



General Certificate of Secondary Education  
2025

Centre Number

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Candidate Number

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# Technology and Design

Unit 1:

Technology and  
Design Core Content



[GTY11]

\*GTY11\*

**THURSDAY 29 MAY, AFTERNOON**

## TIME

1 hour 30 minutes.

## INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write outside the boxed area on each page or on blank pages.**

Questions which require drawing or sketching should be completed using an H.B. pencil.

All other questions must be completed using black ink only.

**Do not write in pencil or with a gel pen.**

Answer **all ten** questions.

## INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Quality of written communication will be assessed in Question **10**.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

The Formula sheet is on page 3.

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**(Questions start on page 4)**

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## Formulae for GCSE Technology and Design

You should use, where appropriate, the formulae given below when answering questions which include calculations.

- 1 Potential Difference = current  $\times$  resistance ( $V = I \times R$ )
- 2 Series Resistors  $R_t = R_1 + R_2 + \dots + R_n$
- 3 Gear ratio of a simple gear train =  $\frac{\text{number of teeth on driven gear}}{\text{number of teeth on driver gear}}$
- 4 Velocity ratio =  $\frac{\text{diameter of driven}}{\text{diameter of driver}}$

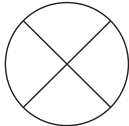
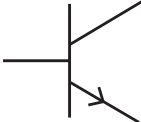



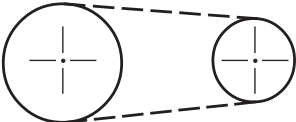


Answer **all** questions

1 **Table 1** refers to a number of symbols.

(a) Using the first row as a guide, complete the table.

**Table 1**

Sketch of Symbol	Type of Symbol	Name of Symbol
	Electronic	Bulb
	Electronic	
	Electronic	SPDT switch
		
	Safe Condition Sign	
		

[7]

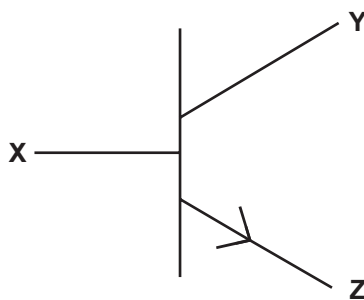


(b) In the space below, produce a neat sketch of the generic flowchart symbol used to show an output.

[1]

(c) One of the symbols shown in **Table 1** is reproduced below as **Fig. 1**.

Name each of the terminals labelled **X**, **Y** and **Z**.



Source: CCEA

**Fig. 1**

Terminal **X** \_\_\_\_\_

Terminal **Y** \_\_\_\_\_

Terminal **Z** \_\_\_\_\_ [3]

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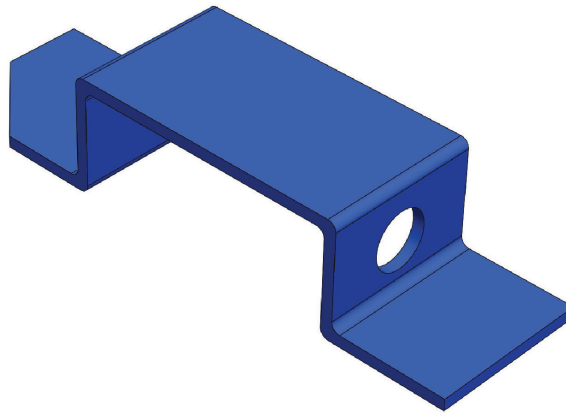
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- 2 **Fig. 2** shows the CAD drawing of a bracket to be made in a school workshop. The bracket is to be manufactured from 2 mm thick thermoplastic.



Source: CCEA

**Fig. 2**

- (a) (i) What do the letters CAD stand for?

\_\_\_\_\_ [1]

- (ii) State **one** reason for using CAD before starting to manufacture.

\_\_\_\_\_ [1]

- (b) (i) Name a thermoplastic that could be used to make the bracket.

\_\_\_\_\_ [1]

- (ii) Name **two** pieces of equipment that could be used to form the shape of the bracket.

1. \_\_\_\_\_ [1]

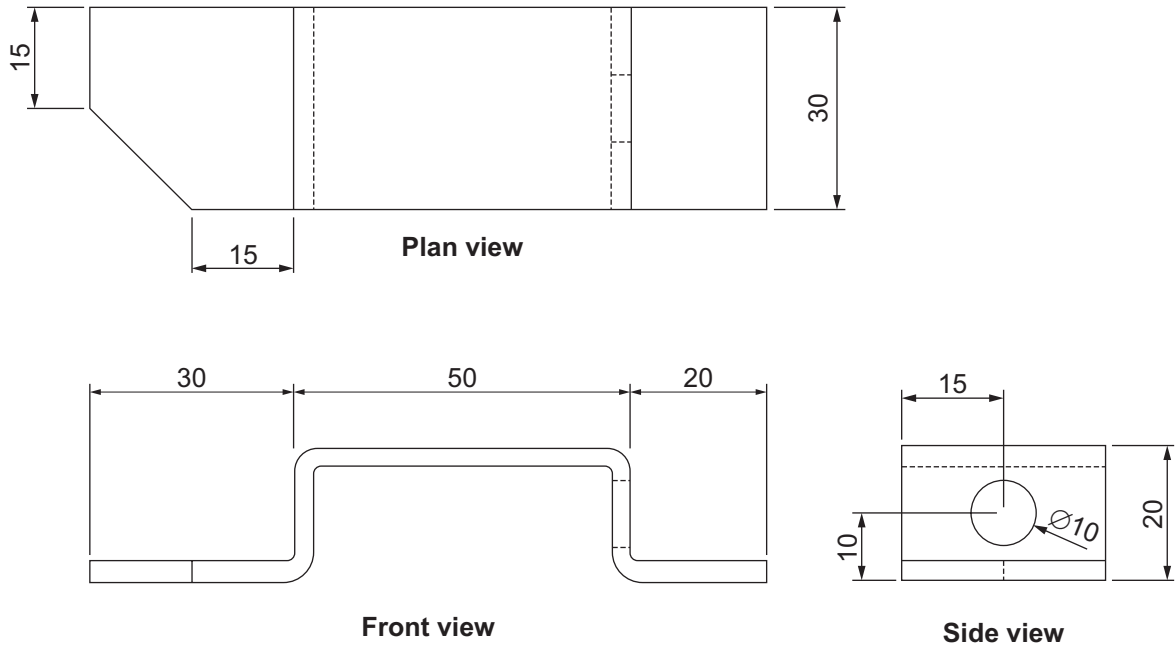
2. \_\_\_\_\_ [1]

[Turn over



**Fig. 3** shows the plan, front and side view of the bracket.

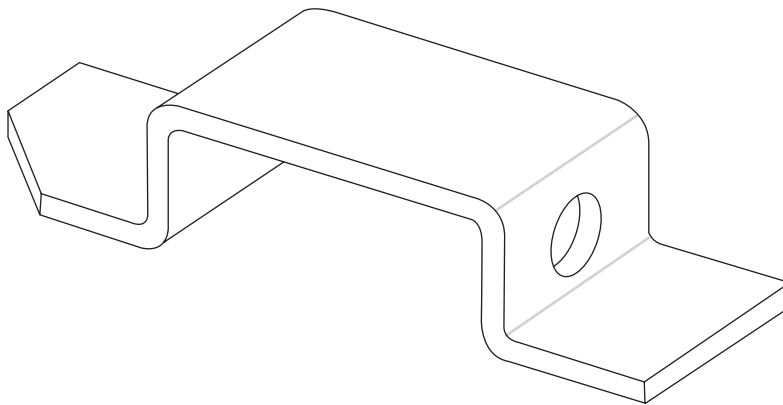
**Fig. 4** shows a 3-D view of the bracket.



**NOT TO SCALE**  
**All Dimensions in mm**

Source: CCEA

**Fig. 3**



Source: CCEA

**Fig. 4**



(c) On the grid below, draw the full size template of the bracket shown in Fig. 3 and Fig. 4 before it is formed. Each square on the grid measures 10 mm × 10 mm.

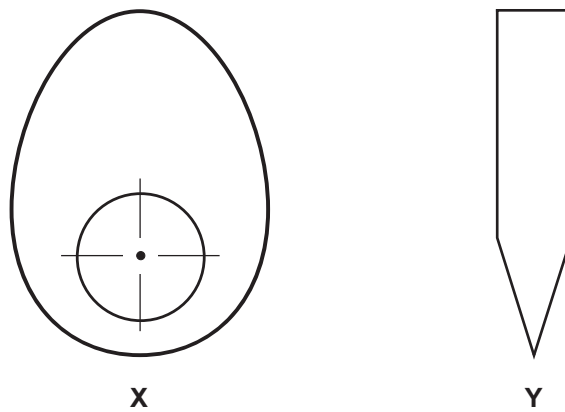


[5]

[Turn over



3 A mechanical system makes use of the two components shown in **Fig. 5**.



**Fig. 5**

Source: CCEA

(a) Name each of the components labelled **X** and **Y**.

**X** \_\_\_\_\_ [2]

**Y** \_\_\_\_\_ [2]

(b) Explain the purpose of each component in a mechanical system.

**X** \_\_\_\_\_  
\_\_\_\_\_ [2]

**Y** \_\_\_\_\_  
\_\_\_\_\_ [2]



(c) In the space below, produce a neat sketch to show how the two components are used together to produce a simple mechanism.

[2]

[Turn over


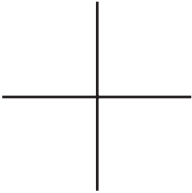


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4 (a) Name each of the pneumatic symbols shown in **Table 2**.

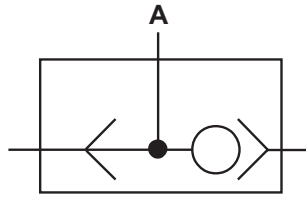
**Table 2**

Pneumatic Symbol	Name of symbol
	
	
	
	

[4]



The pneumatic component represented by the symbol in **Fig. 6** is often required when building pneumatic circuits.



**Fig. 6**

**(b) (i)** Name the symbol shown in **Fig. 6**.

\_\_\_\_\_ [1]

**(ii)** Outline why this component would be used in a circuit.

\_\_\_\_\_  
\_\_\_\_\_ [1]

**(iii)** Name an output component that would normally be connected to the pipeline from **A** in **Fig. 6**.

\_\_\_\_\_ [1]



5 Tenon saws, coping saws and sliding bevels are common tools used in the workshop.

(a) Explain the main purpose of each tool.

Tenon saw \_\_\_\_\_ [2]

Coping saw \_\_\_\_\_ [2]

Sliding bevel \_\_\_\_\_ [2]

Table 3 shows a number of joining methods.

(b) Complete the table by placing a tick (✓) in the correct column to show if the joining method is permanent or semi-permanent.

Table 3

Joining Method	Permanent	Semi-permanent
Knock-down fittings		
Soft soldering		
Countersunk woodscrews		
Dowel joint		
Riveting		

[5]





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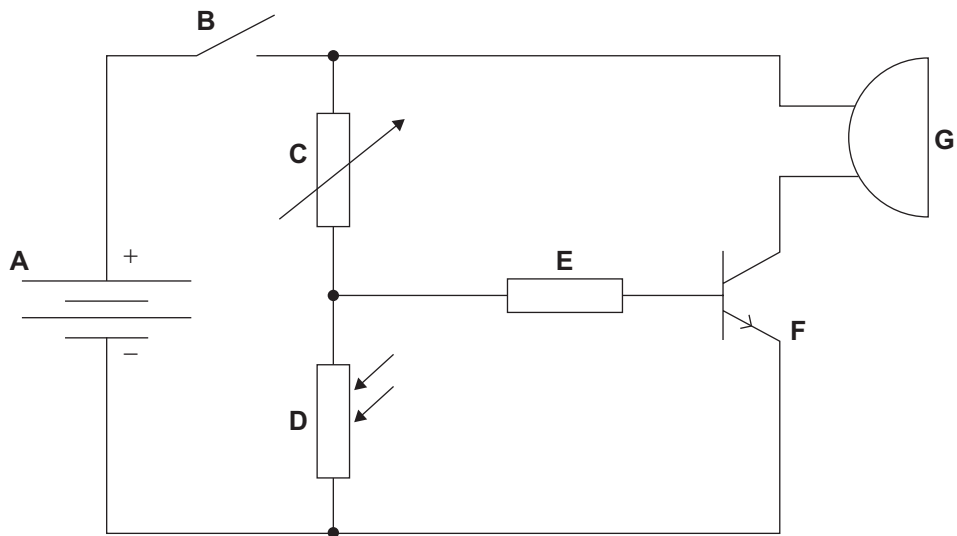
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6 Fig. 7 shows a diagram of an electronic circuit. Each component used has been labelled with a letter.



Source: CCEA

Fig. 7

(a) (i) State the name of component D.

\_\_\_\_\_ [1]

(ii) Explain how component D affects the operation of the circuit.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [3]

(iii) Explain the function of component C in the circuit.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]



(b) (i) In the space below, produce a drawing of the symbol for a reed switch.

[2]

(ii) Explain how a reed switch is activated and suggest a suitable application for a circuit which uses a reed switch.

Activation \_\_\_\_\_

[2]

Application \_\_\_\_\_

[1]

[Turn over



- 7 **Fig. 8** shows a barrier and a ticket machine at the entrance to a car park. When a vehicle drives to the entrance, the barrier will be down as shown. The driver of the vehicle must press a button on the ticket machine in order to enter the car park. If a space is available in the car park, a ticket will be issued and then after a one second delay the barrier will lift. Otherwise it will remain down until a space is available. When the barrier lifts it will remain in that position until the vehicle has driven past it, when it will move back down. The barrier will remain down until another vehicle arrives. The process then repeats.

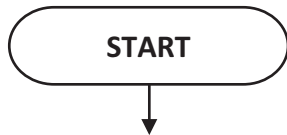
Complete the flow chart in **Fig. 9** to operate the barrier system as described.



Source: CCEA

**Fig. 8**





**Fig. 9**

[12]

**[Turn over**

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8 (a) Define the term alloy.

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[2]

**Table 4** lists a number of common metals and their categories.

**Table 4**

	<b>Ferrous</b>	<b>Non-ferrous</b>	<b>Alloy</b>
Stainless steel			
Copper			
Brass			
Mild Steel			
Aluminium			

(b) Complete **Table 4** by inserting a tick (✓) or ticks (✓) as appropriate for each metal.

[5]

Metals require different surface finishes depending upon their properties and the application.

(c) (i) Which metal from **Table 4** would benefit most from being galvanised?

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[1]

(ii) Explain your answer.

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[1]





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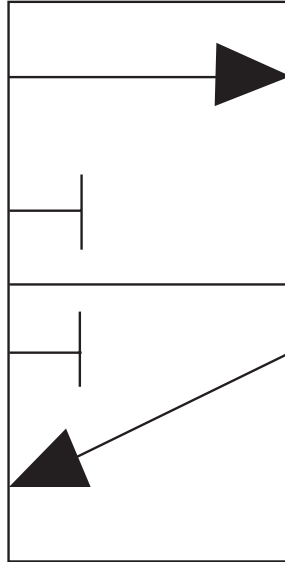
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9 A pneumatic valve is shown in Fig. 10.



Source: CCEA

Fig. 10

(a) (i) Name **two** methods of operation that could be used for this valve.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]

(ii) Sketch, in the correct location on Fig. 10, the symbol for **one** of the methods of operation you have named in (i). [2]



Fig. 10 is reproduced in Fig. 11 below. It is now connected to an SAC.

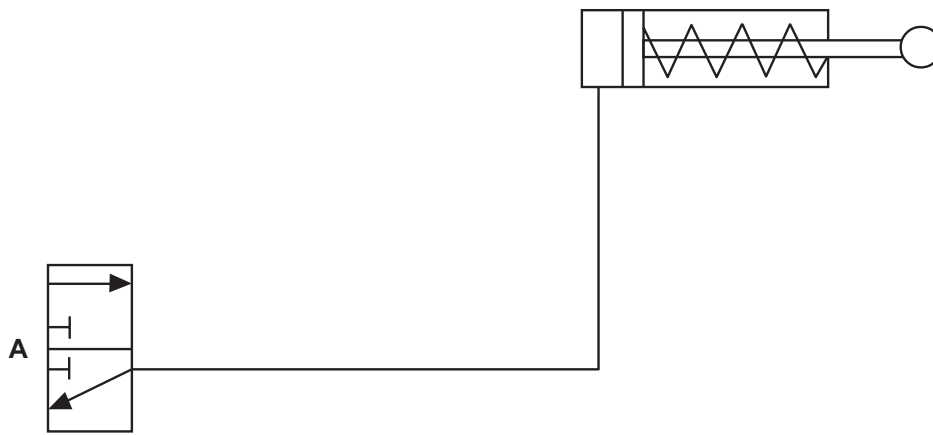
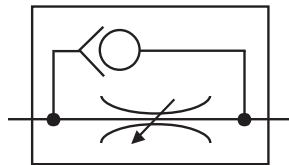


Fig. 11

Source: CCEA

When the valve **A** is operated the SAC is required to outstroke slowly. The symbol for the component that will enable the slow outstroke is shown in Fig. 12.



Source: CCEA

Fig. 12

(b) (i) Name the symbol shown in Fig. 12.

\_\_\_\_\_ [1]

(ii) Insert this component symbol correctly in Fig. 11 to achieve the desired outcome. [2]

(iii) Describe how this component controls the outstroke speed of the SAC.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

[Turn over







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**Sources**

Table 1, Hazard symbol.....© Getty Images  
Table 1, SafeCondition Sign.....© Getty Images

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
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8	
9	
10	
<b>Total Marks</b>	

Examiner Number

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