



**General Certificate of Secondary Education  
January 2019**

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## **Technology and Design**

Unit 1: Technology and Design Core

**[GTD11]**

**WEDNESDAY 9 JANUARY, AFTERNOON**

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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. 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.

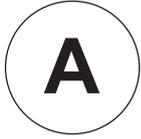
In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

**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.

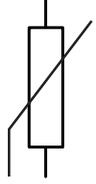
**Level 3 (Very Good):** The level of accuracy of presentation, spelling, punctuation and grammar is very good. The candidate successfully selects and uses the most appropriate form and style of writing, supported with precise and accurate use of diagrams where appropriate. Organisation of relevant material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

1



[1]

Mechanical [1]  
Wheel and Axle [1]



[1]

Electronic [1]  
Flammable [1]  
Mechanical [1]  
Flat Follower [1]  
Shuttle Valve [1]

[9]

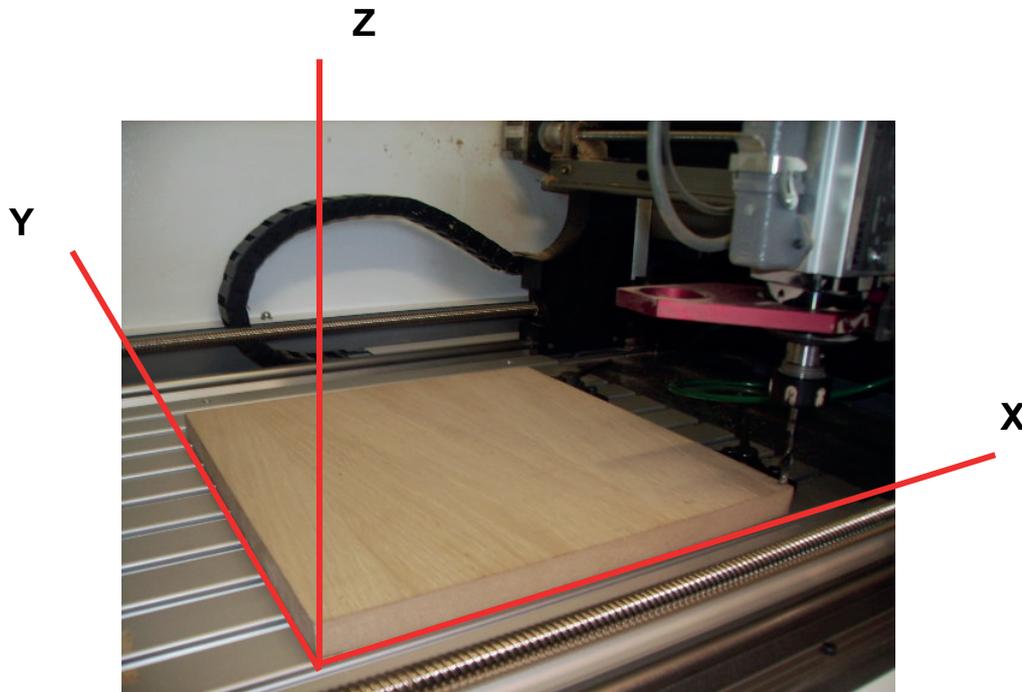
9

2 (a) To generate a file or a drawing for a CNC machine. [1]

(b) CNC produces the file or code, whereas CAM is the means of manufacture. [2]

(c) Three axes X, Y and Z (3 × [1]) [3]

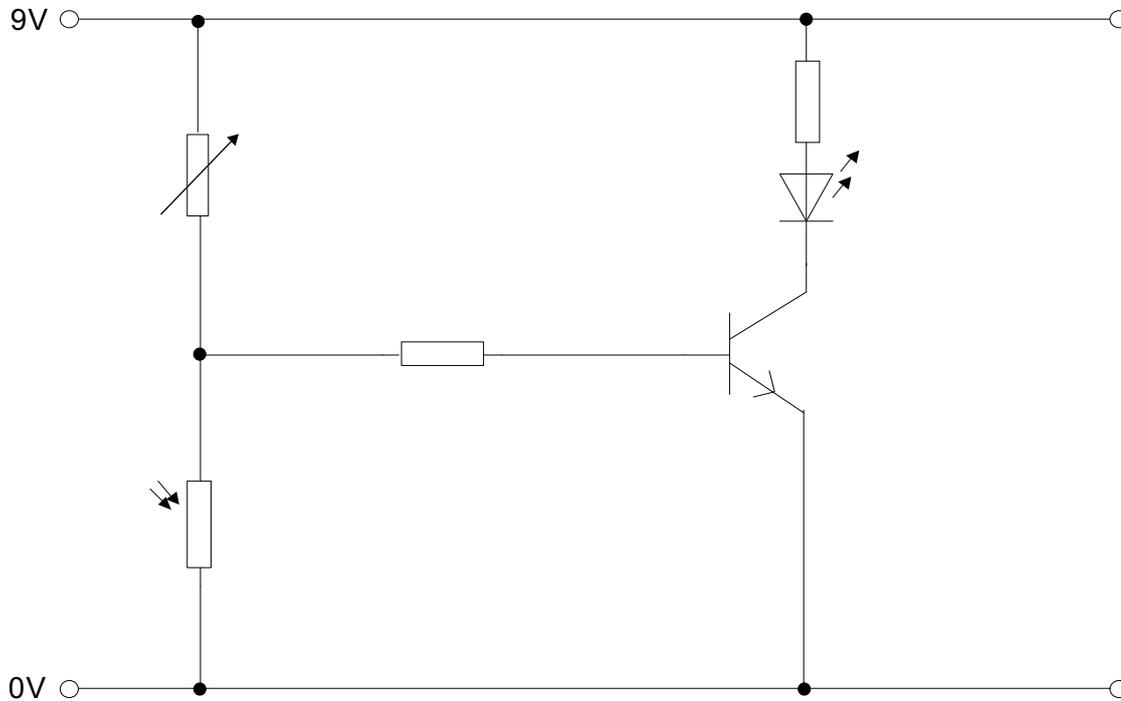
[3]



6

		AVAILABLE MARKS
<b>3</b>	<b>Name A:</b> Pear Shaped Cam and follower	[1]
	<b>Purpose:</b> To change Rotary motion [1] to Reciprocating Motion [1]	[2]
	<b>Name B:</b> Simple Gear Train	[1]
	<b>Purpose:</b> Positive Drive [1] will increase or decrease speed [1]	[2]
	<b>All acceptable answers will be considered.</b>	6
<b>4</b>	<b>(a)</b> Any <b>one</b> from the following:	
	• dentist's Drill	
	• pneumatic Road Drill	
	• bus/Train Doors	
	• lorry Brakes	
	• automated Production Lines	
	• fairground Rides	
	• pneumatic Clamps	[1]
	<b>Correct alternative responses will be considered</b>	
	<b>(b)</b> Plunger [1] Push Button [1]	[2]
	<b>(c)</b> Unidirectional Flow Restrictor	[1]
	<b>(d)</b> To slow down [1] the outstroke of the piston Rod [1]	[2]
	<b>(e)</b> The machine's guard must be pulled down pressing A [1] <b>And</b> Push button B must be pressed [1]	[2]
		8

- 5 (a) Transistor [1]  
Variable Resistor [1]  
Resistor [1]  
Light Dependent Resistor [1] [4]
- (b) Each symbol inserted in the correct place  
(5 × [1]) [5]



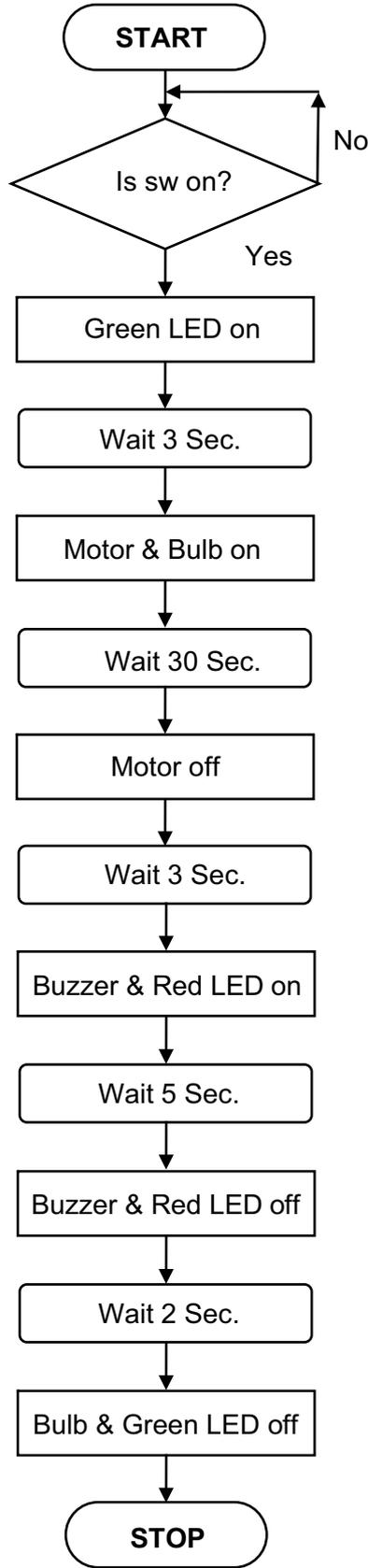
- 6 (a) Round head solid rivet or snap head [1]
- (b) Any **one** from the following:  
  - mild steel will rust
  - dissimilar metals may react against each other (galvanic) corrosion [1]
- (c) Any **three** from the following:  
  - measure and cut the rivet to correct length
  - set the rivet into a dome of a dolly or rivet snap which is held in a vice
  - place the bars and paper through the rivet
  - snap the bars and paper tight together with a rivet snap
  - use a ball peen hammer to form the rivet
  - shape the rivet head using a rivet set and hammer
 (3 × [1]) [3]

AVAILABLE  
MARKS

9

5

		AVAILABLE MARKS
7	(a) Pressure Source [1] 3 Port Valve or 3/2 Valve [1] Single Acting Cylinder [1]	[3]
	(b) A – Roller Trip [1] B – Spring Return [1]	[2]
	(c) A – The method of operating a valve [1] when a cylinder is outstroked or instroked [1]	[2]
	(d) A Lever [1] Release the Brake [1]	[2]
		9
8	(a) (i) Primary or Secondary cell or battery	[1]
	(ii) Series	[1]
	(iii) $R_t = R_1 + R_2 + R_3$ $R_t = 3.3 + 1 + 3.9$ $R_t = 8.2[1] \text{ k}\Omega$ [1]	[2]
	(iv) Orange [1] White [1] Red [1]	[3]
	(b) Thyristor [1] X = Anode [1] Y = Gate [1] Z = Cathode [1]	[4]
		11



AVAILABLE MARKS
11

[11]

11

	[1]	AVAILABLE MARKS
10 (a) Simple Gear Train [1]	[1]	
(b) Direct Drive Non-Slip	[1]	
(c) Keep the gears A and C [1] rotating in the same direction [1] as the input gear [1]	[2]	
(d) $\frac{60}{20}$ [1] = 3 Turns [1]	[2]	6

### 11 Indicative Content:

- Mark out and cut a square block of wood 100 mm square by 30 mm high.
- Mark out top using a pencil, a compass; steel rule and/or try square for draft angle/slope.
- Clamp the wood in a wood vice and use a wood plane to remove excess wood from the sides, or reference to a suitable jig to enable the taper part of the block to be cut and/or sanded.
- Smooth the edges of the wood with a sanding block.
- Radius the top edges.
- Radius the tapered corners.
- Reference to small vent holes in the mould to assist the vacuum forming process.
- Add a wax or lightly polish the surface of the mould or use a releasing agent.
- Reference to appropriate tools throughout.
- Reference to a suitable jig to enable the taper part of the block to be cut and/or sanded.

### Safety Precautions:

- Wear goggles when using the machines.
- Tie hair back.
- Ensure no loose clothing.
- Ensure machine guards are in position.
- Ensure clamps are fully tightened for cutting, drilling or using machines.
- Ensure machines are turned off after use.

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