Rewarding Learning

General Certificate of Secondary Education
2013

Technology and Design

Unit 1:
Technology and Design Core

[GTD11]

WEDNESDAY 15 MAY, MORNING

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:

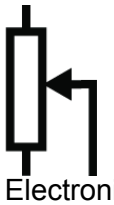
Level 1: Quality of written communication is limited.
Level 2: Quality of written communication is satisfactory.
Level 3: Quality of written communication is very good.

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	Voltmeter	[1]	
			
	Flat Follower	[1]	
	Electronic	[1]	
	Reed Switch	[1]	
	Mandatory	[1]	
	Potentiometer	[1]	
			
	Electronic	[1]	
	Pneumatic	[1]	
	Exhaust	[1]	9
2	**Input Devices:**		
	Pressure Pad; Toggle Switch; Keyboard (3 × [1])	[3]	
	Output Devices:		
	Printer; CNC Machine; Electric Motor (3 × [1])	[3]	6
3	**(a)**		

Motion	Type of Motion
Electric motor	Rotary
Car windscreen wipers	Oscillating
Using a hacksaw	Reciprocating
Push to Make Switch	Linear

[4]

(b) **(i)** Class 2 [1]

(ii) Use longer lever

or

Move load (braking force) nearer pivot, etc. [2] 7

4

	(i)	(ii)
Example	**Method**	**Permanent or Semi-permanent**
Steel plates	Welding or Brazing	Permanent
Electric motor to a steel plate	Nuts and bolts	Semi-permanent
Acrylic strips	Plastic adhesive or Tensol cement	Permanent

(1 × [6]) [3] [3]

AVAILABLE MARKS

6

5 **(a)**

Name of Electronic Component	Input	Output
LED	Electrical	Light
Motor	Electrical	Mechanical
Buzzer	Electrical	Sound
Thyristor	Electrical	Electrical

[4]

(b)

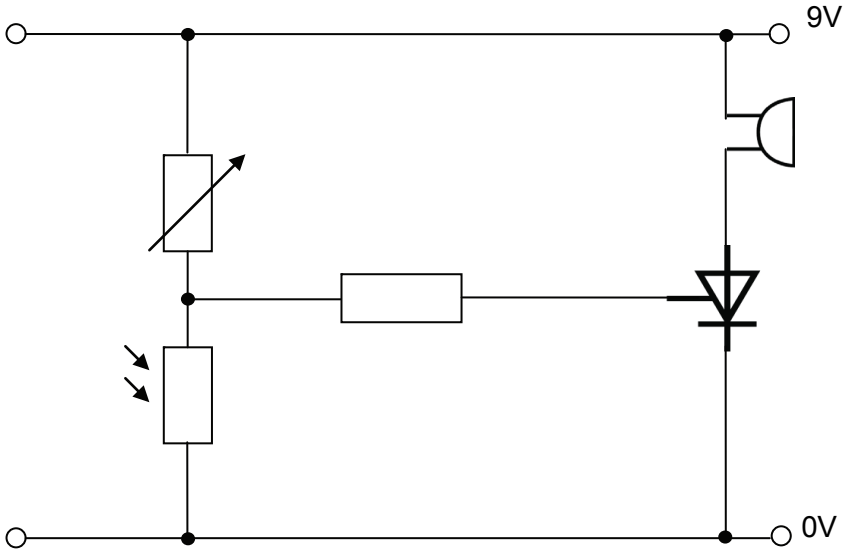


Fig. 2

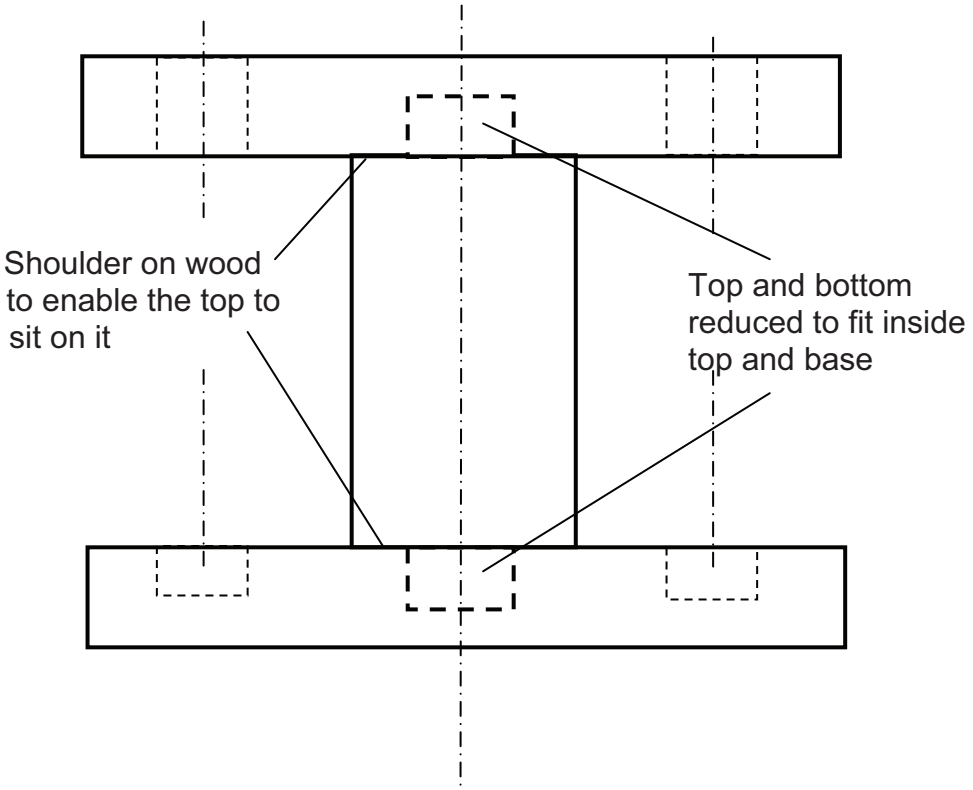
(i) Each symbol correctly located (2 × [1]) [2]
Each symbol correctly drawn (2 × [1]) [2]

(ii) Function 1 Acts as a switch to turn on buzzer
Function 2 Latches the buzzer on even if gate voltage is switched off [1]
Latches the buzzer on even if light level increases/changes
Can only be switched off when the power to the anode leg is cut [1]

(iii) Circuit will switch on when it is dark/Dark conditions [1]

11

					AVAILABLE MARKS
6	**(a)**	**(i)**	3/2 valve Single acting cylinder	[1] [1]	
		(ii)	Press button on valve A Both cylinders outstroke	[1] [1]	
	(b)	**(i)**	To control the speed of clamping	[1]	
		(ii)	Between **A** and the pipe junction.	[1]	
			Reason - To control the speed of **both** cylinders	[1]	7
7	**(a)**		Hard wearing; looks good; strong; durable; hardwood	[1]	
	(b)		Drilling Machine; Bandfacer; CNC Router; Wood Lathe; Scroll Saw (2 × [1])	[2]	
	(c)		Sample Annotated Sketch	[3]	6



8	**(a)**	Conductor: To allow the flow of electric current Insulator: To prevent the flow of electric current	[1] [1]	AVAILABLE MARKS
	(b)	**(i)**		

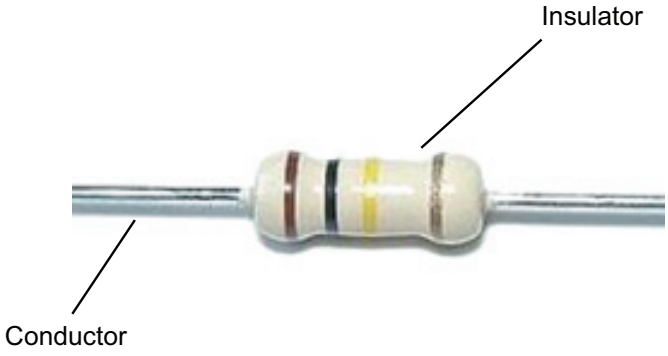


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Fig. 1 [2]

(ii) Band 1 colour: Brown [1]

Band 2 colour: Red [1]

Band 3 colour: Red [1]

(c) **(i)** Potential Divider or Voltage Divider Circuit [1]

(ii) 4.5 Volts [1]

(iii) SPST switch

[1]

(iv) SPST: Single Pole, Single Throw [1] 11

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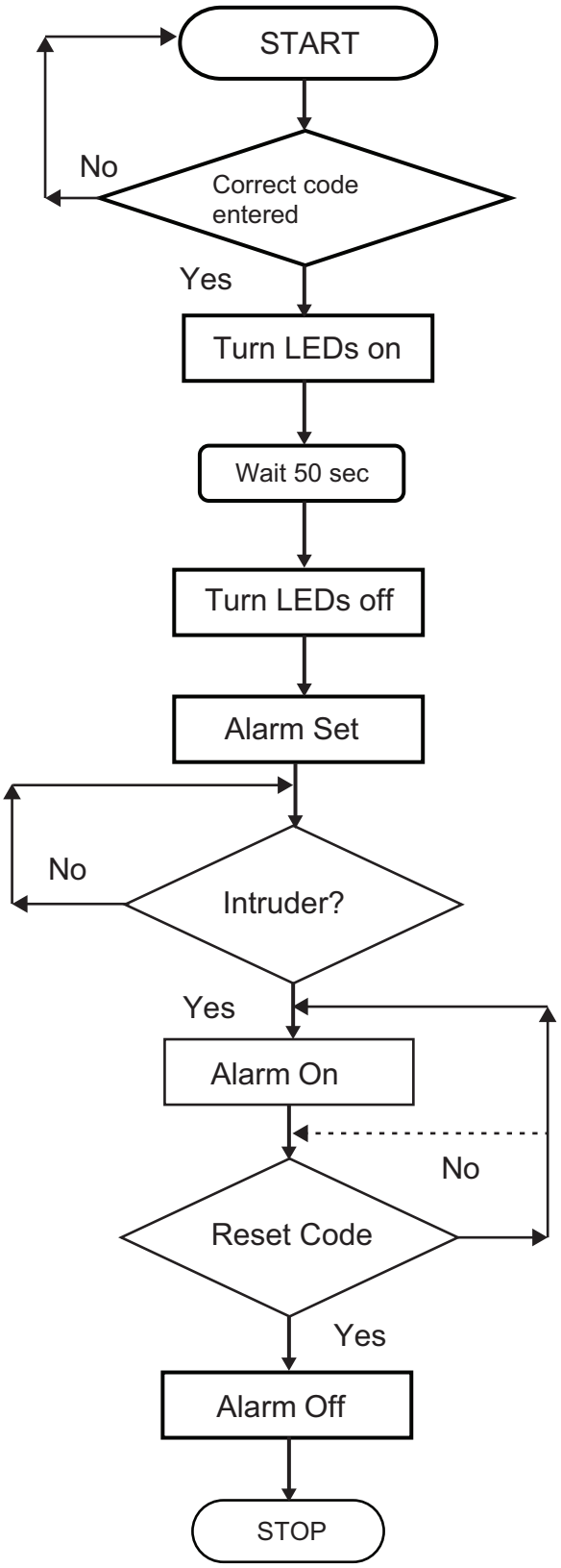

[11]

AVAILABLE MARKS

11

			AVAILABLE MARKS
10	**(a)**	Made by cutting and bending the various parts and assembling/joining them together [1]	
	(b)	**(i)** Reasons: Does not corrode, attractive, does not need painting, etc. Any two (2 × [1]) [2]	
		(ii) Expensive, difficult to weld, any one, etc. [1]	
	(c)	To accommodate more bicycles **or** So that the handlebars of adjacent bicycles do not clash **or** To accommodate bicycles of different sizes any one, etc. [2]	6

11 Indicative Content:

- Make wooden mould
- Insert the mould into the vacuum machine
- Clamp plastic sheet into the machine
- Close guard on the machine
- Turn on the heater(s)
- Check if the plastic is ready (soft)
- Remove heater
- Raise the platform
- Turn on the vacuum pump
- Turn off the vacuum pump
- Blow air into the mould
- Lower the platform
- Allow the plastic to cool
- Release the clamps
- Remove the plastic
- Remove the mould
- Allow the plastic to cool
- Cut out the shape

Safety Precautions:

- Make sure the area is safe
- Wear goggles
- Wear hair tied back
- Ensure there is no loose clothing
- Ask teacher permission and work under supervision
- Wear heat resistant gloves
- Ensure the guard it in place
- Keep hands away from heaters
- One person operating the machine
- Never leave the machine unattended
- Ensure the clamps are fully tightened
- Switch of the machine when finished
- Never use the machine without full instruction in its use by the teacher
- Check or ask if all setting on the machine are correct
- Adequate ventilation/extraction of fumes [10] — 10

Response Type	Description	Mark Band
Limited	Students correctly identify very few steps in the line vacuum forming process and some or **no** 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 vacuum forming process 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]**
Very good	Students correctly identify majority of the steps in the vacuum forming process and in order with some, or a number of safety precautions. 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.	**[8]–[10]**

Total **90**

AVAILABLE MARKS