



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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I declare this is my own work.

GCSE DESIGN AND TECHNOLOGY

Unit 1 Written Paper

Friday 22 May 2020

Afternoon

Time allowed: 2 hours

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 pencils 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

- All dimensions are in millimetres.
- 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.

For Examiner's Use	
Section	Mark
A	
B	
C	
TOTAL	



J U N 2 0 8 5 5 2 W 0 1

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Section A – Core technical principlesAnswer **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** Which type of renewable energy is sourced from plants?**A** Biomass☐**B** Solar☐**C** Tidal☐**D** Wind☐**[1 mark]****0 2** Planned obsolescence is when a product is designed**A** to be repairable.☐**B** to have a short lifespan.☐**C** to have replaceable sections.☐**D** to take upgrades.☐**[1 mark]**

0 3

What is the electrical component shown in **Figure 1** used for?

Figure 1



- A** To detect pressure levels ☐
- B** To detect temperature levels ☐
- C** To switch equipment on or off ☐
- D** To switch the direction of a motor ☐

[1 mark]

0 4

Identify the smart material used to darken windows in bright sunlight.

- A** Aluminium foam ☐
- B** Photochromic pigment ☐
- C** Shape memory alloy ☐
- D** Thermochromic pigment ☐

[1 mark]

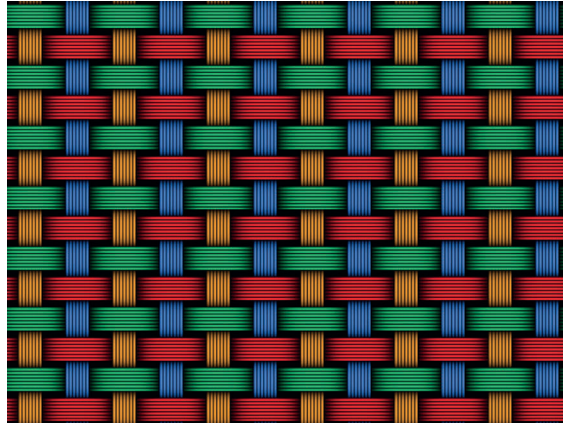
Turn over for the next question

Turn over ►



0 5 Identify the textile fabric shown in **Figure 2**.

Figure 2



A Bonded fabric

☐

B Felted fabric

☐

C Knitted fabric

☐

D Woven fabric

☐

[1 mark]

0 6 'Technology push' describes when products are developed

A due to improvements in new materials.

☐

B due to increased consumer demand.

☐

C in response to consumer feedback.

☐

D with the user in mind.

☐

[1 mark]



0 7Which **one** of the following statements about industry is true?

- A** An increased use of robotics has led to a reduction in manual jobs. ☐
- B** An increased use of robotics means more people need to be employed. ☐
- C** The latest production lines require more people who can use hand tools skilfully. ☐
- D** The use of CAD and CAM in industry has led to less efficiency. ☐

[1 mark]**0 8**

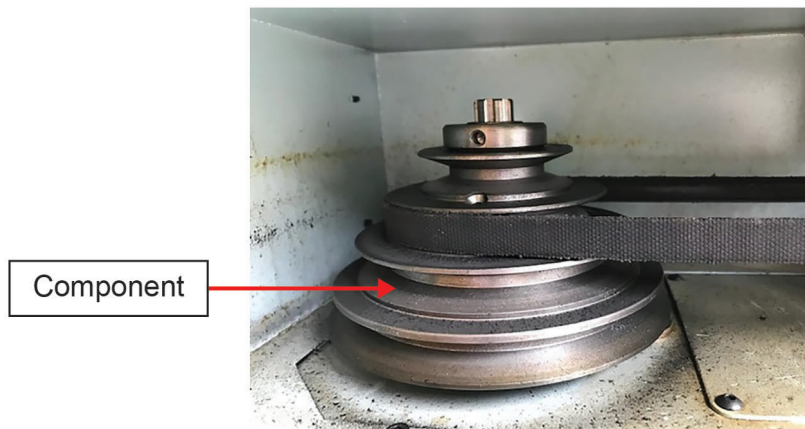
Which of the following is part of a kinetic pumped storage system?

- A** Alkaline battery ☐
- B** Oil field ☐
- C** Photovoltaic cell ☐
- D** Turbine ☐

[1 mark]**Turn over for the next question****Turn over ►**

0 9 Name the identified component shown in **Figure 3**.

Figure 3



A Cam ☐

B Gear ☐

C Lever ☐

D Pulley ☐

[1 mark]

1 0 A ductile material is commonly described as one that

A can be drawn into a long length. ☐

B does not scratch easily. ☐

C resists corrosion and oxidation. ☐

D shatters under a sudden impact. ☐

[1 mark]



1	1	.	1
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Name **one** alloy.**[1 mark]**

1	1	.	2
---	---	---	---

Explain why metals are alloyed.

[2 marks]

Turn over for the next question**Turn over ►**

1	2	.	1
---	---	---	---

Composite materials such as foil and polymer lined boards are used in food and drink packaging.



Give **one** advantage and **one** disadvantage of using composite materials for packaging.

[2 marks]

Advantage _____

Disadvantage _____



1 2 . 2

Table 1 shows the number of food and drink containers successfully recycled by a manufacturer in 2010 and 2017.

Table 1

Recycling of composite food and drink containers	
2010	2017
32 billion tonnes	46 billion tonnes

What is the percentage increase in recycling of composite food and drink containers between 2010 and 2017?

[2 marks]

Answer _____

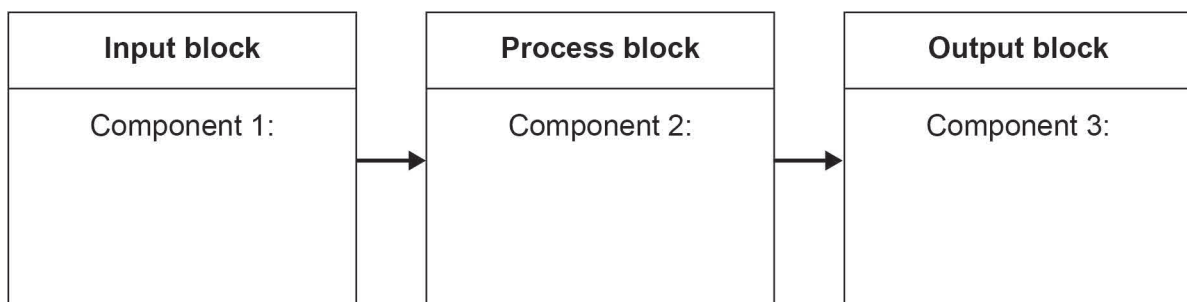
1 3

Figure 4 shows a system diagram for an alarm.

Complete the diagram by naming **one** component that could be used in **each** block.

[3 marks]

Figure 4



20

Turn over for the next section

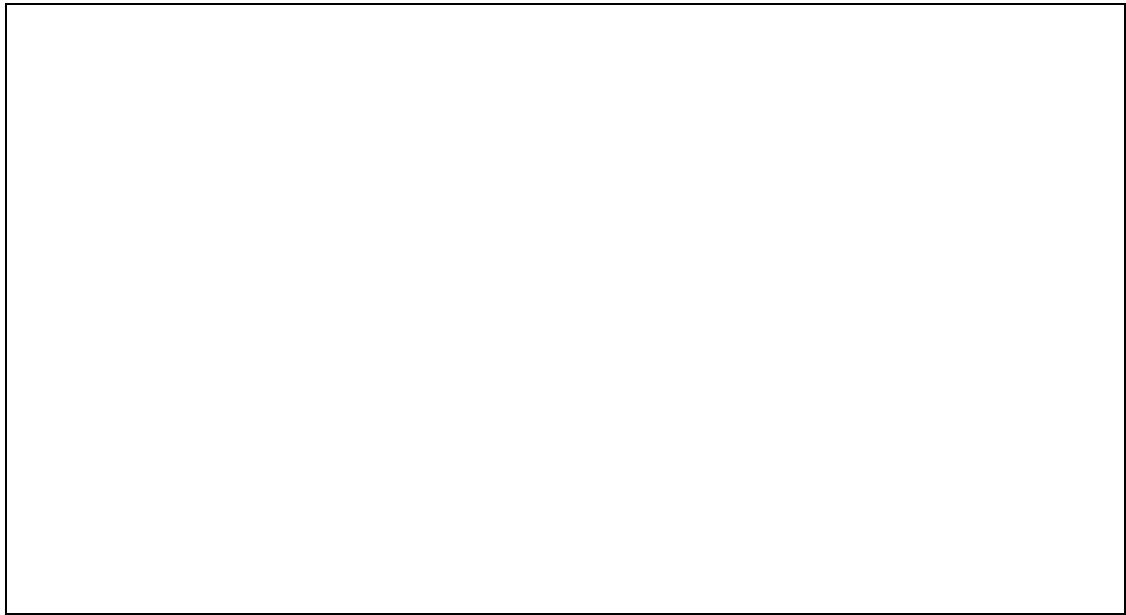
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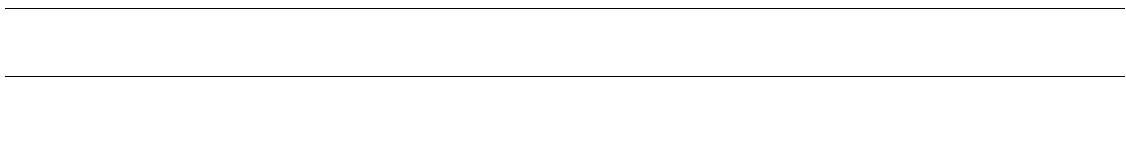
Section B – Specialist technical principlesAnswer **all** questions in this section.**1 4**Name **one** specific commercial manufacturing process and describe what it is used for.

Name of process _____

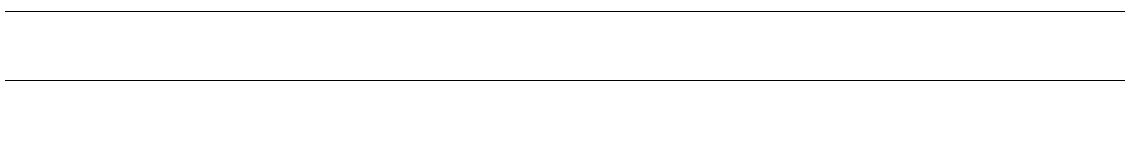
Using notes and/or sketches describe the process you have named above.

[4 marks]

1 5Explain why **each** factor below would need to be considered by a manufacturer when sourcing materials/components.**[2 x 2 marks]**

Bulk buying _____



Ethical factors _____




1 6 . 1 The products/components shown below are manufactured from different materials.



Metal can opener



Card shoe box



Textile shopping bag with logo



Wooden toy



Polymer gears

Choose **one** product/component and complete **Table 2**.

[3 marks]

My chosen product/component is _____

Table 2

Specific main material	Stock form used in manufacture	Appropriate finishing technique

Question 16 continues on the next page

Turn over ►



1 6 . 2 A number of calendars are being made.

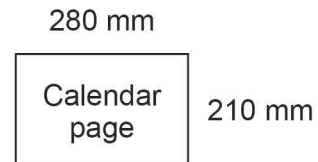
Given the sizes provided in **Figure 5** and **Figure 6**, how many calendar pages can be made from **one** sheet?

[2 marks]

Figure 5



Figure 6



Not drawn to scale

Answer _____

1 6 . 3 What percentage of material is waste after cutting the pages calculated in Question **16.2**?

Show your working and give your answer to **two** decimal places.

[3 marks]

Answer _____



[illegible]

1	8
---	---

Explain why the **two** methods below are used to manufacture products in different volumes.

Give specific examples of products in your answer.

[2 x 3 marks]

Mass _____

Batch _____

30



Answer **all** questions in this section.

1	9
---	---

Alessi	Apple	Braun	Dyson
Gap	Primark	Under Armour	Zara

Outline the design features and/or manufacturing techniques that have made your chosen company successful.

[6 marks]

My chosen company is _____

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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2 0

Figure 7 shows **three** different kettles.

Figure 7

		
Cast iron stove kettle	Polymer electric kettle	Whistling kettle

Analyse and evaluate the kettles in terms of the **three** features identified below.You should not use an analysis or evaluation point more than **once**.

2 0 . 1

ergonomics

[4 marks]

2 0 . 2

functionality

[4 marks]

2 0 . 3

innovation

[4 marks]

Turn over for the next question**Turn over ►**

2	1
---	---

Describe the following **two** types of investigation.

Give examples to show how they help when designing.

[2 x 3 marks]

Primary research _____

Secondary research _____



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ANSWER IN THE SPACES PROVIDED**

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2 2 . 1

A designer has been asked to design a prototype toy suitable for use by a child between 3 and 5 years of age. They are using the data in **Table 4**.

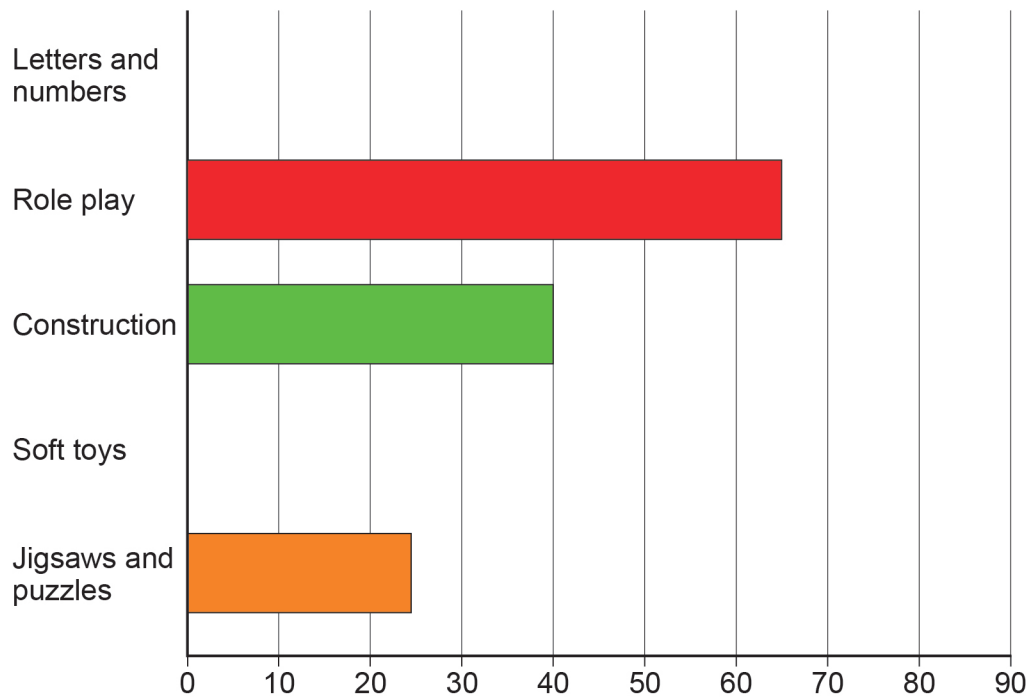
Complete the **two** missing values in **Table 4** for popularity votes.

[1 mark]

Table 4

Type of toy	Popularity votes	Popularity votes as a percentage
Role play	65	26%
Construction	40	16%
Letters and numbers		34%
Jigsaws and puzzles	25	10%
Soft toys		14%
Total	250	100%



2 2 . 2Use your values from Question **22.1** to complete the bar chart and label the x axis.**[3 marks]****Turn over for the next question****Turn over ►**

2	3
---	---

Give **five** detailed specification points to help with the designing of a toy for use by a child between 3 and 5 years of age.

[5 marks]

1 _____

2 _____

3 _____

4 _____

5 _____



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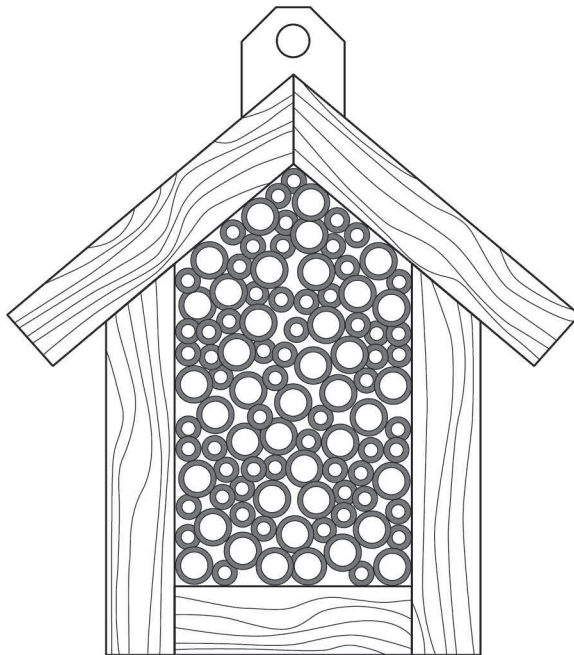
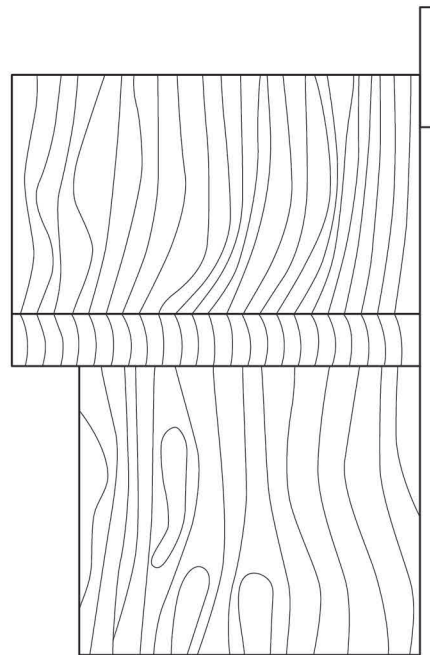
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2 4

Figures 8 and 9 show a front and side view of a bug box used to encourage insects to visit a garden.

Figure 8**Figure 9**

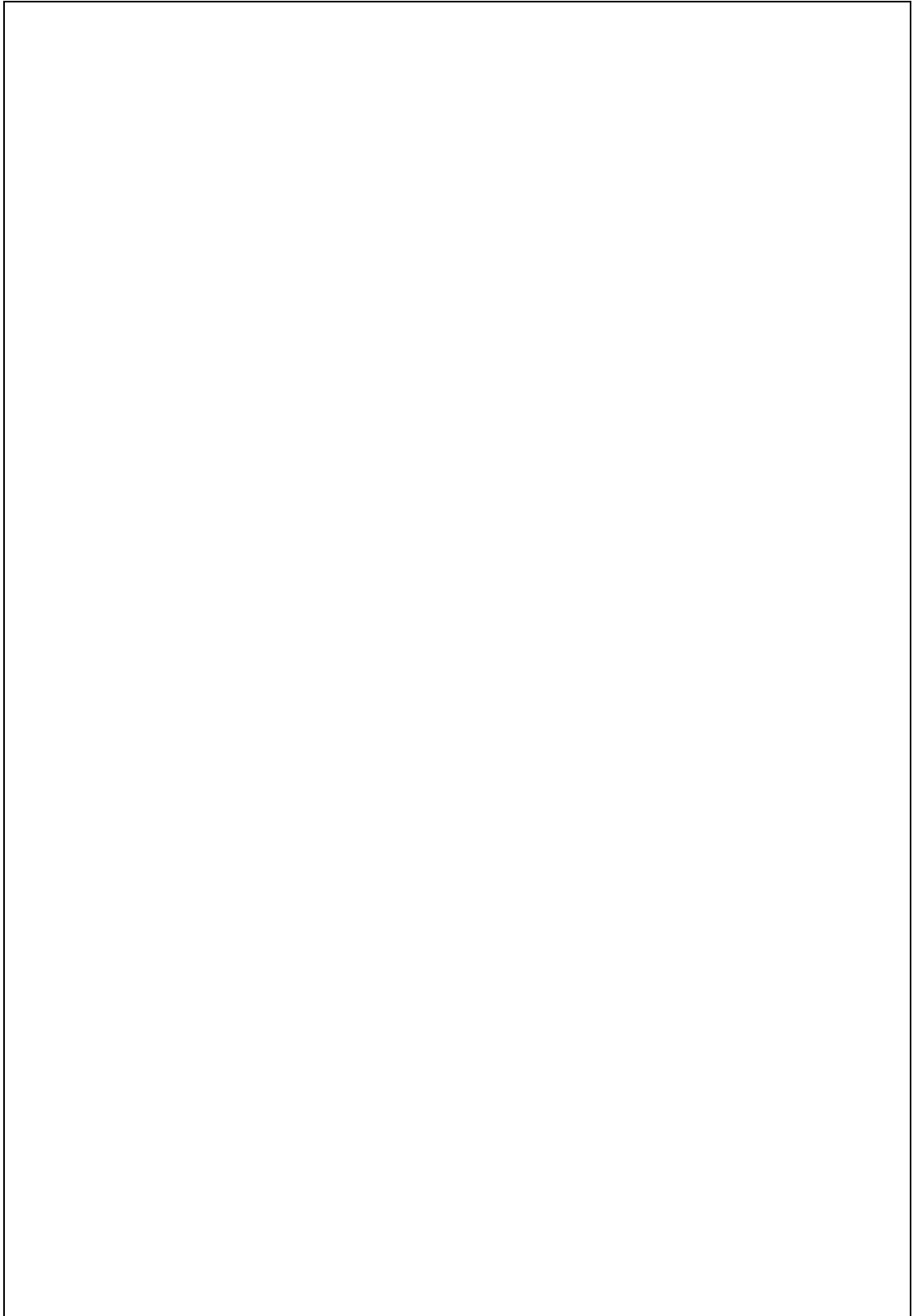
The front and side views are drawn in third angle projection
Hidden detail has not been included



2	4	.	1
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Complete a two-point perspective drawing of the bug box in the space provided below.

[4 marks]

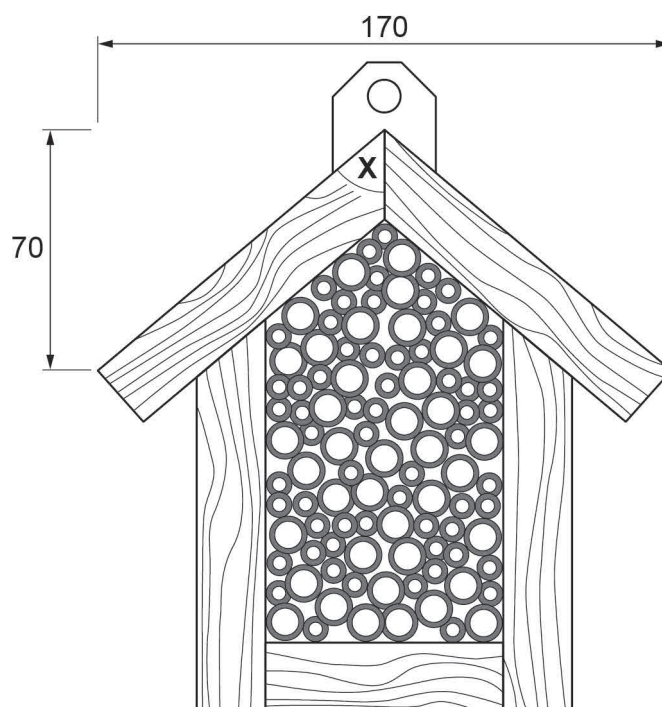


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2 4 . 2

Figure 10



All dimensions are in millimetres
Not drawn to scale

Calculate the size of angle **X** in **Figure 10** to the nearest whole degree to ensure an accurate fit of the two roof pieces.

Show your working/construction.

[4 marks]

Answer _____



2	5
---	---

During manufacture it is important to use materials efficiently and minimise waste.

Explain how each of the following improves material management.

[2 x 3 marks]

Nesting of shapes and parts/lay planning _____

Cutting techniques _____

Turn over for the next question

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2	6
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Describe how material can be formed when making a prototype.

[3 marks]

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END OF QUESTIONS



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Question number	Additional page, if required. Write the question numbers in the left-hand margin.



