



Rewarding Learning

General Certificate of Secondary Education
2015

Technology and Design

Unit 1: Technology and Design Core

[GTD11]

THURSDAY 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. The mark schemes should be read in conjunction with these general marking instructions.

Assessment objectives

Below are the assessment objectives for GCSE Technology and Design.

Students must:

- recall select and communicate their knowledge and understanding of technology and design in a range of contexts (AO1);
- apply skills, knowledge and understanding, in a variety of contexts and in designing and making products (AO2); and
- analyse and evaluate products, including their design and production (AO3).

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 an unanticipated answer, 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 assessing candidates’ responses to all tasks and questions that require them to respond in 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 very good.

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

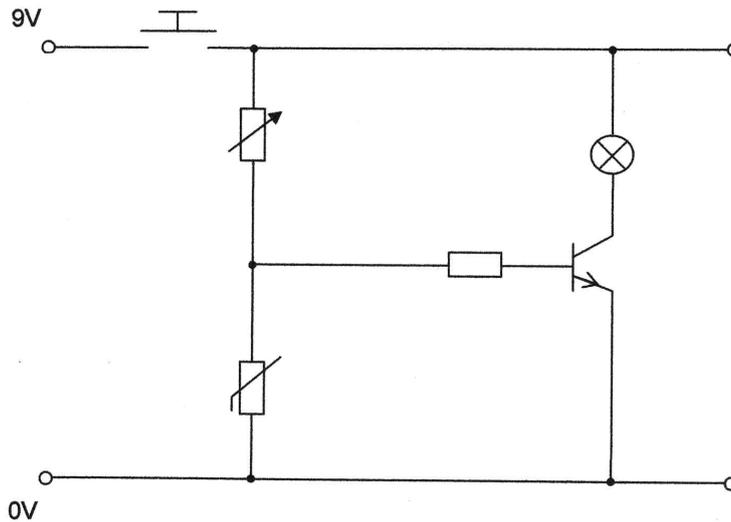
Level 1 (Limited): The level of accuracy of presentation, spelling, punctuation and grammar is limited. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary.

Level 2 (Satisfactory): The level of accuracy of 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 (Very Good): The level of accuracy of presentation, spelling, punctuation and grammar is very good. 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 very good. There is very good use of appropriate specialist vocabulary.

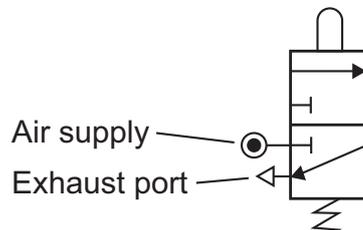
| | | | AVAILABLE MARKS |
|---|--|---------|-----------------|
| 1 |  | [1] | 9 |
| | Electronic | [1] | |
| | Mechanical | [1] | |
| | Wheel and Axle | [1] | |
| | (A) | [1] | |
| | Location of first aid eyewash | [1] | |
|  | [1] | 9 | |
| Pneumatic | [1] | | |
| Lever | [1] [9] | | |
| 2 | (a) (i) Computer Aided Design | [1] | 5 |
| | (ii) Computer Numerical Control | [1] | |
| | (b) Advantage: CNC stores programs; reusable; suitable for repeat operations, increases speed of manufacture (Any two) | [2] | |
| | Disadvantage: cost of machine; training of staff; long set-up time (Any one) | [1] [3] | |
| 3 | (i) Cam: pear shaped | [1] | 6 |
| | Follower: roller | [1] [2] | |
| | (ii) Cam: rotary | [1] | |
| | Lever: oscillating | [1] [2] | |
| | (iii) Class 2 | [1] | |
| | (iv) To keep the follower in contact with the cam | [1] | |
| 4 | (a) Function; aesthetics; environment; protection (Any two) | [2] | 7 |
| | (b) Dip Coating; galvanising | [2] | |
| | (c) Preservative, stain, varnishing | [2] | |
| | (d) Polishing | [1] | |

- 5 (a) (i) Name: Ohms [1]
 (ii) Symbol: Ω [1]
 (iii) Name: Amps [1]
 (b) Value: 10,000 Ω or 10 k Ω [3]
 (c) Correct symbol for PTM switch shown in correct location [2]
 Correct symbol for thermistor shown in correct location [2] [4]



- 6 (a) (i) 3 port valve or 3/2 valve [1]

(ii)



- Air supply [1]
 Exhaust port [1] [2]

- (iii) Plunger [1]
 Spring [1] [2]

- (b) A pressed:
 Cylinder B extends [1]
 Valve C operated [1]
 Cylinder D extends [1]

- A released:
 Both cylinders retract [2]

| AVAILABLE MARKS | |
|-----------------|--|
| 10 | |
| 10 | |

- 7 (i) Thermoplastic [1]
- (ii) Acrylic or rigid polystyrene [1]
- (iii) For strength
For gripping
To accept a lid
Aesthetics
Safety – no sharp edges
(Any two) [2]

8 (a)

| Component | Component Name | Input Component | Process Component | Output Component |
|-----------|----------------------|-----------------|-------------------|------------------|
| B | Variable Resistor | ✓ | | |
| F | Light Emitting Diode | | | ✓ |
| G | NPN Transistor | | ✓ | |

[6]

- (b) **Component A:** When the switch at A is closed the circuit is connected to the power source. [1]

Component B: The variable resistor at B controls the sensitivity of the circuit. [1]

Component C: The LDR at C is a sensor/light sensor/resistance varies with light levels [1]

or

The LDR at C: its resistance increases with darkness. [2] [2]

Component G: Reference to switches on/operates [1]

or

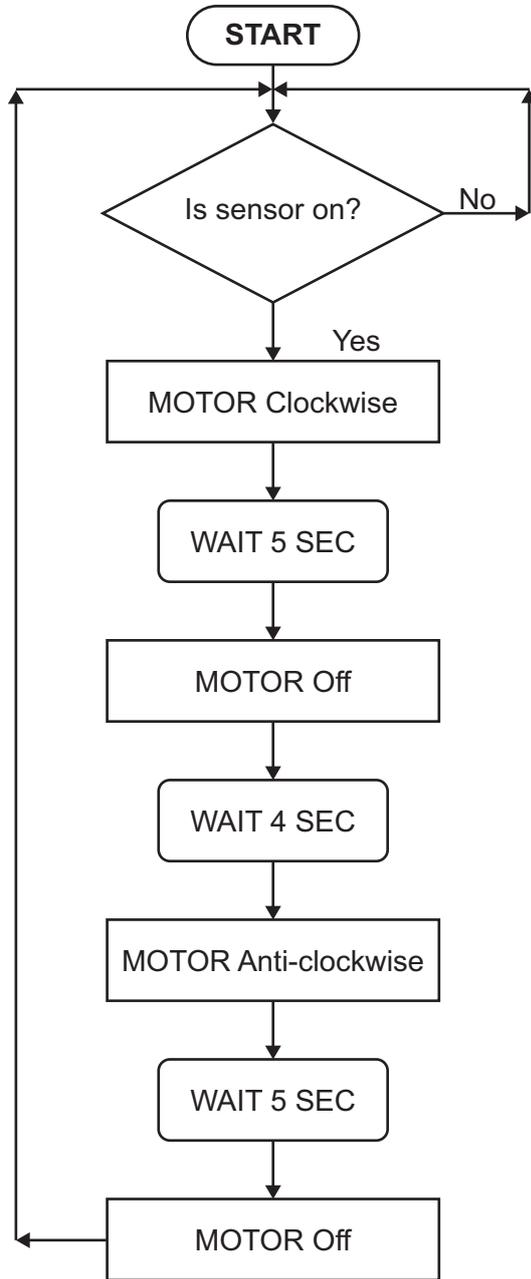
Switches on in dark conditions or when a voltage of 0.6/0.7V is present at the base leg the transistor G will switch on. [2] [2]

Component F: When the transistor switches on it enables the LED F to light. [1]

AVAILABLE
MARKS

4

13



| AVAILABLE MARKS |
|-----------------|
| 10 |

[10]

10

| | | AVAILABLE MARKS |
|---|------|-----------------|
| <p>10 (a) Convenient height for gripping. The height of the loads, etc. (2 × [1])</p> | [2] | |
| <p>(b) Readily available. Easy to weld. Can be formed, etc. (2 × [1])</p> | [2] | |
| <p>(c) Convenient for upright parking Convenient for pushing under a load, etc. (2 × [1])</p> | [2] | 6 |
| | | |
| <p>11 Indicative Content:</p> <ul style="list-style-type: none"> • Mark out the location of the 50 mm square using a steel rule; try square; pencil • Drill a hole(s) in the corner/middle of the 50 mm square • Using a coping saw or scroll saw remove the blade • Pass the blade through the hole • Secure the blade • Insert the MDF into a vice or hold it flat on the scroll saw • Cut out the square • Remove the blade and material • Replace the blade back into the coping saw or scroll saw <p>Safety Precautions:</p> <ul style="list-style-type: none"> • Make sure the area is safe and free of clutter at the workbench/scroll saw • Make sure the material is held securely with a machine vice or clamps • Wear goggles • Wear hair tied back • Ensure there is no loose clothing • Work under supervision when using drill/scroll saw • Ensure the guard is in place • Keep hands away from the blade/drill • One person operating the machine • Never leave a machine unattended • Switch off a machine when finished • Never use the machine without fully instructed in its use by the teacher • Report damaged or broken tools • Return tools to their safe location | [10] | 10 |

| Response Type | Description | Mark Band | AVAILABLE MARKS |
|---------------------|---|-----------------|-----------------|
| Limited | Students correctly identify very few steps in the marking out and cutting processes and no or some safety precautions. The level of accuracy of spelling, punctuation and grammar is limited in most cases. Form and style is generally inappropriate as is the use of specialist terms. | [1]–[4] | |
| Satisfactory | Students correctly identify some steps in the marking out and cutting processes most of which are in order with some or no safety precautions. 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. | [5]–[7] | 90 |
| Very good | Students correctly identify majority the steps in the marking out and cutting processes and in order with a number of safety precautions. The level of accuracy of spelling, punctuation and grammar is very good. The form and style is of a high standard and specialist terms are used appropriately at all times. | [8]–[10] | |
| Total | | | |