through high reject rates, therefore increasing energy consumption. Also many candidates are still using bullet points to respond to this question and therefore failed to score highly on QWC.

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