

Surname
Other Names

Centre Number

Candidate Number
0



GCSE

4111/01

DESIGN & TECHNOLOGY

UNIT 1

FOCUS AREA: RESISTANT MATERIAL TECHNOLOGY

A.M. FRIDAY, 25 May 2012

2 hours

	Leave Blank
Question 1	
Question 2	
Question 3	
Question 4	
Question 5	
Question 6	
Question 7	
Question 8	
TOTAL MARK	

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 shows a desk tidy. The desk tidy is made from injection moulded plastic and is available in a range of colours. The product costs £12.



- (a) State **two** reasons why the desk tidy is available in a range of colours. [2]

Reason 1:

Reason 2:

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

- (i) Function. [2]

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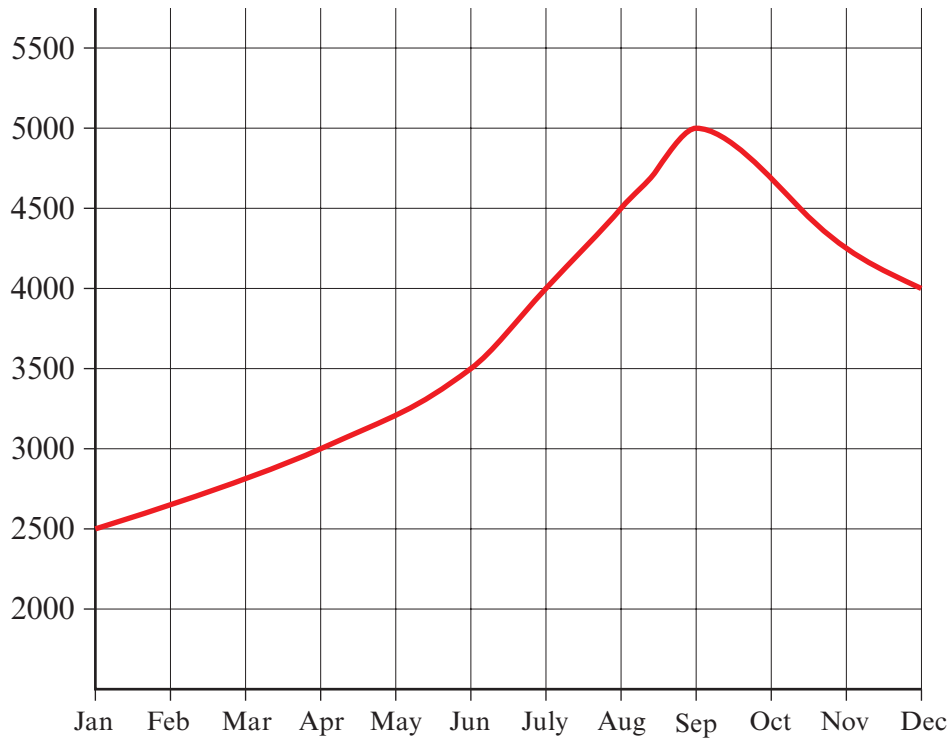
- (ii) Size. [2]

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(c) Explain the advantages of using injection moulding to make the desk tidy. [2]

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(d) The graph below shows annual sales for the desk tidy.



(i) State the month when sales were at their highest. [1]

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(ii) Calculate how many more desk tidies were sold in July than in January. [1]

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(iii) Calculate the percentage increase in sales between April and August. [2]
Show all your calculations.

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(e) Discuss the strategies that could be used by the manufacturer to stop the drop in sales of the product. [3]

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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) This question refers to the six Rs of sustainability. Name the 'R' that matches the following descriptions. [3]

<i>Name</i>	<i>Description</i>
.....	The product can be taken apart and the material used for something else.
.....	The product can be made using fewer parts.
.....	The product can be mended when it is broken.

(b) Many products we buy today have this logo on them.



(i) Name a product that would use this logo: [1]

(ii) Explain the benefits to the environment of buying a product or material with this logo. [3]

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(c) Explain what you understand by the term carbon footprint. [3]

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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 James Dyson and Ross Lovegrove.

(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 in 1947. Worked as an Art teacher. Set up his own manufacturing company.
(ii) Worked for Frog Design. Uses the shapes and forms in nature as inspiration. Works as a freelance designer for companies such as Peugeot and Mathmos.

(b) Write a short essay in the space below that describes James Dyson’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) Using the words from the list below, complete the missing stages in the design process.

Plan for Making Development Specification Evaluation

(i) [1]



(ii) [1]



(iii) [1]



(b) Explain **two** reasons why it is important to plan the manufacture of products carefully.

Reason 1: [2]

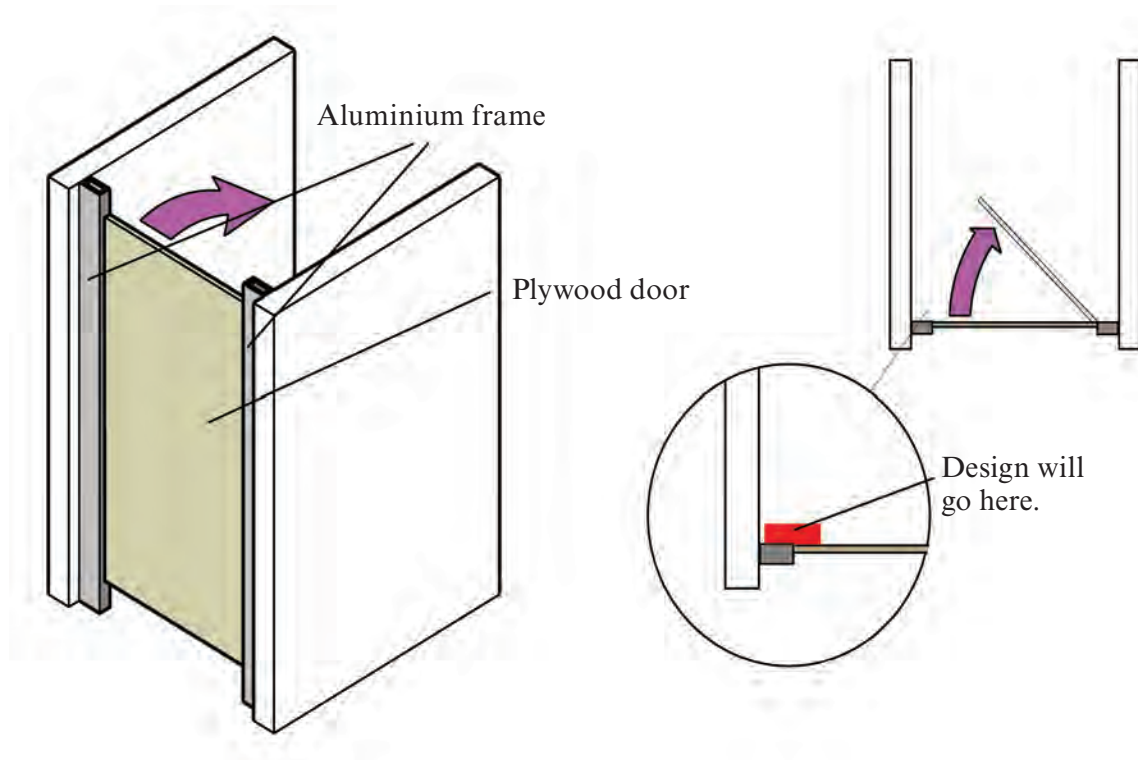
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Reason 2: [2]

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- (c) A local gym has installed new shower cubicles. You have been asked to design a means of securing the door when showering. The doors are made of 15 mm plastic coated plywood and the frame is made of aluminium box section.



Specification

The design must:

- allow the door to be secured from the inside;
- be easy to use;
- be fixed to the door and frame;
- be water resistant.

Draw **one** design for the device.

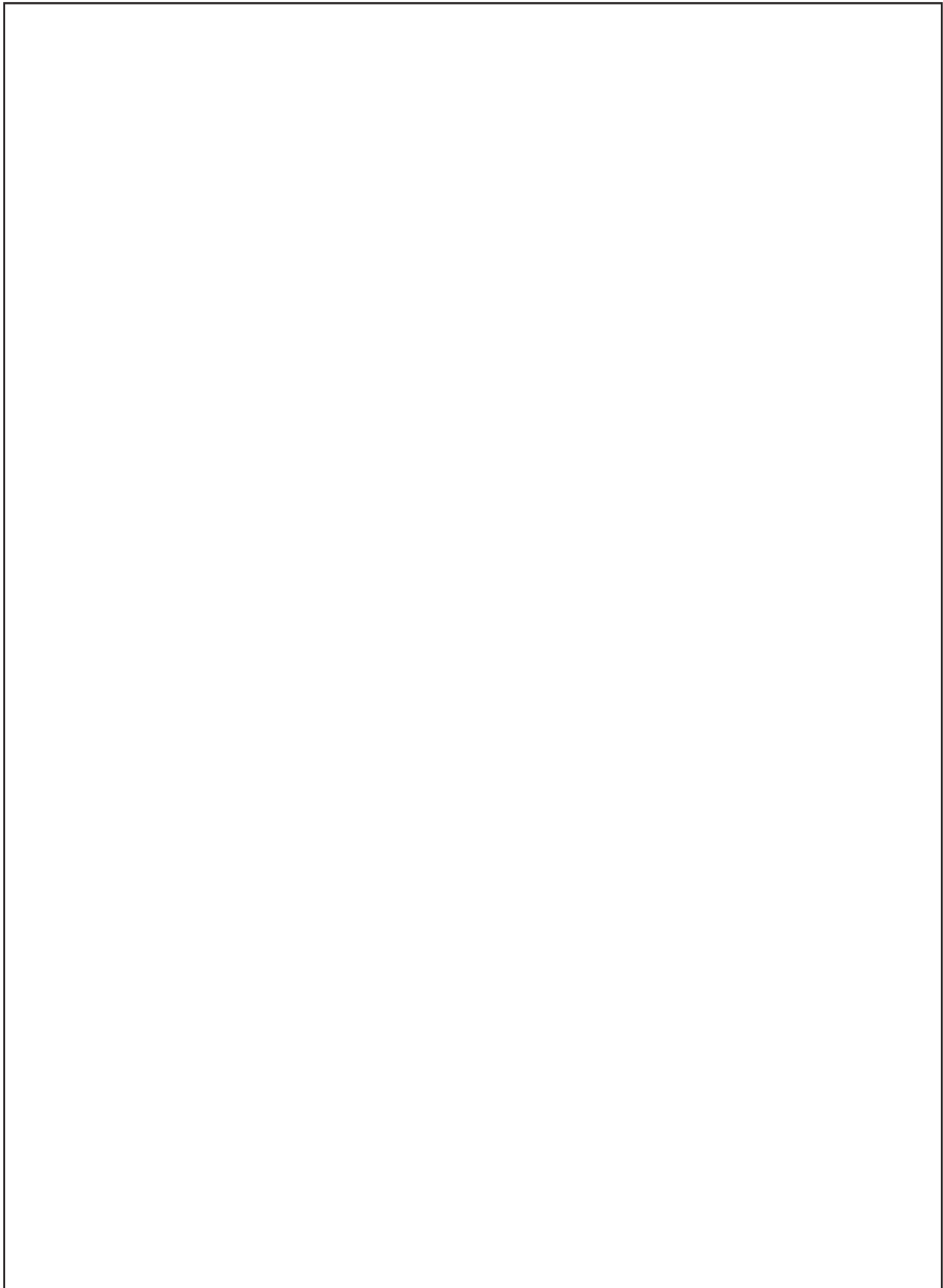
Use notes to explain your idea.

Marks will be awarded for:

- | | |
|--|-----|
| (i) showing clear details of the design and construction of the device; | [5] |
| (ii) showing how the design is easy to use; | [3] |
| (iii) showing clear details of how the design is attached to the door and frame; | [3] |
| (iv) specifying suitable materials and dimensions; | [3] |
| (v) quality of communication. | [4] |

Sketch your solution on the opposite page.

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) Place **each** of the processes shown below under the material they apply to. [4]

Spinning Compression Moulding Forging Steam Bending

<i>Wood</i>	<i>Metal</i>	<i>Plastics</i>

(b) The photograph shows an industrial vacuum forming machine.



(i) **Underline** the product that would be made on this machine. [1]

Chocolate Box Tray Hairdryer Casing Drinks Bottle

(ii) Explain why vacuum forming is a suitable process to make this product. [2]

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(c) Explain what you understand by the five (5) step risk assessment.

[3]

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

(a) Complete the table by naming a specific material that can be used to make each product. [4]

<i>Product</i>	<i>Material</i>
	<p>.....</p>
	<p>.....</p>
	<p>.....</p>
	<p>.....</p>

(b) From the list below **underline** the **two** permanent joining methods. [2]

- Screw
- Nail
- Rivet
- Nut and Bolt

(c) Name **two** heat treatment processes used on metal. [2]

- (i)
- (ii)

(d) Explain the difference between a thermoplastic and a thermosetting plastic. [3]

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(e) Before wood can be used to make most products it needs to be seasoned.

(i) Name the **two** main methods of seasoning timber.

Method 1: [1]

Method 2: [1]

(ii) Explain what you understand by the term seasoning. [2]

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

(a) Correctly name **each** of the tools shown below.

[4]

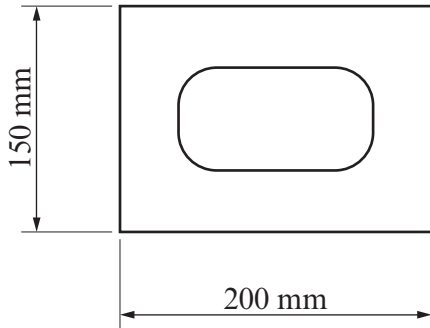
	
<p>.....</p>	<p>.....</p>
	
<p>.....</p>	<p>.....</p>

(b) Sketch the safety symbols used in the workshop for the following hazards.

[4]

<p style="text-align: center;">Wear ear protection</p>	<p style="text-align: center;">Hazardous chemicals</p>
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- (c) Using notes and sketches, explain in detail how you would manually mark out, cut and finish the internal shape in a piece of 3 mm aluminium as shown below. [5]



- (d) A group of students has been asked to produce a batch of 30 identical bird boxes to raise funds for a local charity. Discuss the advantages of using jigs, formers and templates to help manufacture the bird boxes. [3]

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- (e) Explain in detail how you would produce an M8 threaded hole in a piece of 10 mm thick mild steel plate. [4]

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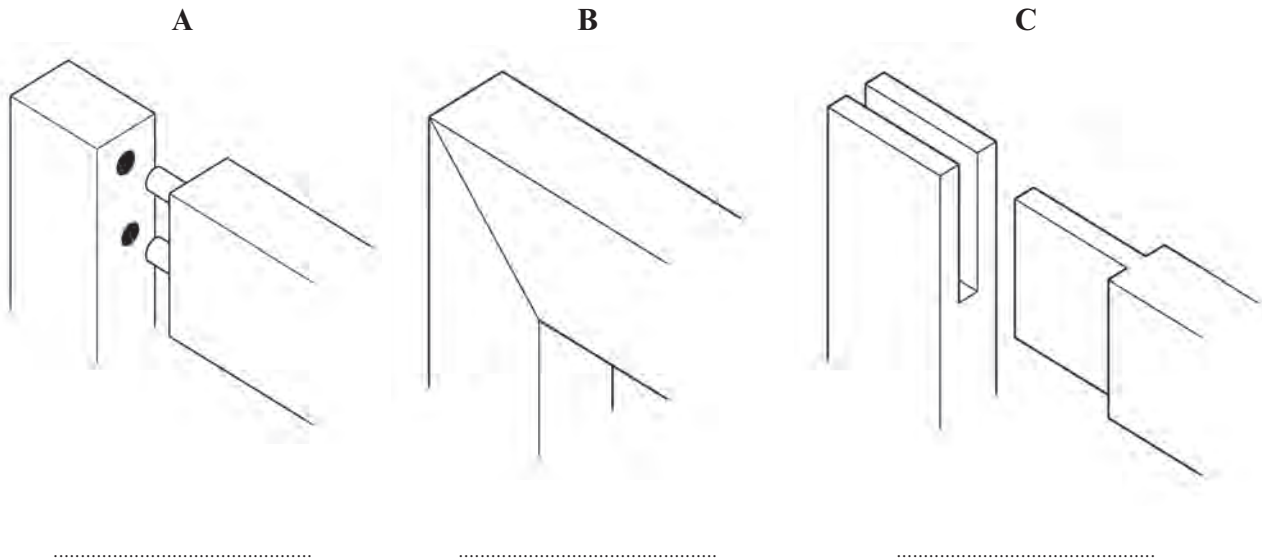
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8. This question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 marks.

(a) Place **one tick (✓)** for each adhesive to indicate whether it can be used for wood or plastic or both. [4]

<i>Adhesive</i>	<i>Wood</i>	<i>Plastic</i>	<i>Both</i>
PVA			
Contact adhesive			
Tensol			
Liquid solvent cement			

(b) (i) Correctly name the following wood joints. [3]



(ii) Explain why joint C is the strongest of the three joints above. [3]

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(c) Explain how a spreadsheet programme can be used when analysing research. [2]

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(d) Describe some important considerations when setting up a CAM router for cutting 3mm Acrylic with a 2mm cutting tool. [3]



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