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Examiners' Report/
Principal Examiner Feedback

Summer 2015

Pearson Edexcel GCSE
in Manufacturing & Engineering

5EM03 Paper 3A

Printing and Publishing, Paper and Board

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General Comments

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

Lower ability learners often gave generic responses to questions, such as 'Quick', 'Fast' or 'Cheap' etc which gained limited marks. The more demanding questions, especially towards the end of Section A and Section B, were difficult for some learners and consequently a large proportion gave inappropriate responses. Some learners misunderstood the technical terminology in the questions and/or based their answers on an incorrect context and therefore generated low quality responses.

Learners would benefit from being taught examination skills and techniques, as often they did not read the questions properly, and 'describe', 'explain' or 'discuss' questions were answered using single word statements and/or bullet points, as opposed to the 'It's…because…which means…' method. In addition, learners should be encouraged to attempt all questions on the paper.

Section A

Question 1

The majority of learners correctly identified the products belonging to the printing and publishing sector in part (a) and the paper and board sector in part (b); however, a significant minority chose the response 'Ironing board' for part (b), which was incorrect (the correct responses being 'Recipe book' and 'File dividers').

Question 2

For (a), the majority of learners correctly named the two items of equipment used during the manufacture of printing and publishing, paper and board products, namely the 'Set square' (although a significant minority wrote 'Triangle', which was incorrect) and 'Protractor'. For (b), learners generally gained 1 mark for both parts (2 marks from 4 overall), with responses such as 'Your logo can't be copied' (for the 'Trademark' symbol) and 'Means you own the printing' (for the 'Copyright' symbol), but only the higher ability learners extended their answers for the second mark in both parts (please refer to the mark scheme).

Question 3

A generally well answered question, with most learners scoring high marks; however, a significant proportion of learners identified the Term 'Computer-integrated engineering (CIE)' as belonging to the 'Information and communications technology (ICT)' Key area, which was incorrect.

Question 4

Appropriate responses to (a) included products used in the pre-release materials for examination papers from previous years, such as 'Paperback

books', 'Point of sale displays', 'Food tray packaging' and 'Cereal packaging', and the vast majority of learners gained 2 marks for this question. When learners did not gain the second mark for this question it was normally because the product was not from the printing and publishing, paper and board sector. Part (b)(i) mainly elicited a good quality response, with 'Corrugated card' the most popular correct answer. Learners that did not score on part (b)(ii) normally gave no response for (b)(i), or stated a process or technology (rather than a modern material) in (b)(i) and then gave an inappropriate explanation of the said process/technology in (b)(ii) (please refer to the 'follow through rules' in the mark scheme); however, when a correct answer was given for (b)(i), the responses for (b)(ii) often gained the full 4 marks, for example [when 'LDPE' was given as a correct answer in (b)(i)] 'It is quite durable which means it won't easily wear away' (for 2 marks) and 'It is waterproof to protect the cereals from getting damp' (for another 2 marks). Part (c)(i) was poorly answered in the main, with a variety of incorrect materials stated by the majority of learners, 'Cardboard' being the most popular. Again, when a correct response was given in (c)(i), invariably the learner gained both marks for (c)(ii), with an answer such as [when 'Thermochromic inks' given as the response in (c)(i)] 'When they are heated up they change colour' (again, please refer to the 'follow through rules' in the mark scheme).

Question 5

Part (a)(i) was generally answered well. Most learners provided responses associated with researching and contacting others, such as 'The internet is a way of finding out information and talking to friends, by using Google and Facebook' (for 3 marks). The majority of learners also scored well for part (a)(ii), with many responses focusing on the possible loss of important information due to hacking/viruses. Part (b)(i) was also answered well by most learners, with 'Mobile phone' the most popular response; when a correct answer was given for (b)(i), the response for (b)(ii) normally gained 2 marks, for example [when 'Skype' was given as a correct answer in (b)(i)] 'They don't have to waste time and money on travelling, as they can see and talk to them on a screen' (again, please refer to the 'follow through rules' in the mark scheme).

Question 6

Part (a)(i) was not answered well by most learners, as many responses were generic, (for example, 'To make the boxes') without any specific link as to how robots might be used during the stated activity. Consequently, part (a)(ii) also proved difficult for most learners, with few gaining more than 2 marks (from the 4 marks available). When learners did gain more than 2 marks, their responses normally focused on issues associated with set-up, training, maintenance and downtime. Several learners provided a response based on reduced employment opportunities, which cannot be considered a disadvantage of using robotics for a manufacturer. Responses to (b) were also generally poor, and it was clear that many learners did not have appropriate knowledge of the main features of a CIM system. When learners did gain marks (from the 4 available), their responses normally focused on the linking together of aspects of a manufacturing system and the monitoring of processes.

Question 7

This examination paper is ramped in difficulty and the latter questions in each section are aimed at the more able learners; as a result, this question required an ability to provide specific responses, by drawing upon specialist knowledge. Part (a) elicited a mixed response, as expected, but some good answers (for 4 marks) were seen, such as 'Production planning can be used to tell the supplier what materials are needed and the latest time they will have to be delivered, and so they can plan how much to have in stock so they don't run out but don't overbuy. This helps the manufacturer and the supplier as they both know what is necessary in plenty of time and can organise themselves for material delivery and make sure they have enough money to pay'. Less able learners often just described the stages of production planning and materials supply and control in a discrete fashion. Surprisingly, part (b) prompted a strong response, with many learners gaining 2 marks for an answer such as 'It has made information on sales better as the manufacturer can get instant feedback. This means that they can see how many products will be needed and find out how much profit they will make from each type of product, so they can advertise them that are profitable'. Incorrect answers were often generic and lacking a link to marketing and selling products, such as 'To quickly find out what you need too'.

Section B – based upon the 'mass produced satellite navigation system packaging' pre-release material

Question 8

A well answered question for all three parts. Learners were able to effectively explain, using notes and sketches, the function of the 'Outer box', the 'Inner tray' and the 'Lid flaps'. The vast majority of learners had clearly undertaken research based upon the pre-release material, and those that provided incorrect responses sometimes described a manufacturing process for the part in question, rather than the function. Centres should note that full marks can only be achieved with a written response and sketches for each of (a), (b) and (c); a significant number of learners omitted one or the other, or just labelled a sketch without describing the function of the part. For (a), the majority of learners gained 3 marks, with an appropriate 3D sketch and written answers such as 'It protects the Sat Nav' and 'Gives you information about the Sat Nav'. Where learners gained lower marks it was mainly because: a) the sketch wasn't provided; or b) the properties of the material that the part is made from were stated rather than the function of the part itself. For (b), the majority of learners also gained 3 marks, with an appropriate 3D sketch and written answers such as 'To stop the Sat Nav moving around' and 'Extra protection with the box'. Where learners gained lower marks it was mainly because a legible sketch wasn't provided or the sketch was simply labelled and functions weren't stated. For (c), the majority of learners again gained 3 marks, with a suitable 3D sketch and answers such as 'So the lid doesn't come open' and 'You don't need to use sticky tape'. Where learners gained lower marks for (c) it was mainly because a suitable sketch wasn't provided.

Question 9

For part (a)(i), the vast majority of learners were able to correctly add the missing main stages in the flow chart ('Marketing' and 'Processing and production' [or appropriate variations thereof]) for 2 marks. Non-creditable responses often stated 'Quality control', or sometimes the correct answers were entered in the wrong order. For (a)(ii), almost all learners correctly named the stage as 'Materials supply and control' (or appropriate variations thereof). Part (b) was generally well answered too, with many learners gaining at least 2 marks. Responses normally centred on producing ideas, using CAD or modelling. Where learners gained lower marks, it was invariably due to repetition in their answers, for example 'Using the internet to get ideas' and 'Using the internet to get existing products'. It was pleasing to note that answers for part (c) were often contextualised, focusing specifically on what would happen at the packaging and dispatch stage when manufacturing satellite navigation system packaging; responses associated with bar coding, flat packing and transportation were prevalent (and correct). Poor responses often described activities with a production or assembly and finishing bias, such as 'Cutting box shapes to the right size'.

Question 10

Part (a) was answered well; the most popular correct response was 'Cardboard'. Part (b)(i) elicited a mixed response, which was surprising; answers that gained the full 3 marks were not as frequent as expected, with many learners incorrectly stating other printing processes, such as 'Gravure'/'Letter press'/'Lithography', or other manufacturing stages/aspects of manufacturing, such as 'Quality control', 'Health and safety', or sometimes even 'Materials'. 'Die cutting', 'Scoring', 'Folding' and 'Gluing' were the most popular correct responses, with 'Varnishing' seen very rarely. For (b)(ii), some learners that had studied the pre-release material were able to offer complete responses in relation to why flexography is a suitable process to use during the manufacture of satellite navigation system packaging, but the majority of learners only gained between 1 and 2 marks. Correct responses for 3 marks included answers such as 'Flexography uses fast drying inks which are ready mixed and do not run, which makes it suitable for making lots of packaging as they can be made quickly without needing to clean up'. A small proportion of learners simply described a printing process (not necessarily flexography), which was incorrect; and very few learners gave responses associated with the process being highly automated, which was surprising. Part (c) was answered appropriately in the main, for 1 or 2 marks; the majority of good responses centred on the durability/recyclability/weight of thermoplastic materials, and again it was pleasing to note that answers were often contextualised around the inner tray. Learners that gained lower marks normally provided responses that centred exclusively on costs.

Question 11

Many learners answered part (a)(i) by stating types of control technology rather than their use during the assembly and finishing stage, such as 'Remotely operated vehicles' or 'Conveyors', and gained no marks as a result. Those learners that did gain a mark normally referenced checking activities, for example 'Sensing whether a finish has been put on evenly'. Answers for (a)(ii) generally gained between 1 and 3 marks, with

appropriate responses such as ‘Conveyors are used to move the finished product to be packed’ (for 2 marks) and ‘Using robots to do the dangerous jobs like cutting’ (for another 2 marks); weaker responses to this question sometimes referred to ‘embedded computers’, but not how they are used when producing satellite navigation system packaging, rather what they do as an internal part of the Sat Nav itself. Part (b) generated a very mixed response, with learners being awarded the full range of marks; in addition, a lot of repetition was seen in the answers to this question. Good responses stated three different benefits to the manufacturer of using computer controlled production, with an extension to each describing why they are benefits, for example ‘Computers are very good at repetition and following instructions so there is now less chance of human error’ (for 2 marks) or ‘It will now cost a lot less to make lots of items once the computer control has been set-up’ (another 2 marks); in contrast, poor quality responses were highly generic, for example, ‘It’s quicker’/‘It’s easier’ with no extension, and were often repeated later in part (b).

Question 12

Part (a)(i) resulted in a range of responses that were invariably poor, and it was clear that most of the answers given were essentially a guess. When learners did gain a mark, the response was normally associated with reducing waste, such as ‘Using less energy when making products’. Very few learners mentioned anything associated with responsivity, flexibility or the removal of non-value adding activities. Similarly, part (a)(ii) was not answered at all well; given that learners found it difficult to ‘Explain the term lean manufacturing’ in (a)(i) this was not surprising, and very few learners gained any marks on this question. Some learners attempted to answer the question by describing how the packaging would be distributed, but responses such as this were not creditable as there was no link to the advantages of lean manufacturing. For (b)(i), the majority of learners were awarded either 1 or 2 marks, and the responses were much better than for both parts of (a), perhaps due to the link to the global environment. Correct and popular responses included answers such as ‘Less energy is used in production’ and ‘Less harmful emissions come from the factory’. Numerous learners gave generic ‘environmental’ answers that lacked specificity to the question in hand and were consequently not creditable, such as ‘No more acid rain’. Unfortunately, part (b)(ii) was again not answered well, as it did require at least a basic understanding of the benefits of lean manufacturing; when learners did gain a mark, the response normally focused on enhancing the skills and career prospects of employees.

Question 13

The majority of learners were awarded 0 or just 1 mark for this question, which was surprising. Simple answers associated with recycling and using less finite resources/fossil fuels were seen most frequently. Very few learners referred to reworking materials and/or recovering/reclaiming energy/waste heat from processing etc. Numerous learners also provided responses that were repetitive, such as ‘Recycle waste paper’ and ‘Materials recycling could be used’. Inappropriate responses often focused on processing materials without a link to sustainability, such as ‘They can use a group of specialised workers that know how to process materials quickly’.

Question 14

Although the standard of response was mixed overall, the majority of learners attempted this final question, which was pleasing, and most gained some credit for their answer (generally between 1 and 3 marks). The latter questions in each section are written to challenge the most able learners; some reasonable responses were seen, with several learners providing answers that were specific to the question in hand, such as ‘Less faulty products are dispatched as the product consistency is higher as there is better control of the process. Everything can be checked too to make sure this always happens. Because of this there is less waste because automation doesn’t tire like humans do and all of this means the customer will be happier as they are getting a product that is what they were expecting’. Very few learners commented on automation prompting a move away from bespoke items, and lower scoring responses normally suggested improvements in efficiency/productivity, when the question focused on product quality. It should also be noted that the ‘quality of written response’ is taken into account for this question, and therefore accurate spelling, punctuation and grammar were required for the higher marks (please refer to the mark scheme for further details).

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
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