

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE**

4141/01

**DESIGN & TECHNOLOGY**

**UNIT 1**

**FOCUS AREA: PRODUCT DESIGN**

A.M. FRIDAY, 25 May 2012

2 hours

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Question 1	
Question 2	
Question 3	
Question 4	
Question 5	
Question 6	
Question 7	
Question 8	
<b>TOTAL MARK</b>	

**ADDITIONAL MATERIALS**

You will need basic drawing equipment, coloured pencils and a calculator for this examination.

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. Where the space is not sufficient for your answer, continue at the back of the book, taking care to number the continuation correctly.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets at the end of each question or part-question.

**Section A**

*Marked out of 60 60 minutes*

1. This question is about Product Analysis. It is worth a total of 15 marks.

The photograph below shows an aluminium greenhouse sold at a garden centre.



**Product Information:**

- Aluminium framework.
- Polycarbonate glazing.
- Flat packed design.
- 1.8m × 1.8m.
- Retail price: £289.98.

(a) **Underline** the most suitable scale of production to make this greenhouse. [1]

Batch Production

One-off Production

(b) A design specification was produced before designing the greenhouse. Write a detailed specification point for **each** of the following headings.

(i) Function [2]

.....  
.....

(ii) Safety [2]

.....  
.....

(c) Give **two** reasons why aluminium was used to construct the frame of the greenhouse.

(i) Reason 1: ..... [2]

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.....

(ii) Reason 2: ..... [2]

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- (d) Explain why it is an advantage to the manufacturer that the greenhouse is sold flat packed. [3]

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- (e) The table below shows the greenhouse sizes available and their costs.

<i>Option</i>	<i>Size</i>	<i>Cost</i>
A	1·8 metres × 1·8 metres	£289·98
B	2·4 metres × 1·8 metres	£329·98

The cost of option A greenhouse is £89·50 per square metre. Calculate the cost per square metre of option B greenhouse to the nearest penny. [3]

*Show all your workings.*

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2. This question is about the general issues of Design and Technology. It is worth a total of 10 marks.

(a) Place a **tick** (✓) in the correct box to indicate the word which best represents **each** of the following statements. [3]

<i>Statement</i>	<i>Repair</i>	<i>Reuse</i>	<i>Recycle</i>
A product is reprocessed and its materials are used for another purpose.			
A product is mended after it has stopped working.			
A product is used for another purpose.			

(b) The pictures below show two different logos that appear on products. State the meaning of **each** logo.



(i) .....  
 .....  
 .....  
 ..... [2]



(ii) .....  
 .....  
 ..... [2]

(c) Using a named product, explain with reference to Rethink how you could design and make a more sustainable product. [3]

Name of the product: .....

Explanation: .....  
 .....  
 .....

3. This question is about the Designers that you have studied. It is worth a total of 10 marks.

During your course you have studied the work of Jonathan Ive and Verner Panton.

(a) Study the descriptions below and state the name of the designer that matches the information. [2]

	<i>Description</i>	<i>Name of Designer</i>
(i)	Born 13 February 1926. Trained as architectural engineer in Odense. Designed the Stacking chair or S chair.	.....
(ii)	Born in Chingford 1967. Studied Industrial Design at Northumbria University. Worked for London design agency Tangerine.	.....

(b) Write a short essay in the space below that describes Jonathan Ive's work, identifying its main features and discuss the influence that he has had on Product Design. [8]

*Marks will be awarded for the content of the answer and the quality of written communication.*

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4. This question is about the Design Process and how it is used. It is worth a total of 25 marks.

(a) Study the three design stages below and use a line to join them to the correct descriptions. [3]

<i>Design Stage</i>
Design Specification
Design Brief
Initial Ideas

<i>Description</i>
A list of important features to be included in the product.
A range of possible designs.
A statement of what you intend to design and make.

(b) (i) Describe why designers would analyse a competitor's product. [2]

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(ii) Describe the importance of making a model before making the final product. [2]

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- (c) A local primary school has asked you to design a new recycling unit that will encourage children to recycle different materials during the school day.

Draw **one** idea for the new recycling unit. Use notes to explain your idea.



### Specification

#### The design must:

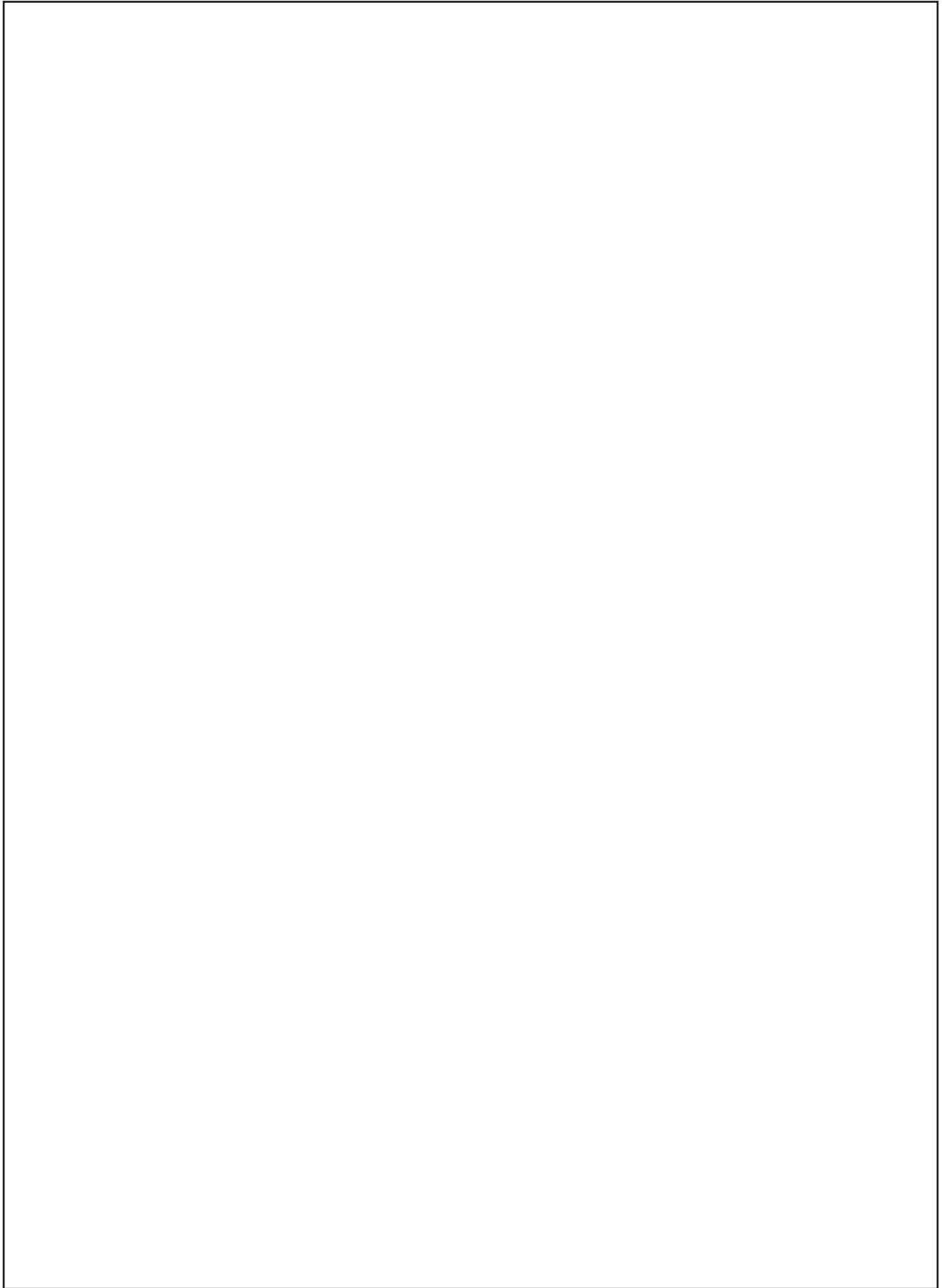
- be simple to use;
- display the recycle logo on the unit;
- be able to store and access plastic, paper and metal separately;
- use a simple mechanical mechanism to open and close a lid.

#### Marks will be awarded for:

- |  |     |
|--|-----|
| (i) ease of use;   | [3] |
| (ii) displaying the logo;  | [2] |
| (iii) a simple mechanical mechanism, imaginative storage and ease of access; | [5] |
| (iv) showing relevant sizes for the recycling unit;                          | [2] |
| (v) specifying the materials used to make the unit;                          | [2] |
| (vi) quality of communication.   | [4] |



Draw your design in the box below.

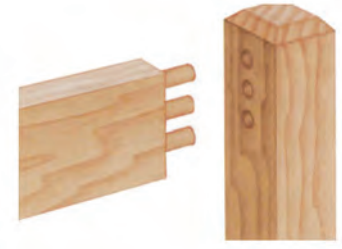


**Section B**

*Marked out of 60 60 minutes*

5. This question is about Commercial Manufacturing Processes. It is worth a total of 10 marks.

(a) The diagram below shows a dowelled joint that is used as part of a frame construction. Five hundred frames are to be manufactured.



Describe **two** advantages of using a jig to carry out the drilling operation.

Advantage 1: ..... [2]

.....

Advantage 2: ..... [2]

.....

(b) (i) Put a **tick** (✓) in the grid below to indicate whether the following statements are true or false. [3]

<i>Statement</i>	<i>True</i>	<i>False</i>
In batch production, batch size can vary from small numbers such as 20 or 30 to many thousands of products.		
A prototype car would normally be made as a one-off product.		
Computer controlled machines are suitable for batch production.		

(ii) Explain how the different scales of production can affect the cost of a product. [3]

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 .....  
 .....  
 .....

6. This question is about Materials and Components. It is worth a total of 15 marks.

(a) Use the correct words from the list below to complete the sentences:



- Blockboard                  Softwood                  Balsa                  Beech

(i) ..... trees contain resin. [1]

(ii) ..... is a hardwood used for worktops. [1]

(iii) ..... is an example of a manufactured board. [1]

(b) (i) Complete the table by stating **two** specific properties of the materials named that make them suitable for that product. [4]

<i>Product</i>	<i>Material</i>	<i>Specific Properties</i>
 Water Bottle	Polyethylene	1. .... ..... 2. .... .....
 Electrical Wire	Copper	1. .... ..... 2. .... .....

(ii) Describe a test that would be used to check whether the tin shown below is made from a ferrous metal. [2]



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(c) Use notes and sketches to describe in detail the main stages used to finish the edge of a roughly sawn piece of acrylic. [6]

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7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.

(a) Complete the table below by adding the name or use of **each** of the following tools.

<i>Tool</i>	<i>Name</i>	<i>Use</i>
	..... [1]	This tool is used to cut straight lines in wood.
	Try Square	..... ..... ..... [2]
	..... [1]	This tool is used to mark a centre for drilling.
	Bench Hook	..... ..... ..... [2]

(b) Explain the meaning of **each** of the symbols shown below.

(i)		..... ..... [2]
(ii)		..... ..... [2]

(iii) Explain why graphic symbols are used instead of words on safety notices. [2]

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(c) When making a model for a new screwdriver handle, the designer used a smart material.

(i) From the list below **underline** the smart material used to model the screwdriver handle. [1]

Polymorph

Clay

Foam

(ii) Explain the advantages of using this smart material to model the new screwdriver handle. [3]

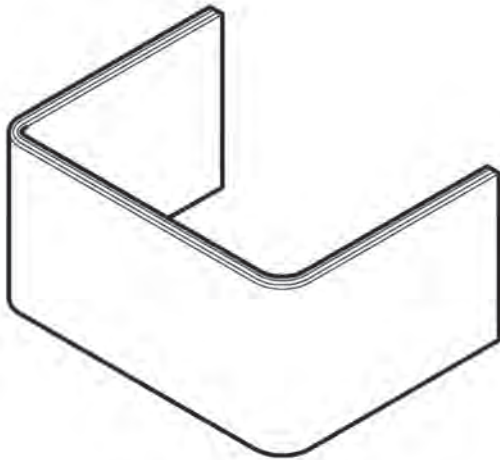
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(d) Using notes and sketches, show how you would create the wooden laminated shape shown below. [4]



8. This question is about ICT, CAD/CAM, Systems and Processes. It is worth a total of 15 marks.

(a) (i) **Underline** the correct software type used to create **each** image. [2]

<i>Clipart Animal</i>	<i>Mood Board</i>
	
<p>Bitmap Package / Vector Package</p>	<p>Bitmap Package / Vector Package</p>

(ii) Designers will often use CAM to develop a design. Give **two** advantages of using a CAM model when developing a design.

Advantage 1: ..... [2]

.....

.....

Advantage 2: ..... [2]

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(iii) Discuss the advantages of using CAM for high volume production. [3]

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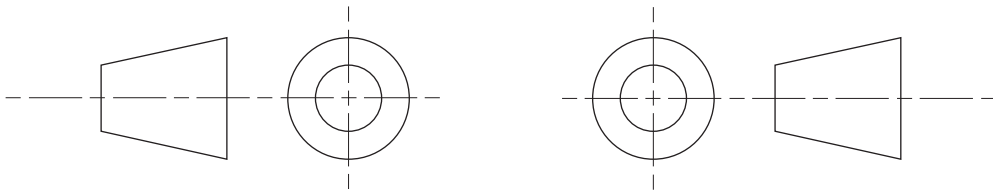
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(b) (i) **Circle** the correct symbol for Third Angle Orthographic projection. [1]



(ii) An Orthographic drawing of the item shown in the pictorial view has been started. Finish the drawing by completing both the plan and end views. [5]

*Include all hidden detail.*

