



*Rewarding Learning*

General Certificate of Secondary Education  
2013

---

**Engineering**

Paper 1

Assessment Unit 3

*assessing*

Engineering Technology

**[GEE31]**

**WEDNESDAY 15 MAY, AFTERNOON**

---

**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 candidate’s 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 candidate’s 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 candidate’s 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
<b>1</b>	<b>(a)</b> Hexagonal key Tinsnips (2 × [1])	[2]	4
	<b>(b)</b> Ivor Williams trailer Metal exercise bike (2 × [1])	[2]	
<b>2</b>	Countersink drill Calipers Toolmaker's cramp Allen keys Engineer's Vice Sliding bevel (5 × [1])	[5]	5
<b>3</b>	<b>(a) (i)</b> Mild steel		10
	<b>(ii)</b> Brass	[1]	
	<b>(iii)</b> Polypropylene	[1]	
	<b>(iv)</b> Porcelain	[1]	
	<b>(v)</b> Carbon fibre	[1]	
	<b>(vi)</b> Phenol Formaldehyde	[1]	
	<b>(vii)</b> Copper	[1]	
	<b>(b)</b> Stainless steel, aluminium Others considered (2 × [1])	[2]	
<b>(c)</b> Easily stored Others considered	[2]		
<b>4</b>	<b>(a) (i)</b> Computer Integrated Manufacture	[1]	11
	<b>(ii)</b> Reduced lead times Others considered	[2]	
	<b>(b)</b> Products can be viewed in 3D Modifications can be made easily Others considered (2 × [2])	[4]	
	<b>(c) (i)</b> Designs can be downloaded to a CNC router and the design modelled in 3D Others considered	[2]	
	<b>(ii)</b> Accuracy of production Others considered	[2]	

			AVAILABLE MARKS	
5	(a)	To ensure the holes are correctly lined up together To help reduce drilling time Others considered (2 × [2])	[4]	11
	(b) (i)	Stage 2 shows a pop rivet gun over the metal pin and the rivet compressing Stage 3 shows the metal pin broken away and the rivet securely holding the two pieces together (4 × [1])	[4]	
	(ii)	Bolt Nail Self tapping screw (3 × [1])	[3]	
6	(a)	Movement of materials/components is much faster Robotic welding is more accurate and faster Others considered (2 × [2])	[4]	10
	(b)	Staff need retrained to use the new technology People will lose their jobs (2 × [2])	[4]	
	(c)	More emissions Larger factories being built to house new technology Others considered	[2]	
7	(a)	Appropriate engineered product stated	[1]	5
	(b)	Appropriate characteristics of how modern technology has improved this product (2 × [2])	[4]	
8	(a)	Products can be made remotely Others considered	[1]	6
	(b)	Electronic checks to ensure dimensional accuracy of products throughout its production Others considered	[1]	
	(c)	Reduced lead times Products can be viewed and ordered online Companies have their own web sites Others considered	[1]	
	(d)	More complex products can be manufactured Others considered	[1]	
	(e)	Online ordering Easier access to and more availability of materials Others considered (2 × [1])	[2]	

			AVAILABLE MARKS
<b>9</b>	<p><b>(a)</b> It helps to clean the joint</p> <p><b>(b)</b> Wrong paint was used Others considered</p> <p><b>(c) (i)</b> Cellulose paint Others considered</p> <p><b>(ii)</b> Sprayed Others considered</p> <p><b>(d)</b> Appropriate safety goggles must be used Others considered</p>	<p>[2]</p> <p>[2]</p> <p>[1]</p> <p>[1]</p> <p>[2]</p>	8
<b>10</b>	<p><b>(a)</b> All labelled appropriately for ease of dismantling and disposal Can be recycled Others considered (2 × [2])</p> <p><b>(b)</b> Development costs have increased therefore product costs have increased also Others considered (2 × [2])</p> <p><b>(c)</b> Product development To keep up with competitors Others considered</p>	<p>[4]</p> <p>[4]</p> <p>[2]</p>	10
		<b>Total</b>	<b>80</b>