

Candidate Name	Centre Number	Candidate Number
		0



**GCSE**

144/02

**DESIGN AND TECHNOLOGY**

**PAPER 2**

**FOCUS AREA: PRODUCT DESIGN**

**Foundation Tier**

A.M. MONDAY, 2 June 2008

1½ hours

	<b>Leave Blank</b>
<b>Question 1</b>	
<b>Question 2</b>	
<b>Question 3</b>	
<b>Question 4</b>	
<b>Question 5</b>	
<b>TOTAL MARK</b>	

**ADDITIONAL MATERIALS**

You will need basic drawing equipment for this examination.

**INSTRUCTIONS TO CANDIDATES**

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 the answer 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.

Answer **all** questions in the spaces provided.

1. The basic squeezable shampoo bottle shown below needs to be **redesigned for a specific target group**.



- (a) (i) **Select one** of the following target groups. **State two** design features for the new bottle.

**Children**

**Teenagers**

**Hair dressers**

The chosen target group is: .....

Design Feature 1: .....

[2]

Design Feature 2: .....

[2]

- (ii) From the list below **underline** the **two** most suitable materials that could be used to make the squeezable shampoo bottle.

**Nylon**

**HDPE**

**Acrylic**

**Polypropylene**

[2]

- (iii) From the list below **underline** the correct process used to make the bottle. [1]

**Vacuum Forming**

**Blow moulding**

**Extrusion moulding**

- (iv) Market Research is to be carried out to see how successful the redesigned bottle is. **Describe** what is meant by market research.

.....  
.....

[2]




(b) Answer the following questions either **True** or **False**.

4 × [1]

Anthropometrics is the study of human measurements.	.....
Energy is the study of people in their working environment.	.....
A mood board is a collection of pictures all about the user.	.....
Market pull is where manufacturers create consumer demand.	.....

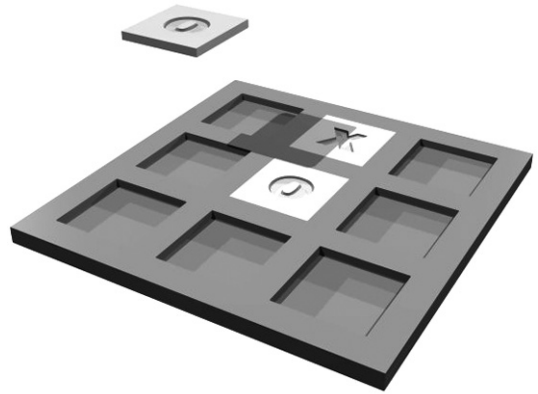
(c) The symbols shown in the table below are used on **packaging**.

**Complete** the table by explaining what each symbol means.

<i>Symbol</i>	<i>Explanation</i>
	<p>..... [2]</p> <p>.....</p> <p>.....</p>
	<p>..... [2]</p> <p>.....</p> <p>.....</p>
	<p>..... [2]</p> <p>.....</p> <p>.....</p>

2. The design for a travel game of *noughts* and *crosses* is shown.

The game is to be designed using CAD and made using CAM.



(a) (i) From the list below **underline** the most suitable sheet plastic material which could be used to make the travel game and give **two** reasons why it is suitable.

**Acrylic                  Nylon                  Urea Formaldehyde** [1]

Reason 1: ..... [1]

Reason 2: ..... [1]

(ii) **State** the meaning of CAM: Computer ..... [2]

(iii) **Complete** the table below to describe the main steps for cutting out the game on a CAM machine. [3 × 2]

<i>Stage</i>	<i>Description</i>
<b>1</b>	<b>Load the drawing onto the computer and open it in the correct program for the CAM machine.</b>
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>5</b>	<b>Run CAM machine to cut the parts.</b>

- (iv) **Describe two** advantages to the manufacturer of using CAM to produce the game. [2 × 2]

Advantage 1: .....

.....

Advantage 2: .....

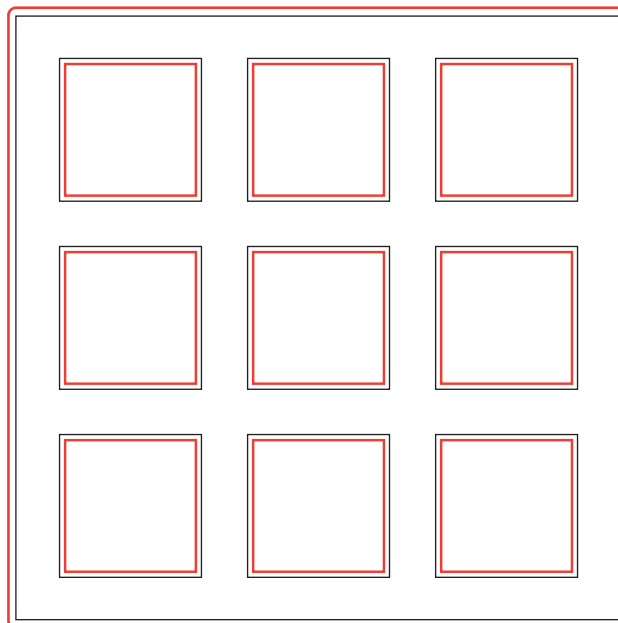
.....

- (v) The **CAM** machine shown on the right uses a 2 mm diameter cutter and is set to cut on the red lines.

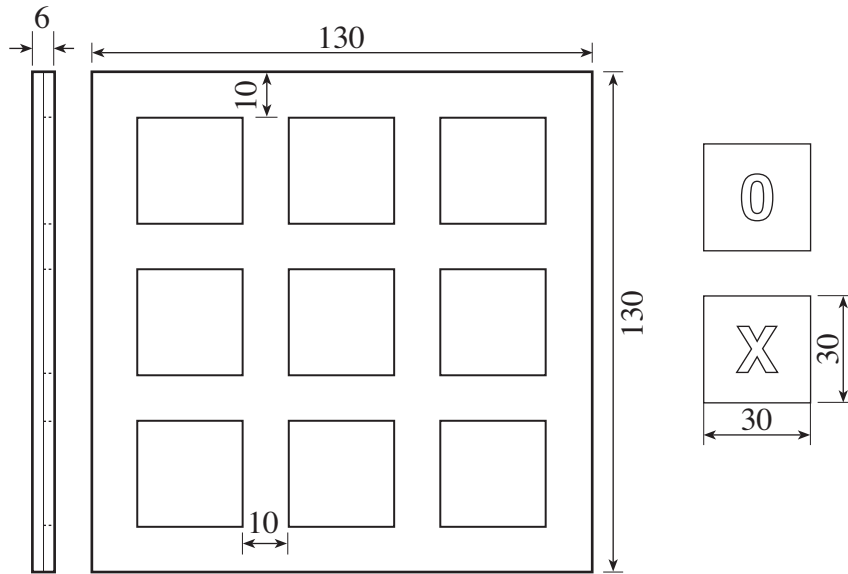


**State** the name of the red lines.

..... [2]



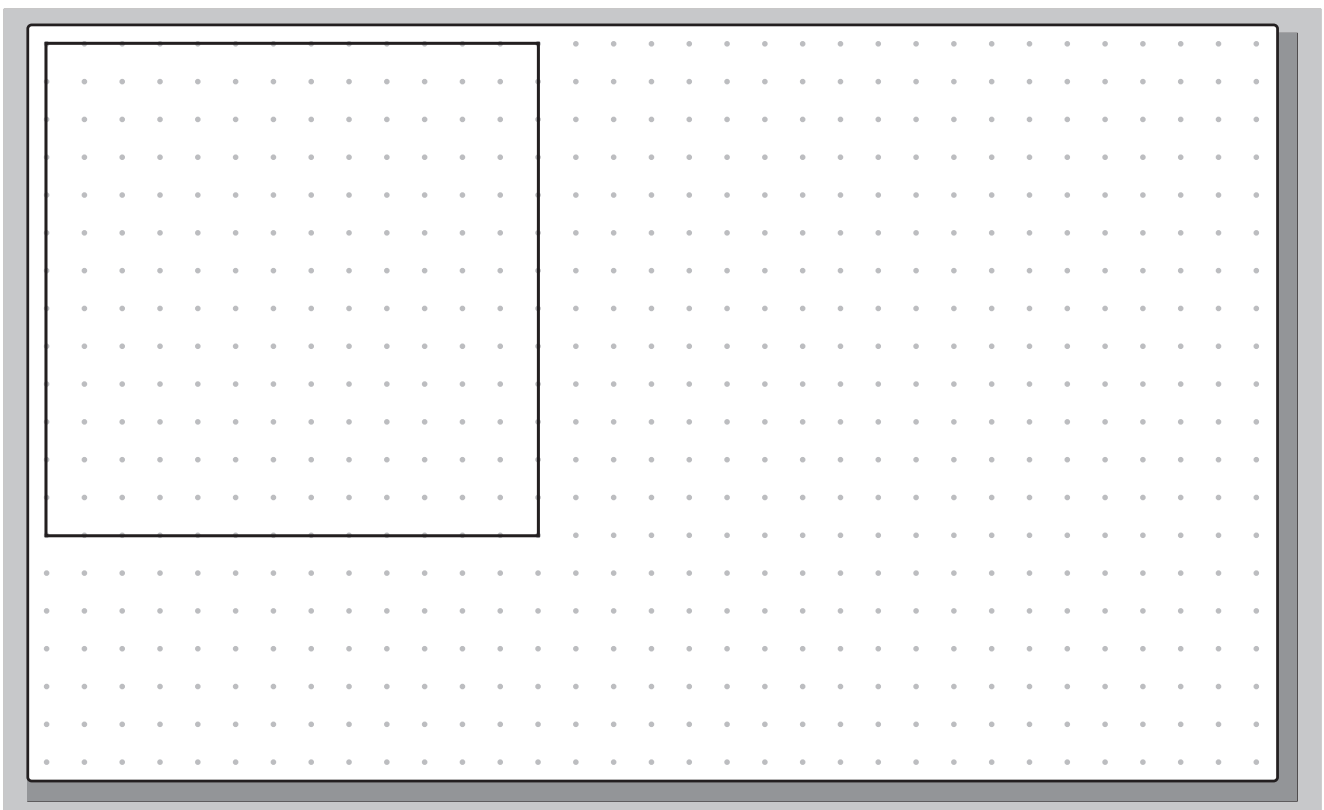
- (vi) The illustration below shows the design of the game. The game and its playing counters are made using CAM. All the dimensions are shown below.



Name any **suitable** CAM machine that could be used to cut out the game board and the playing counters.



..... [1]

- (vii) The grid below is set to 10 mm. **Accurately sketch** all the pieces needed to make the travel game. [5]



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3. **Environmental** concerns are important.  
Study the photographs and information below and answer the questions that follow.

	<p><b>Product A</b></p> <ul style="list-style-type: none"> <li>• Little packaging, display and transport packaging only.</li> <li>• Does not use plastic packaging.</li> <li>• Majority of packaging is made from renewable material.</li> </ul>
	<p><b>Product B</b></p> <ul style="list-style-type: none"> <li>• Individually packaged.</li> <li>• Uses plastic packaging.</li> <li>• Majority of packaging is made from non-renewable material.</li> </ul>

- (a) (i) The packaging for product **A** is more environmentally friendly than **B**. **State two** reasons for this. [2]

Reason 1: .....

Reason 2: .....

- (ii) The packaging for product **B** includes a plastic outer covering that protects the product.

**Underline** the process used to make this outer covering: [1]

Vacuum Forming

Injection Moulding

Laminate

- (iii) The packaging for product **A** is made from cardboard. **Explain** why this is a renewable material. [2]

.....  
.....



- (b) The photograph alongside shows a solid block model of a torch.



- (i) **State** a suitable material to make the model. [1]

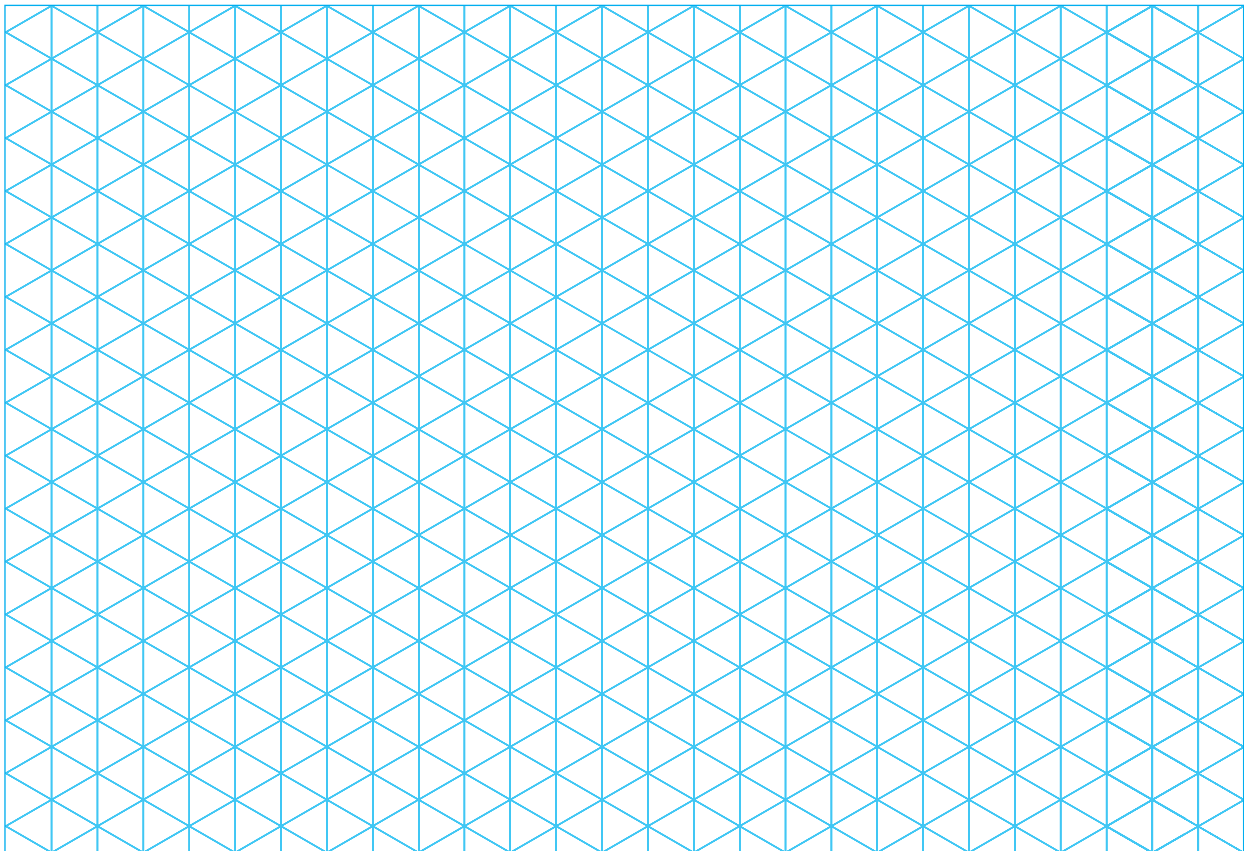
.....

- (ii) **Give one** reason why a designer would make a block model when developing a new design. [2]

.....

.....

- (c) **Use** the grid below to make isometric **sketches** of the individual parts needed to make the block model for the torch above. [6]



4. Kettles have **evolved** in design but they all have the same function. **Study** the pictures of the products shown below.



**Kettle A**



**Kettle B**

(a) (i) **State three** features that are common to both designs.

Feature 1: ..... [1]

Feature 2: ..... [1]

Feature 3: ..... [1]

(ii) **Explain** why the window shown in **Kettle B** could help the user to save energy. [2]

.....  
 .....

(b) (i) **Explain** how **Kettle B** is an improvement over **Kettle A** using the following headings:  
 2 x [2]

Function: .....

.....

Materials: .....

.....

- (ii) Kettle B makes use of a **control system**.  
**Label** the following boxes using **Input**, **Process** or **Output**. [3]

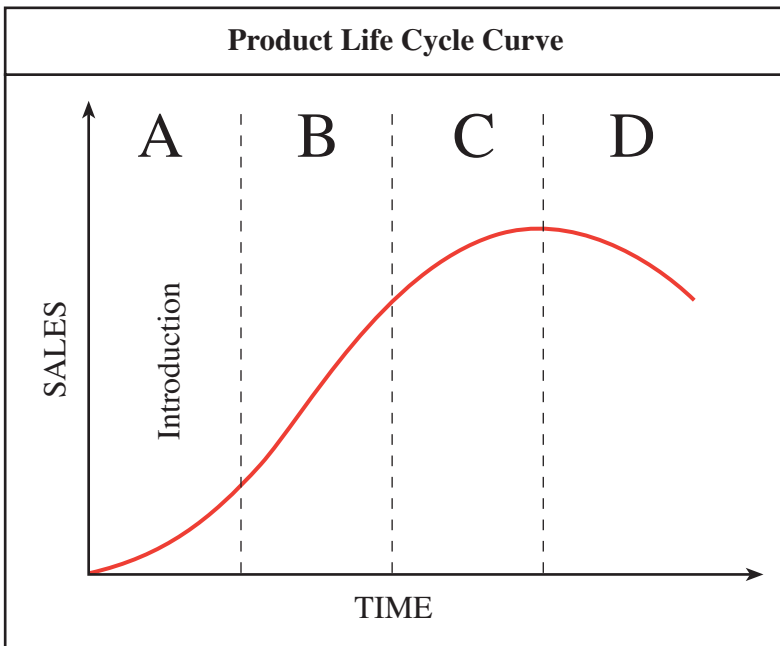
.....	Hot water / steam produced
-------	----------------------------

.....	Electrical power / water
-------	--------------------------

.....	Switch on Kettle
-------	------------------



- (c) (i) **Study** the graph below and **complete the table** to show the four stages of a product lifecycle. One has been completed for you. [3]



<b>Maturity</b>	
<b>Decline</b>	
<b>Growth</b>	
<b>Introduction</b>	<b>A</b>

- (ii) **Explain** what happens to sales in part C.

.....  
 ..... [2]

- (iii) **Explain** what happens to sales in part D.

.....  
 ..... [2]

5. A company plans to launch a compact fan that can be clipped to a flat screen monitor. The product is to be marketed under the name '**Breeze**'. You have been asked to design the new compact fan and logo. The fan will be used when you are working at a computer.

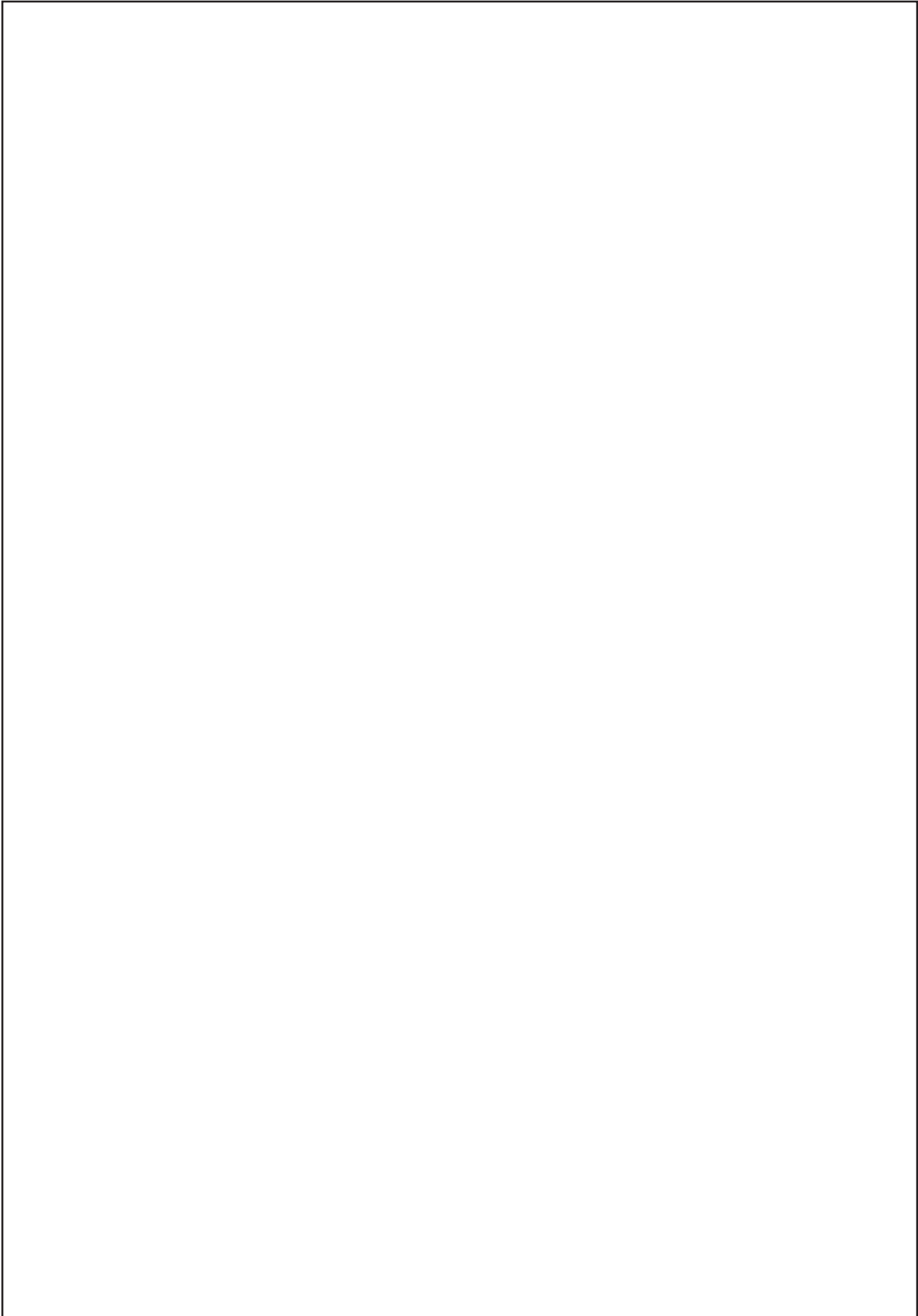
**Specification** – *Your design must:*

- be aesthetically pleasing and compact;
- clip to the monitor without causing damage;
- include a suitable logo for the 'Breeze' fan;
- be powered by a USB connection to the computer.



**Marks will be awarded for:**

- |       |  |     |
|-------|--|-----|
| (i)   | designing a logo for the fan;  | [4] |
| (ii)  | showing clear labelled sketches of your design for the fan, including construction details and material(s) used; | [6] |
| (iii) | showing clear details of the clip that holds the fan onto the monitor;   | [4] |
| (iv)  | including three important sizes;   | [3] |
| (v)   | showing how the USB cable connects to the fan;   | [2] |
| (vi)  | quality of communication including the use of colour.  | [6] |
- (a) (i) A logo is needed for the new desk fan.  
Draw **one** idea for the logo in the space below.
- (ii) **Sketch** your solution on the **opposite** page.



**For continuation only**

A series of horizontal dotted lines for handwritten notes.