



Rewarding Learning

**General Certificate of Secondary Education
2018**

Engineering

Paper 2

Assessment Unit 3

assessing

Engineering Technology

[GEE32]

MONDAY 4 JUNE, 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 GCSE Engineering

Candidates must:

- recall, select and communicate their knowledge and understanding of engineering 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 products, 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.

Types 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 assessment candidates’ response 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): Candidates presentation, spelling, punctuation and grammar 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): Candidates presentation, spelling, punctuation and grammar 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.

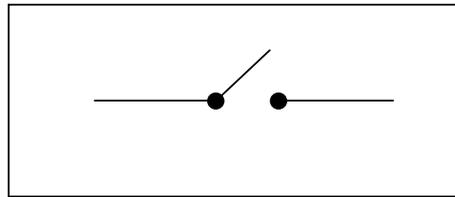
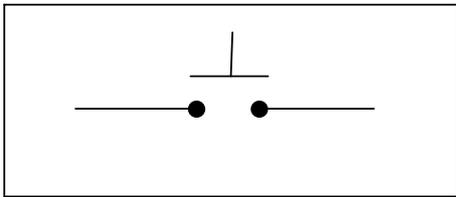
Level 3 (Excellent): Candidates presentation, spelling, punctuation and grammar is excellent. The candidate successfully selects and uses the most appropriate form and style of writing, supported with precise and accurate use of diagrams where appropriate. Organisation of relevant material is excellent.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

- 1 (a) Any **two** from the list below:
- Suitable for non-ferrous metals;
 - Less waste when die casting compared to press forming;
 - Easily cast into complex shapes compared to press forming;
 - Less expensive than press forming.
- All alternative answers will be considered.
(2 × [1]) [2]

- (b) (i) Injection moulding.
All alternative answers will be considered.
(1 × [1]) [1]

- (ii) Urea formaldehyde;
Melamine formaldehyde.
All alternative answers will be considered.
(1 × [1]) [1]

- (c) Any **one** of the circuit symbols shown below:



- All alternative answers will be considered.
(1 × [1]) [1]

- (d) (i) Any **two** from the list below:
- Strong;
 - High tensile strength;
- All alternative answers will be considered.
(2 × [1]) [2]

- (ii) • It is corrosion resistant;
• There is no paint or coating to wear off.
All alternative answers will be considered.
(1 × [1]) [1]

- (e) Any **two** from the list below:
The manufacturer must consider that employees:
- Wear appropriate clothing;
 - Use safety equipment as appropriate;
 - Follow health and safety procedures.
- All alternative answers will be considered.
(2 × [1]) [2]

- (f) (i) Any **one** from the list below:
- An adhesive could melt when the floodlight is on;
 - An adhesive needs time to set and therefore the joint may move.
- All alternative answers will be considered.
(1 × [1]) [1]

- (ii) Any **one** from the list below:
- Rivets connecting the hinge of the metal cage to the stand;
 - Machine screw securing the cage to the floodlight.
- All alternative answers will be considered.
(1 × [1]) [1]

- (g) Any **two** from the list below:
- When applied it can hide surface imperfections;
 - It is a durable quality finish that can be applied to most metals;
 - It is more resistant to chipping, scratching, fading and wearing than other finishes.

All alternative answers will be considered.

(2 × [1])

[2]

- (h) • The collet is turned in a rotary motion. It exerts a strong clamping force when tightened.[1] The collet screw thread is screwed onto a matching screw thread which is tapered, such that its inner surface contracts to a slightly smaller diameter squeezing the steel frame and holding it in the required position.[1]
- The collet is turned clockwise to tighten the tubes together [1] to prevent slipping.[1]

All alternative answers will be considered.

(1× [2])

[2]

- (i) Any **two** from the list below:

Indicative content:

ICT has:

- made the ordering of components more efficient
- enabled the automatic reordering of stock.
- enabled the movement of materials to be more efficient, e.g. in a warehouse.

Response Type	Description	Mark Band
	When a response is worthy of no credit [0] marks should be awarded	[0]
Limited	Students correctly identify one way with limited discussion. The level of accuracy of spelling, punctuation and grammar is limited in most cases. The form and style is generally inappropriate as is the use of specialist terms.	[1]
Satisfactory	Students correctly identify two ways with satisfactory discussion. The level of accuracy of spelling, punctuation, and grammar is satisfactory in most situations. The form and style is satisfactory in most cases and specialist terms are used appropriately in some cases.	[2]–[3]
Excellent	Students correctly identify two ways with detailed discussion. The level of accuracy of spelling, punctuation, grammar is very good. The form and style is of a high standard and specialist terms are used appropriately at all times.	[4]

(2 × [2])

[4]

- (j) Appropriate diagrams illustrating how the stand of the floodlight can be collapsed for easier storage.

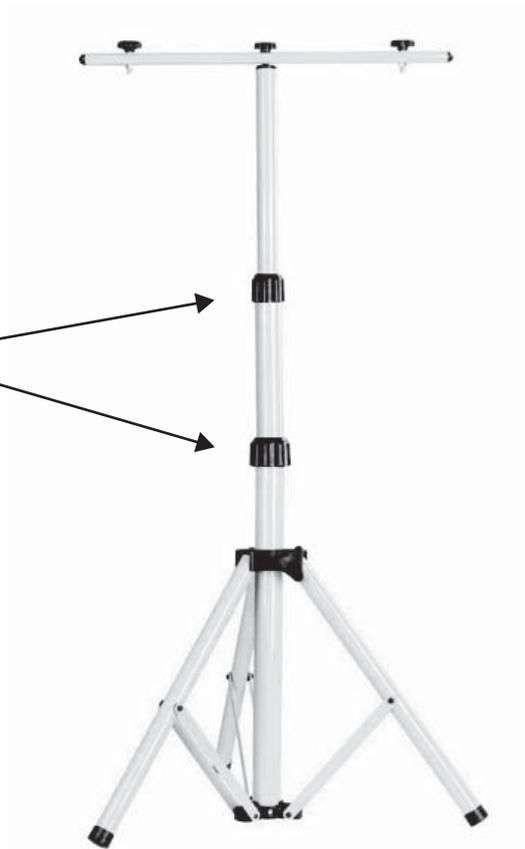
Reference should be made to:

- The pivot points on the base and the pivot points on the legs.
- How the three legs of the stand collapse upwards in a linear movement.
- Turning the collets in a rotary movement can allow the stand to collapse vertically.



Pivot points

The collets when turned in a rotary movement allow the stand to collapse in a linear movement



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Marks will be awarded for

- Detail contained in sketches [4]
- Quality of sketches [3]
- Detailed notes [3]

[10]

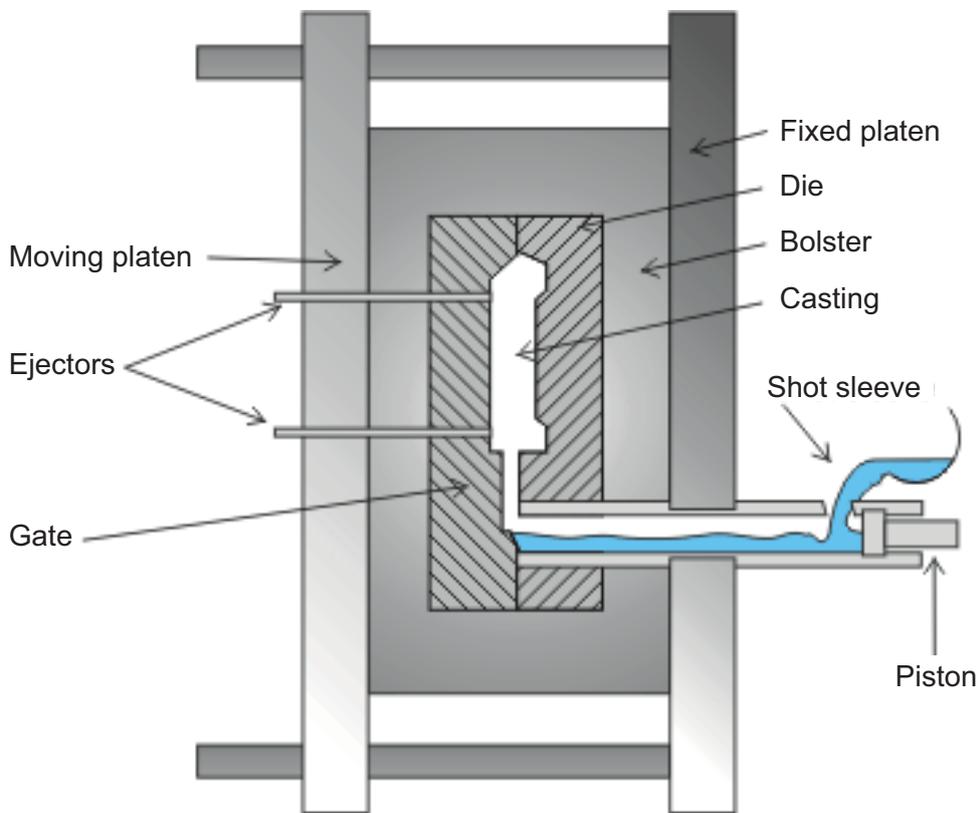
AVAILABLE
MARKS

(k) Appropriate notes and sketches outlining the process of die casting.

AVAILABLE
MARKS

Description of process

1. The die is lubricated by liquid spray and closed
2. Molten metal is accurately dosed into the Shot Sleeve by Robot, Dosing furnace or manually
3. Slow moving hydraulically controlled injection Piston moves molten metal forward and up into the "runner"
4. A faster 2nd stage speed is then applied to the Piston, quickly forcing molten metal to jet into the die
5. A final 3rd stage of high pressure is applied milliseconds after the die cavity is full, which is maintained until the casting has solidified
6. After the programmed solidification takes place, the die is opened and the casting ejected
7. Back to step 1.



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Marks awarded for:

- Detail contained in sketches [4]
- Quality of sketches [3]
- Detailed notes [3]

[10]

40

Total

40