



Pearson

Examiner's Report Principal Examiner Feedback

Summer 2018

Pearson Edexcel GCSE
In Engineering/Manufacturing (5EM03)
Paper 3D Engineering Fabrication

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Publications Code 5EM03_3D_1806_ER

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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 'accurate', 'quicker' and 'cheaper' which gained limited marks. Some candidates continue to misread or misinterpret questions and therefore did not gain marks. The more demanding questions, especially at the end of Section A and Section B, were difficult for some candidates; however, there continues to be an improvement in the quality of most responses.

The majority of candidates continue to attempt all questions and empty spaces were again kept to a minimum throughout the paper. It appears that centres have again taken on board information from previous series examiners reports as there was further improvement in candidates abilities to respond to 'describe', 'explain' or 'discuss' without using bullet points. Centres continue to build on teaching appropriate examination skills and techniques.

Section A

Question 1

The majority of candidates correctly identified the products belonging to the engineering fabrication sector in part (a) and part (b); however, a minority chose the response 'Satellite navigation' for part (b) which was incorrect (the correct responses being 'Mechanics vice' and 'Aluminium ladders' for part (a) and 'Road barrier' and 'Chuck key' for part (b)).

Question 2

Candidates had the opportunity to use their knowledge and understanding to correctly identify and describe some tools and components this year. A minority of candidates were able to identify both in part (a) however; most candidates only identified the first component which was the 'engineers square'. The second (Split die/die) was often referred to as a 'tap' which was incorrect. Part (b) of this question also proved quite challenging. The first image clearly showed a nut that could be used to tighten or loosening bolts. Whilst many candidates were able identify this use, many failed to expand on this by mentioning, for instance, to hold materials together and therefore did not achieve the second mark. The Bearing was more accessible to candidates and both marks were often awarded for responses such as 'used between a rotating component and a stationary component' and 'used to reduce friction'.

Question 3

A straightforward and generally well answered question. However a minority of candidates thought that 'Integrated manufacturing systems' was linked to 'Information and communications technology' where 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 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 stunt scooter, as the subject for the question. In part (b), there was a considerable improvement in performance.

Most candidates were able to correctly identify an appropriate type of automation such as 'robotics', 'conveyor systems' and 'CAM'. Typical reasons for the use of automation included, 'product consistency', 'faster distribution' and 'fast production rates' for Robotics, Conveyor systems and CAM respectively. Part (c) was also answered reasonably well. Candidates were clearly able to identify a material for one of their products and describe how the material changes the products characteristics. Some candidates lost marks here by not giving a correct type of automation which then lost access to the reasons.

Question 5

Part (a) was generally answered well. Most candidates provided responses such as 'products are consistent quality' and 'products are made with accuracy' (for 2 marks). A number of candidates gave benefits for the manufacturer rather than the consumer and failed to gain any marks here. The majority of candidates also scored well for part (b), with many responses relating to 'easy to modify drawings', 'easy to transfer information/data' and 'ability to convert 2d to 3D models'. Some candidates gave responses linked to speed of production which was in the actual question stem and could not be accepted.

Question 6

Part (a)(i) was also answered very well. Again candidates were able to gain both marks for describing the term 'Bluetooth'. Typical responses focused on 'a wireless connection between two devices' or 'a method of connecting devices to allow ease of transfer of data over a short range'. Part (b) proved far more challenging. The majority of candidates did not score here and were unable to identify a traditional method that EPOS has replaced. Correct responses focused on 'manual stock taking' and 'databases'. Again part (b)(ii) proved very challenging with the majority of candidates unable to give two advantages of using EPOS. Where some marks were scored, candidates gave responses relating to 'quick response times when dealing with customers' or 'keeping track of stock levels with ease'.

Question 7

Centres are reminded that this examination paper is ramped in difficulty and the latter questions in each section are aimed at the more able candidates; as a result, this question required an ability to provide specific responses, by drawing upon specialist knowledge. Part (a) was generally well answered by most candidates. There was a popular 3 mark response such as 'Can detect faulty products by tracking trends and reacting to the situation'. Part (b) also produced some good responses. Most responses centred around the use of immediate reaction to hazardous situations and shutting systems down instantly if there was a danger present.

Section B – based upon the 'mass produced stunt scooters' 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 detailed sketching and notes relating to the functions of various parts of the bike stand. Most candidates were able to effectively explain, using notes and sketches, the

function of the 'axle and fork', 'deck' and 'bar ends'. Some candidates are still producing notes only and this does not allow them access to full marks for each part of Q8.

Question 9

For part (a)(i), the majority of candidates were able to correctly add the missing main stages in the flow chart ('Production planning' and 'Materials Supply and Control' for 2 marks. Responses that could not be rewarded often stated 'Quality control', or sometimes the incorrect stages were entered. For (a)(ii), almost all candidates correctly named the stage as 'Production'. It was pleasing to note that answers for part (b) were often contextualised, focusing specifically on what would happen at the assembly and finishing stage when manufacturing stunt scooters; responses associated with attaching the wheel, brake or applying decals or quality control inspection could often be seen. Part (c) was generally well answered too, with many candidates gaining at least 2 marks. Responses normally centred on product advertising and product promotion along with establishing product costs.

Question 10

Part (a)(i) proved accessible for most candidates and reward was given to the candidates that recognised a metal such as 'Aluminium' or 'Steel'. Some candidates mis-read the question and gave a polymer such as 'ABS' instead of a metal. Part (b)(i) produced a better response than last series with popular correct answers such as 'extrusion', 'casting' and 'drilling'. For part (b)(ii), those candidates that had studied the pre-release material were able to offer detailed responses in relation to why CNC machining is a suitable process used during the manufacture of the stunt scooter. Popular answers centred on 'the production of consistent quality products and minimal waste production'. Part (c) was answered well by candidates, with most gaining 2 to 3 marks. The majority of responses centred on 'improved properties meaning products will last longer' and 'improved manufacturing processes leading to reduce costs'. There were also very specific responses that discussed better grip and easy to mould to suit the user. Again it was pleasing to note that answers were often contextualised, focusing specifically on materials that are used for the stunt scooter.

Question 11

Many candidates gained 2 marks for part (a) with explanations of 'quality control' such as 'inspection and testing of components to meet the specification' or 'a system used to monitor the standard of products throughout production'. Part (b)(i) proved to be a quite accessible. The majority of candidates gained 4 marks on this question, for answers that focused on three examples of quality control procedures used during the production stage. There were typical responses such as 'visual inspection' and 'dimensional checks or 'welding checks'. These were often supported with description such as 'to check for physical damage' for visual inspection, 'to ensure the parts are the correct size' for dimensional checks and 'to ensure joints are in good condition' for welding checks.

In part (b)(ii), most candidates gained at least 1 mark, with a typical response focusing on the increased time it takes to perform quality control checks. In part (b)(iii), the majority of candidates scored well. It is clear that candidates know

the benefits of using quality control for the consumer with responses relating to product reliability and customer satisfaction.

Question 12

Part (a)(i) was answered very well by the majority of the candidates. Typical correct responses for this question included 'safer environment' and 'less labour intensive'. Similarly, part (a)(ii) was also answered well; most candidates scored well with responses such as 'less production of waste as packaging techniques are carefully controlled' (for 2 marks) and 'modern machines allow for continuous operation meaning faster dispatch times' (for another 2 marks). For part (b), the majority of candidates scored well here with responses that centred around 'reduced employment opportunities leading to lower income' and 'increased competition for jobs meaning higher level of skills required'.

Question 13

Candidate responses to this question generally gained 2 to 3 marks. Popular answers focused around responses such as 'less storage space required as goods arrive when required' or 'lower costs associated with raw materials and work in progress'.

Question 14

The standard of response was similar to the previous series. The majority of candidates attempted this final question, which was pleasing, and most gained credit for their answer (generally between 2 and 6 marks). The latter questions in each section are written to challenge the most able candidates. There were some very good responses discussing how modern technology has impacted on the sustainable manufacture of stunt scooters. There was clear indication that candidates had been taught about sustainability and coherent responses centred around detailed explanations of at least two impacts, namely the use of ICT, modern materials or systems and control. There were responses that focused on lean manufacturing techniques and the generation of their own energy sources too.