Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2025

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)

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 × resistance ($V = I \times R$)

2 Series Resistors $R_t = R_1 + R_2 + ... + R_n$

3 Gear ratio of a simple gear train $= \dfrac{\text{number of teeth on driven gear}}{\text{number of teeth on driver gear}}$

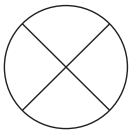
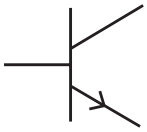
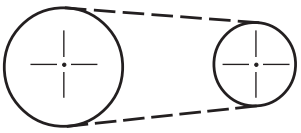
4 Velocity ratio $= \dfrac{\text{diameter of driven}}{\text{diameter of driver}}$

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	
		

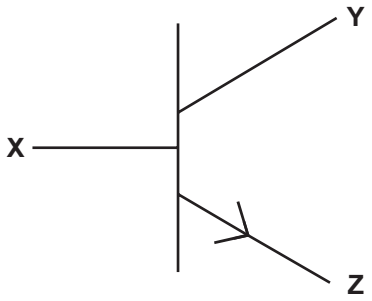
[7]

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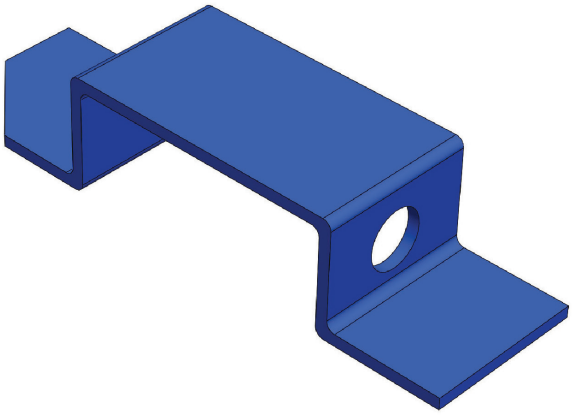
2 **Fig. 2** shows the CAD drawing of a bracket to be made in a school workshop. The bracket is to be manufactured from 2 mm thick thermoplastic.



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.

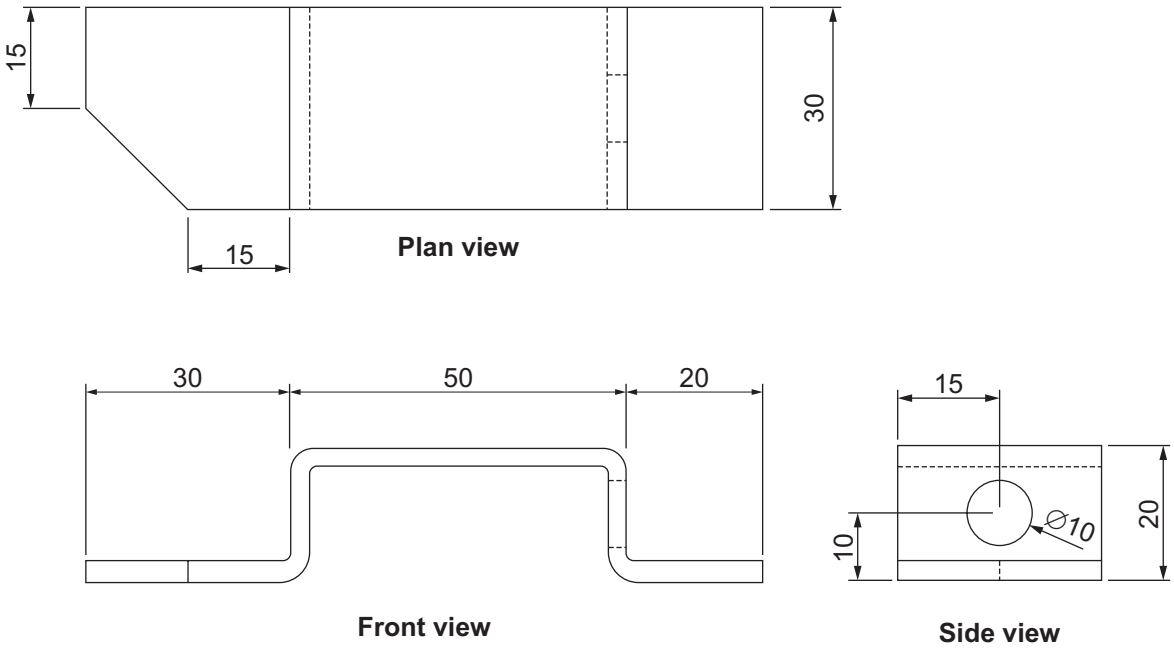
1. _____ [1]

2. _____ [1]

[Turn over

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

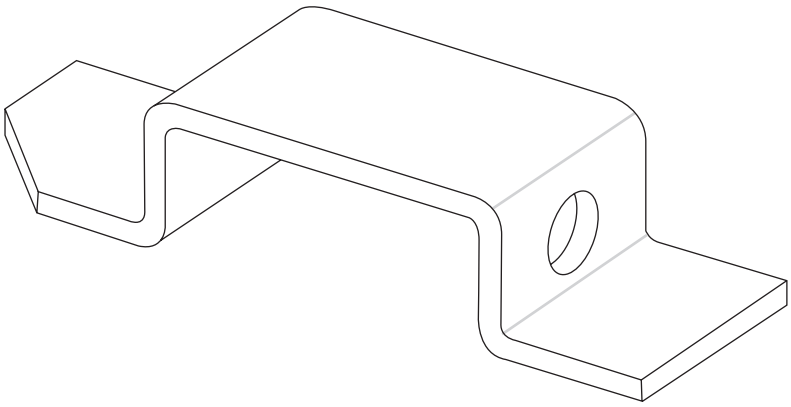
Fig. 4 shows a 3-D view of the bracket.



NOT TO SCALE
All Dimensions in mm

Source: CCEA

Fig. 3



Source: CCEA

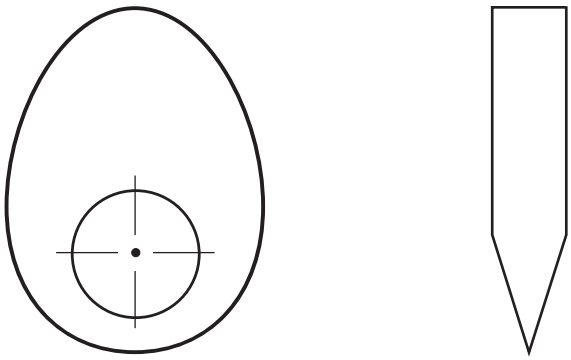
Fig. 4

(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**.



Source: CCEA

Fig. 5

(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]

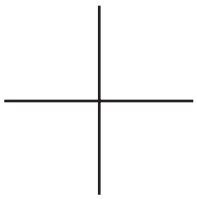
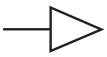
(c) In the space below, produce a neat sketch to show how the two components are used together to produce a simple mechanism.

[2]

[Turn over

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.

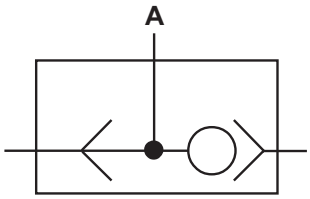


Fig. 6

(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]

[Turn over

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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(Questions continue overleaf)

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

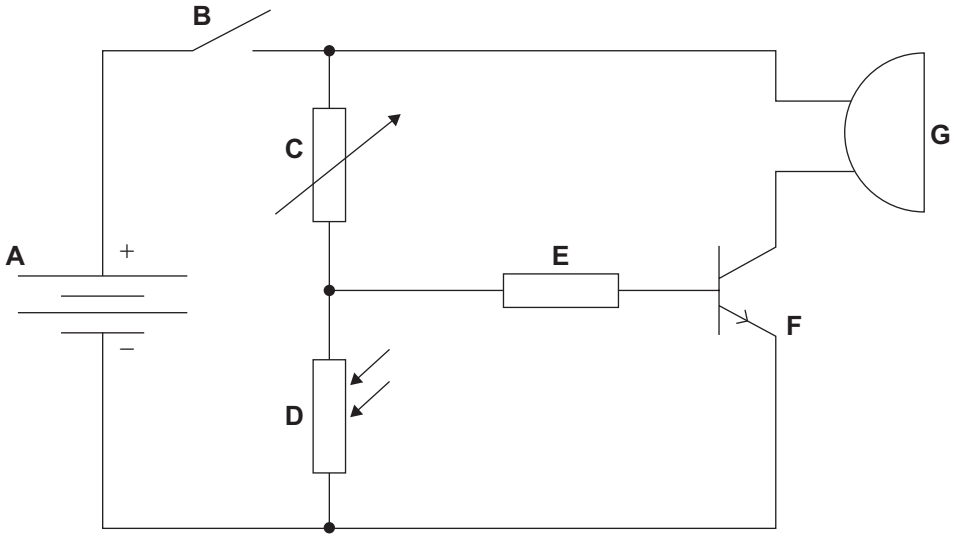

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Fig. 7

(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

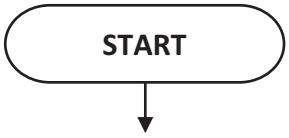

Fig. 9

[12]

[Turn over

8 **(a)** Define the term alloy.

_____

_____ [2]

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

Table 4

	Ferrous	**Non-ferrous**	**Alloy**
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?

_____ [1]

(ii) Explain your answer.

_____ [1]

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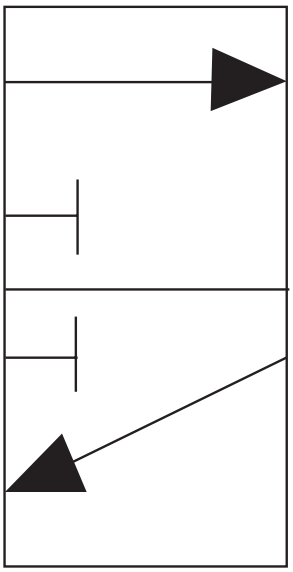
9 A pneumatic valve is shown in **Fig. 10**.



Source: CCEA

Fig. 10

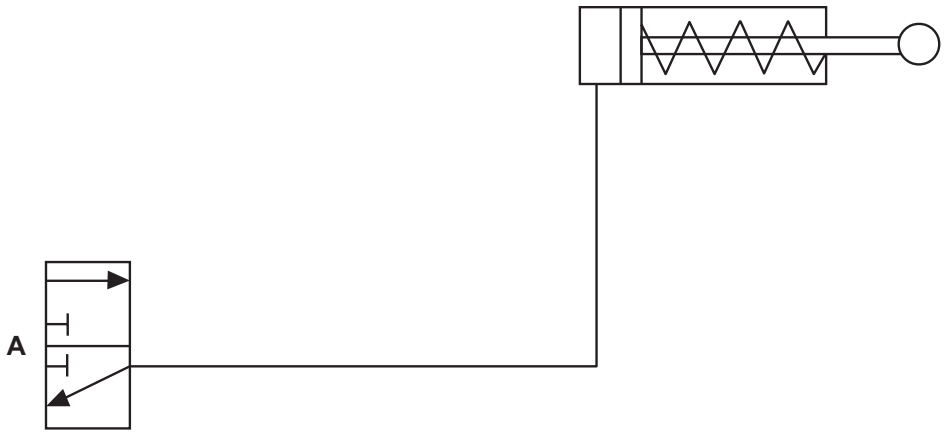
(a) (i) Name **two** methods of operation that could be used for this valve.

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]

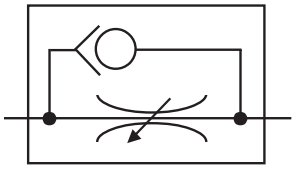
Fig. 10 is reproduced in **Fig. 11** below. It is now connected to an SAC.



Source: CCEA

Fig. 11

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

10 Describe the vacuum forming process required to enable the creation of a suitable casing/product for a Technology and Design project. Your response should include the preparation of the mould, the removal of any surplus material after vacuum forming and safety precautions employed throughout the task.

Quality of written communication will be assessed in this question.

[10]

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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	
4	
5	
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8	
9	
10	
Total Marks	

Examiner Number

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