



General Certificate of Secondary Education  
January 2014

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## **Manufacturing**

Paper 1

Assessment Unit 3

*assessing*

Manufacturing Technology

**[GMA31]**

**THURSDAY 9 JANUARY, MORNING**

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**MARK  
SCHEME**

## General Marking Instructions

### **Introduction**

Mark schemes are intended to ensure that the GCSE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses. The mark schemes should be read in conjunction with these general marking instructions.

### **Assessment Objectives**

Below are the assessment objectives for Manufacturing.

Candidates must:

- recall, select and communicate their knowledge and understanding of manufacturing in a range of contexts (AO1);
- apply skills, knowledge and understanding, including quality standards, in a variety of contexts, and plan and carry out investigations and tasks involving a range of tools, equipment, materials and components (AO2); and
- analyse and evaluate evidence, make reasoned judgements and present conclusions (AO3).

### **Quality of candidates' responses**

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

### **Flexibility in marking**

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

### **Positive marking**

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

### **Awarding zero marks**

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

### **Type of mark schemes**

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

### **Levels of response**

Tasks and questions requiring candidates to respond in extended writing are marked in terms of levels of response. In deciding which level of response to award, examiners should look for the “best fit” bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement. The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

### **Marking calculations**

In marking answers involving calculations, examiners should apply the “own figure rule” so that candidates are not penalised more than once for a computational error.

### **Quality of written communication**

Quality of written communication is taken into account in assessing candidates’ responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is limited.

Level 2: Quality of written communication is satisfactory.

Level 3: Quality of written communication is excellent.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

**Level 1 (Limited):** The level of accuracy of the candidates spelling, grammar and punctuation is limited. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary.

**Level 2 (Satisfactory):** The level of accuracy of the candidates spelling, grammar and punctuation is satisfactory. The candidate makes a satisfactory selection and use of an appropriate form and style of writing supported with appropriate use of diagrams as required. Relevant material is organised with some clarity and coherence. There is some use of specialist vocabulary.

**Level 3 (Excellent):** The level of accuracy of the candidates spelling, grammar and punctuation is excellent. The candidate successfully selects and uses the most appropriate form and style of writing, supported with precise and accurate use of diagrams where appropriate. Organisation of relevant material is excellent. There is excellent use of appropriate specialist vocabulary.

			AVAILABLE MARKS
1	(a) Biro pen Printer scanner fax (2 × [1])	[2]	4
	(b) Metal tool chest Metal work vice (2 × [1])	[2]	
2	(a) Hacksaw Used to cut metal/plastic (2 × [1])	[2]	10
	(b) Tenon saw Used to cut wood and create woodworking joints (2 × [1])	[2]	
	(c) Marking gauge Used in the construction of woodworking joints (2 × [1])	[2]	
	(d) Chisel Used to remove excess wood particularly in woodworking joints (2 × [1])	[2]	
	(e) Sliding bevel Used to mark out angles of different sizes (2 × [1])	[2]	
3	(a) Automation is the use of computer control in industry to remove the need for more human labour on the production lines.	[3]	10
	(b) Computer Aided Manufacture	[1]	
	(c) The production line can operate 24/7 Others considered	[2]	
	(d) (i) More efficient manufacturing techniques enabling less waste of materials. Others considered	[2]	
	(ii) To see if there are any errors with the design before an actual production run takes place. Others considered	[2]	
4	(a) 1. Could be financial reasons. The hardware could be too expensive. 2. Staff might not have the technical knowledge to operate the new technology. Others considered (2 × [2])	[4]	8
	(b) 1. To keep up with their competitors. 2. In the long run it will keep down manufacturing costs. Others considered (2 × [2])	[4]	

	AVAILABLE MARKS
<p><b>5 (a)</b> Polymer: PVC Others accepted [1]</p> <p>Where it is used: Spouting, guttering. Others considered [2]</p> <p><b>(b) (i)</b> The term composite material is a material that is made from two or more constituent materials with significantly different physical or chemical properties which remain separate and distinct within the finished structure. Others considered [2]</p> <p><b>(ii)</b> Glass fibre in resin. Others accepted [1] Use: Boat hulls Others accepted [2]</p>	8
<p><b>6 (a)</b> Quality control is the checking of quality at critical points throughout the manufacture of a product by the manufacturer. Others considered [3]</p> <p><b>(b)</b> 1. Robotic testing 2. Laser measuring Others considered (2 × [2]) [4]</p> <p><b>(c)</b> To ensure the safety of the end user when using the product. Others considered [2]</p>	9
<p><b>7 (a)</b> Automation in the workplace to include: 1. Robotic assembly lines, introduction of ICT has cut down the need for labour. 2. Computers can handle, store and calculate much quicker than a human workforce. Others considered (2 × [2]) [4]</p> <p><b>(b)</b> 1. Emissions 2. Waste Whether or not recyclable materials should be used. Others considered (2 × [2]) [4]</p>	8
<p><b>8 (a)</b> The product can be assembled easily and quickly. Others considered [2]</p> <p><b>(b)</b> 1. The cradle parts can all be cut very accurately. 2. Robotic drilled holes for assembly purposes can be drilled easily and quickly, reducing lead times. Others considered (2 × [2]) [4]</p>	6

			AVAILABLE MARKS
9	(a) (i)	Materials supply and control: With ICT and databases of materials stock, materials can be bought in on a JIT basis as required. This reduces financial outlay for the company making it more efficient with regards to manufacture. Others considered [2]	8
	(ii)	Time: products can be made much faster as with automation production lines can run 24/7. Others considered [2]	
	(b)	1. Smaller workforce due to the introduction of modern technology. 2. A more specialized workforce is required. Others considered (2 × [2]) [4]	
10	(a)	Products can be marketed worldwide. Products can be made remotely much cheaper. Others considered [5]	9
	(b)	1. Products can be made much smaller. 2. More detailed complex products can be manufactured. Others considered (2 × [2]) [4]	
Total			80