

**GCSE**

**Manufacturing**

Unit **B232/02**: Manufacturing Processes

General Certificate of Secondary Education

**Mark Scheme for June 2016**

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All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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## MARK SCHEME:

Question		Answer	Mark	Guidance
1	(a)	<p><b>Manufacturing sectors produce different products. Complete the table below by giving one example of a product made in each of the manufacturing sectors given.</b></p> <p><b>Food and drink:</b> May include items such as tea bags, Christmas cakes, freeze-dried vegetables, pro-biotic yogurt, Gluten-free meals.</p> <p><b>Furniture:</b> May include items such as armchairs, dining tables / chairs, kitchen cabinets, child's cot,</p> <p><b>Electrical:</b> May include items such as torch, electric kettle, alarm clock, vacuum cleaners, wind turbines, electric fires.</p> <p><b>Chemical and pharmaceutical:</b> May include items such as Asthma medication, saccharin tablets, soaps, shampoos, petroleum jelly.</p> <p style="text-align: right;">(4 x 1)</p>	[4]	<p>Award one mark for correctly identifying a suitable product linked with the relevant sector.</p> <p>Do not accept examples of products made in the Electronics and communications sector</p> <p>Do not accept repeated products.</p>
	(b)	<p><b>Name two manufacturing sectors different to those shown above.</b></p> <p>Clothing and Textiles, Machinery and equipment, Packaging, Electronic and communications, Motor manufacturing, Paper and print</p> <p style="text-align: right;">(2 x 1)</p>	[2]	<p>Do not award marks for repeated sectors.</p>

Question		Answer	Mark	Guidance
2	(a)	<p><b>Name a product that you have made or are familiar with. State two processes used when making this product.</b></p> <p>Accept generic process types e.g. Measuring and marking out; material removal; assembly; finishing <b>and</b> specific processes such as cutting out; mixing; injection moulding; milling; vacuum forming (2 x 1)</p>	[2]	Not simply 'CAD/CAM' Award one mark for correctly naming each of two different processes used.
	(b)	<p><b>Describe the use of one tool or piece of equipment used when making the product.</b></p> <p>Award one mark for naming the tool and one mark for the description. (1 + 1)</p>	[2]	Some justification required for full marks.
	(c)	<p><b>Describe two safety precautions, other than PPE (personal protective equipment), that should be taken when making the product.</b></p> <p>Answers could include references to e.g., use of safety guards, manual handling, exclusion zones, emergency stop switches, ventilation systems, first aid provision (2 x 2)</p>	[4]	Precautions to directly relate to the processes / tools used when making the product. Award up to two marks for a description of each of two different and relevant safety precautions
3	(a)	<p><b>State which material would be the easiest to handle</b></p> <p>Material D</p>	[1]	
	(b)	<p><b>Give two reasons why material B would be best suited for making a prototype product.</b></p> <p>Reference should be made to material B being readily available, good value for money and safe to use. (2 x 1)</p>	[2]	Award one mark for identifying each of two relevant points

Question		Answer	Mark	Guidance
	(c)	<p><b>Explain how the information in the table could be used to identify the best material for the workforce to use.</b></p> <p>Answers should relate to key points such as: material is familiar to the workforce, it is safe to use, it's ease of handling possibly referring to material size and weight, ease of storage,</p>	[3]	<p>Award up to three marks for valid reason.</p> <p>Answers must relate to the workforce based upon numerical values in the table.</p>
4	(a)	<p><b>Manufacturing companies continually develop their products. Give two examples of how research is used in the development of products.</b></p> <p>Answers should make reference to: use of the internet to look for suitable modern material, check their properties, look up competitors' products,</p> <p style="text-align: right;">(2 x 2)</p>	[4]	<p>Award marks for relevant points given and justification</p>
	(b)	<p><b>Explain why CAD / CAM is a useful resource for product development</b></p> <p>Explanation could include references to: product designs can be easily modified, new information quickly downloaded to CAM machine saving time and money; use for rapid prototyping; ability to share details with others by email</p> <p style="text-align: right;">(2 x 2)</p>	[3]	<p>Response must relate to development not volume production</p> <p>Justified responses required for full marks</p>

Question		Answer	Mark	Guidance
5	(a)	<p><b>Robotic technology is increasingly being used in manufacturing operations. Describe, using one example, how robots are used when manufacturing products.</b></p> <p>Answers could include the following: welding motor vehicle body parts, spraying finished products, conveying components to assembly point, pick and place assembly / packaging</p> <p style="text-align: right;">1 + (2x1)</p>	[3]	Award up to two marks for a correct and valid description of how robots are used in large scale manufacture and a further mark for an example
	(b)	<p><b>Describe two benefits to a manufacturing company of using robotics.</b></p> <p>Consistency of finished product, can operate in hazardous environments, more reliable / faster than humans, flexibility (can be easily re-programmed for a different task), can eliminate need for workers to lift heavy items</p> <p style="text-align: right;">(2 x 2)</p>	[4]	Award two marks for a valid description of each benefit named. Some justification required for full marks.
	(c)	<p><b>Describe one disadvantage to a company of introducing automation to manufacture products.</b></p> <p>Possible high initial / set-up / training costs, prolonged set-up time , need for skilled workers to programme the robots, possible extra space needed,</p>	[2]	Up to two marks for a justified response Accept 'loss of jobs for workforce' for 1 mark only

Question		Answer	Mark	Guidance
6	(a)	<p>Describe what takes place in the following stages:</p> <p>(i) <b>Producing design ideas:</b> Researching and analysing existing products, materials and processes, discussing ideas with others, freehand sketching, use of CAD</p> <p>(ii) <b>Modifying designs:</b> use of the internet to search for new information and ideas, e-mail manufacturers for new instruction / information, use of search engines and on-line surveys, modelling / prototyping / testing ideas and making any necessary changes,</p> <p style="text-align: right;">(2 x 2)</p>	[4]	<p>Up to two marks for a valid and justified description</p> <p>Do not accept simplistic statements without any justification</p>
	(b)	<p><b>Explain how modern technology could be used during the following design stages.</b></p> <p>(i) <b>Client Brief:</b> Use of 3D modelling Video conferencing Power point presentations Use of emails</p> <p>(ii) <b>Prototyping:</b> Use of CAD for 3D modelling / testing / 3D printing Rapid prototyping processes / CAM Use of spreadsheets to calculate material costs / quantities / production times.</p> <p style="text-align: right;">(2 x 3)</p>	[6]	<p>Award one mark for naming a technology, one mark for a description of the technology and one mark for a <b>clear explanation</b> of the application of the technology in the design stage.</p> <p>Do not award marks for repetition.</p>

Question		Answer	Mark	Guidance
7	(a)	<p><b>Explain why quality control is important when manufacturing products.</b></p> <p>To ensure consistency of product, efficient use of materials, no fault/ dangerous products are sent onto the market, reduce the amount of scrap / waste products, give manufacturer good reputation</p> <p style="text-align: right;">(3x1)</p>	[3]	Detailed explanation required for full marks
	(b)	<p><b>Describe one quality control check carried out during the manufacture of a product that you have made or are familiar with.</b></p> <p>Functional testing, measuring and checking against specification, surface finish checks,</p> <p style="text-align: right;">(2x1)</p>	[2]	Award up to two marks for a description of a standard quality control check.
	(c)	<p><b>Explain, using one example, the use of modern technology in quality control.</b></p> <p>Use of infra red detectors to identify faulty products, use of robotics for random sampling, automatic weighing / measuring</p> <p style="text-align: right;">1 + (2x1)</p>	[3]	One mark for a relevant example of a modern technology and up to two further marks for an explanation of its use.



Question		Answer	Marks	Guidance	
				Content	Levels of response
8*		Award up to six marks for discussion of the implications that the introduction of systems and control technology has had on the quality of manufactured products.		<p>Examples and relevant points could include:</p> <p>Programmable / flexible control of the production process using say, a PLC so that outputs can readily be altered depending on inputs – examples include conveyor belt speeds, temperature control and the like</p> <p>Development, design, production planning, material sourcing, processing, assembly, finishing, packaging and dispatch are all linked through a series of computers using a single set of data</p> <p>Scanners used to check and accept / reject products moving past on conveyors ensuring quality control</p>	<p><b>Level 3 (5 – 6 marks)</b> Candidates provide a thorough analysis and show a clear understanding of the required question material. Specialist language and terms would be used in the appropriate areas being discussed and the required information will be well structured in its presentation. Candidates will demonstrate an accurate level of spelling, punctuation and grammar.</p> <p><b>Level 2 (3 – 4 marks)</b> Candidate provides an adequate discussion which shows a reasonable level of understanding of the question material. There will be some evidence of the use of specialist language although not always in the appropriate areas being discussed. Information, for the most part, will be reasonably structured but, again, may contain occasional errors in spelling, punctuation and grammar.</p> <p><b>Level 1 (0 – 2 marks)</b> Candidate provides a basic discussion which shows some understanding of the question material but uses little or no specialist language. Answers may well be ambiguous or disjointed. Contains obvious errors in spelling, punctuation and grammar</p> <p>0 - a response not worthy of a mark.</p> <p>Do not apply ticks or annotations to 'Levels of response' questions; add 'Seen' at end of every response</p>
		<b>Total for paper</b>	<b>60</b>		

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