Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____
I declare this is my own work.

GCSE
DESIGN AND TECHNOLOGY

Unit 1 Written Paper

Wednesday 18 June 2025 Morning Time allowed: 2 hours

For Examiner's Use	
Section	Mark
A	
B	
C	
TOTAL	

Materials
For this paper you must have:
- normal writing and drawing instruments
- a calculator
- a protractor.

Instructions
- Use black ink or black ball-point pen. Use pencil only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 100.
- There are 20 marks for Section A, 30 marks for Section B and 50 marks for Section C.

Do not write outside the box

Section A – Core technical principles

Answer **all** questions in this section.

Each of Questions **01** to **10** is followed by four responses, **A**, **B**, **C** and **D**.

For each question completely fill in the circle alongside the appropriate answer.

CORRECT METHOD ⬬ WRONG METHODS

If you want to change your answer you must cross out your original answer as shown.

If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.

0 1 Products designed to be more efficient are developed by

A batch production. ⬭

B continuous improvement. ⬭

C lean manufacture. ⬭

D planned obsolescence. ⬭

[1 mark]

0 2 Which **one** of the following is part of inclusive design?

A Design for disabilities ⬭

B Disposal of waste ⬭

C Efficient working ⬭

D Just in time ⬭

[1 mark]

Do not write outside the box

0 3 Which energy source is finite?

A Biomass ⬭

B Oil ⬭

C Solar ⬭

D Tidal ⬭

[1 mark]

0 4 A fusible material is commonly described as one that

A absorbs and retains moisture. ⬭

B allows heat to pass through. ⬭

C conducts electrical current. ⬭

D melts when heat is applied. ⬭

[1 mark]

0 5 Identify the correct definition of a modern material.

A A combination of two or more different materials. ⬭

B A material produced through a new or improved production technique. ⬭

C A material that changes its properties when exposed to heat. ⬭

D A naturally occurring renewable material. ⬭

[1 mark]

Turn over for the next question

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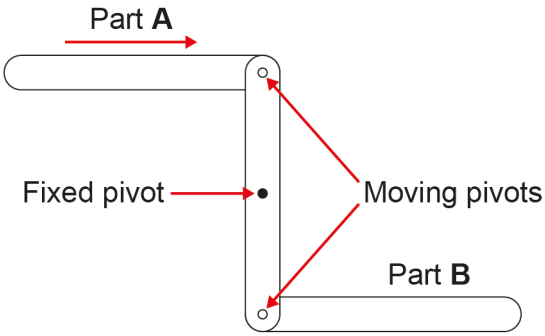
0 6 Part **A** moves 20 mm to the right.

The distances between the fixed pivot and the moving pivots are the same.

How far and in what direction does Part **B** move?



A Moves 10 mm to the right ⬭

B Moves 20 mm to the left ⬭

C Moves 30 mm to the right ⬭

D Moves 40 mm to the left ⬭

[1 mark]

0 7 New products are developed to satisfy customer needs and wants in response to

A co-operatives. ⬭

B crowd funding. ⬭

C market pull. ⬭

D technology push. ⬭

[1 mark]

Do not write outside the box

0 8 Which **one** of the following is a ferrous metal?

A Aluminium ⬭

B Iron ⬭

C Tin ⬭

D Zinc ⬭

[1 mark]

0 9 Design focused on fashion is influenced by

A automation. ⬭

B culture. ⬭

C enterprise. ⬭

D manufacturing. ⬭

[1 mark]

1 0 Which **one** of the following is a thermoforming polymer?

A Epoxy resin (ER) ⬭

B High Impact Polystyrene (HIPS) ⬭

C Melamine-formaldehyde (MF) ⬭

D Polyester resin (PR) ⬭

[1 mark]

Turn over for the next question

Do not write outside the box

1 1 Describe briefly the **two** material properties below:

[4 marks]

Hardness _____

_____

_____

_____

Strength _____

_____

_____

_____

1 2 Explain why some people are opposed to the use of nuclear power to provide energy.

[4 marks]

_____

_____

_____

_____

_____

_____

_____

_____

1 3 Describe the characteristics of a material with elastic properties.

[2 marks]

_____

_____

_____

_____

20

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Section B – Specialist technical principles

Answer **all** questions in this section.

1 4 Commercial products often make use of standard components in their assembly.

1 4 . 1 Give **one** example of a standard component.

[1 mark]

_____

1 4 . 2 Describe **two** advantages to the manufacturer of using standard components.

[4 marks]

Advantage 1 _____

_____

_____

_____

Advantage 2 _____

_____

_____

_____

Turn over for the next question

Do not write outside the box

1 5 A company mass produces a product at the rate of 22 000 items a day.

In holidays this reduces to 4500 items per day.

Calculate how much production has fallen as a percentage.

Give your answer to the nearest whole per cent.

Show your working.

[4 marks]

Answer _____ %

1 6 When selecting materials or components, the aesthetics and their source need to be considered by a designer.

1 6 . 1 Explain why a designer would consider aesthetics when selecting a material or component.

Give an example in your answer.

[3 marks]

Do not write outside the box

1 6 . 2 Explain why a designer would need to consider the source of a material or component.

Give an example in your answer.

[3 marks]

1 7 Explain why we need to allow for waste when making prototypes.

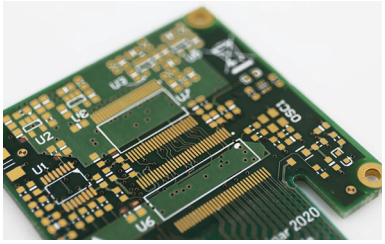
[3 marks]

Turn over for the next question

Do not write outside the box

1 8 The products/components shown in **Table 1** use materials that are modified to make them suitable for specific purposes.

Table 1

Polymer window frame	**Solid wood dining furniture**	**Metal bike hub**
		
Printed Circuit Board (PCB)	**Fabric pop up tent**	**Paper and board takeaway food packaging**

Choose **one** product/component and answer the questions below.

My chosen product/component is _____

1 8 . 1 Specific main material used:

[1 mark]

_____

Do not write outside the box

1 8 . 2 Name **one** modification technique used on the material in your chosen product.

[1 mark]

1 8 . 3 Why does the material need modifying to make a more effective product?

[2 marks]

Turn over for the next question

Do not write outside the box

1 9 Products are made using different scales of production:

- batch
- continuous
- mass
- prototype.

Analyse and evaluate the different scales of production a manufacturer can use.

Give examples of products in your answer.

[8 marks]

30

Do not write outside the box

Section C – Designing and making principles

Answer **all** questions in this section.

2 0 Production aids are used in the manufacture of products.

Explain how or why each of the following production aids is used.

[4 marks]

Jigs _____

_____

_____

_____

Patterns/templates _____

_____

_____

_____

Turn over for the next question

Do not write outside the box

2 1 Analyse the picture in **Figure 1** and the specification below.

Figure 1

Specification:
- a variety of exercise programmes
- internet ready
- robust design
- customer care support
- ergonomic design
- safety features.

Evaluate the exercise bike in terms of:

2 1 . 1 Satisfying the needs and wants of the user.

[4 marks]

Do not write outside the box

2 1 . 2 Use of anthropometrics and ergonomics.

[4 marks]

2 1 . 3 Innovation in the design.

[4 marks]

Turn over for the next question

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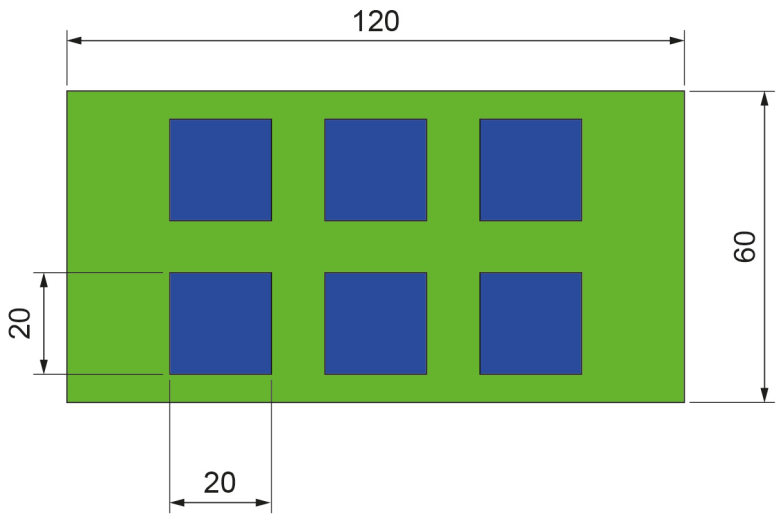
2 2 **Figure 2** shows a decorative surface of a product based on a green rectangle with six identical blue squares.

Figure 2



All dimensions in millimetres

Using the drawing and the dimensions provided, calculate the ratio between the **two** different colours used to create the decorative surface effect.

Give your answer in the simplest form.

You **must** show your working.

[6 marks]

Ratio is _____

Do not write outside the box

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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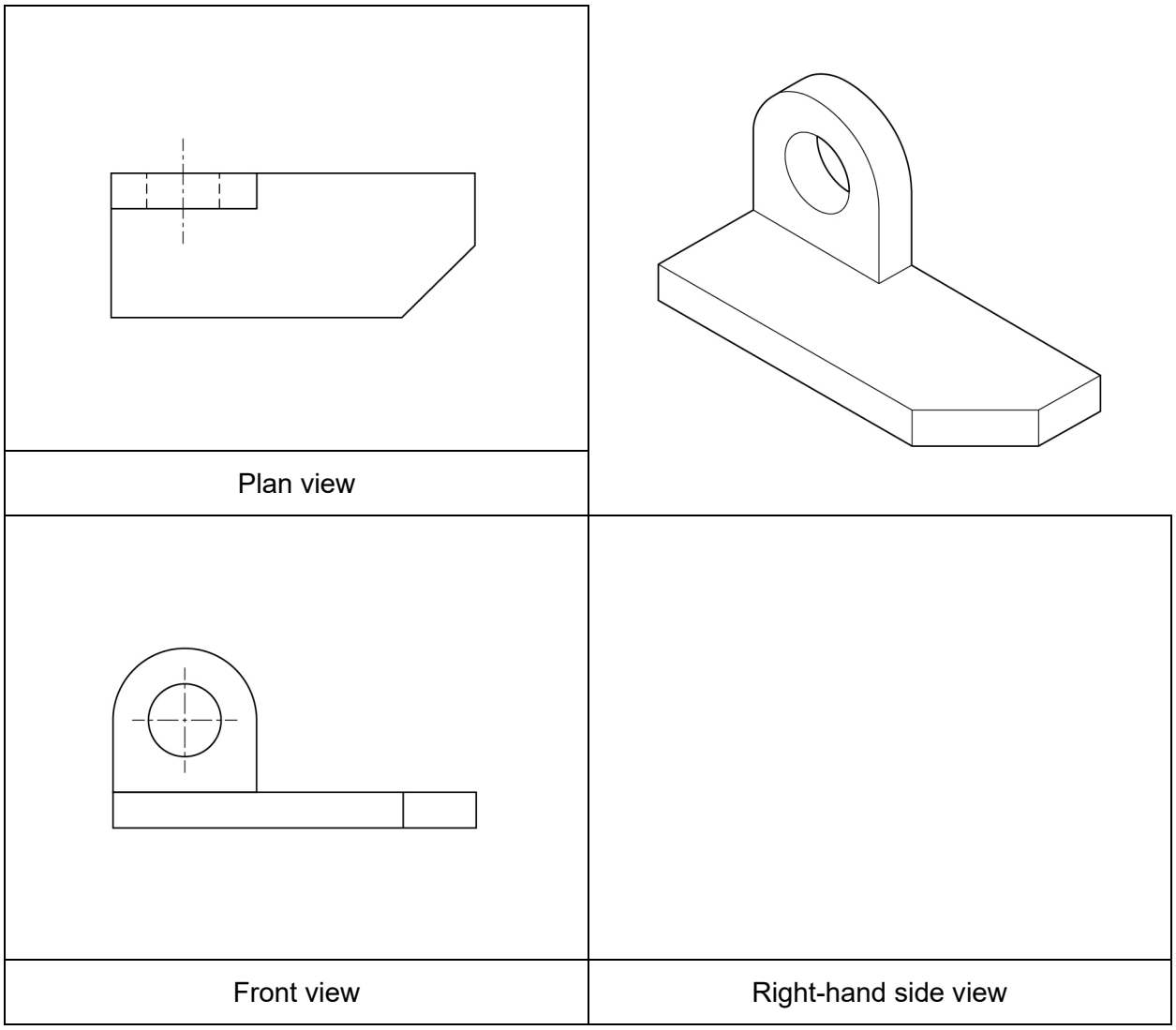
2 3 . 1 **Figure 3** shows a component partially completed in 3rd angle orthographic projection with an accompanying 3D isometric drawing.

Complete the orthographic drawing by adding the correct right-hand side view for the component.

[4 marks]

Figure 3



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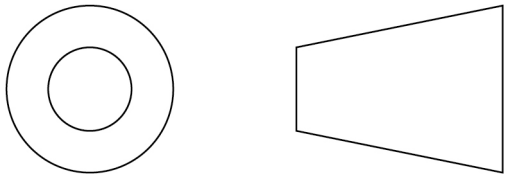
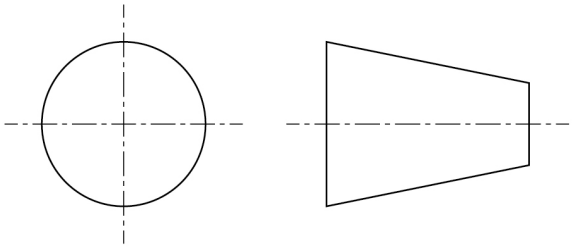
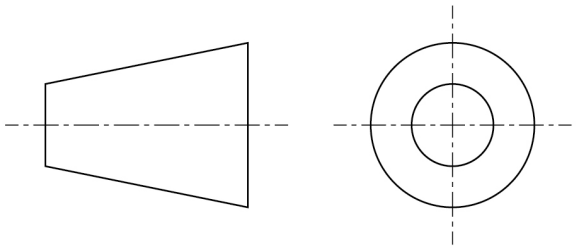
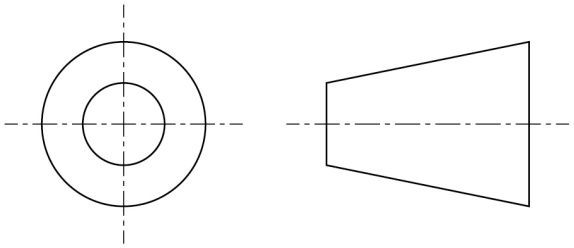
2 3 . 2 Study the table in **Figure 4**.

Which symbol is used to correctly indicate a 3rd angle orthographic drawing?

Put **one** tick next to the correct symbol in the column provided.

[1 mark]

Figure 4

Label	Symbol	Correct symbol (tick one only)
A		
B		
C		
D		

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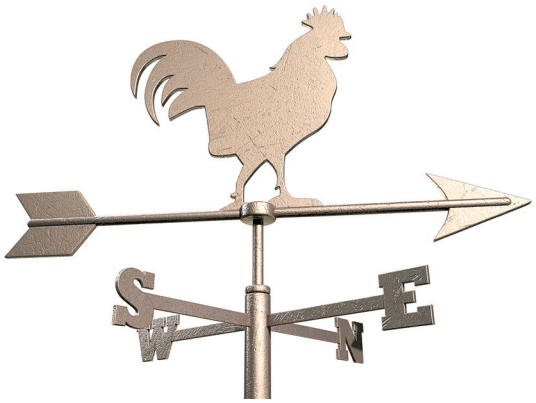
2 4 A manufacturer wants to produce **six** weather vanes similar to the one in **Figure 5**.

Figure 5



They have **two** manufacturing methods:

- **one** skilled worker
- team of **five** workers working together to make each weather vane.

2 4 . 1 **Method 1 – One worker only, making six weather vanes**

Study **Table 2** showing the costs of making **one** weather vane by this method.

Table 2

Tool/equipment/ material costs	Labour cost per hour	Production time for one weather vane
£5	£22 per hour	4 hours

Calculate how much it would cost to make **six** weather vanes using this method.

Show your working.

[2 marks]

Answer £ _____

Do not write outside the box

2 4 . 2 **Method 2 – Five workers working as a team to make all six weather vanes**

Study **Table 3** showing the costs of making **one** weather vane by this method.

Table 3

Tool/equipment/ material costs	Labour cost per worker per hour	Production time for one weather vane
£5	£22 per hour	0.5 hours

Calculate how much it would cost to make **six** weather vanes using this method.

Show your working.

[4 marks]

Answer £ _____

2 4 . 3 Which of the **two** methods is the more cost effective for the manufacturer?

Explain your answer.

[2 marks]

Do not write outside the box

2 5 Prior to making, materials and components are selected for:

- product function
- cost
- availability.

Explain why **each** factor needs to be considered before choosing a material or component for use.

[6 marks]

Product function _____

_____

_____

_____

Cost _____

_____

_____

_____

Availability _____

_____

_____

_____

2 6 Explain how increasing carbon dioxide levels in the atmosphere impact on the design and manufacture of products.

[3 marks]

_____

_____

_____

_____

_____

_____

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2 7 Explain why designers should investigate and research existing products before starting to design new products.

[6 marks]

50

END OF QUESTIONS

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