

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	



General Certificate of Secondary Education
June 2010

Design and Technology: 45551 Product Design

Unit 1: Written Paper

Monday 7 June 2010 9.00 am to 11.00 am

For this paper you must have:

- a pen, a pencil, a ruler, an eraser, a pencil sharpener and coloured pencils.

Time allowed

- 2 hours

Instructions

- Use black ink or black ball-point pen. Use pencil and coloured 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.
- 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 120.
- The question in Section A relates to the context referred to in the preliminary material that was previously issued.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in Question 1 (d) and Question 5 (c).



J U N 1 0 4 5 5 5 1 0 1

There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



Section A

Answer this question.

Question 1 is about designing.

You are advised to spend about 30 minutes on this question.

1 Products are often designed with a user in mind.

Choose a target user from the list below. Circle your choice.

elderly person	teenager	young parent
toddler	male mid 20s	

Name a product you could design for the user you have chosen.

You will be asked to create a design for this product later.

Product

1 (a) Give **three different** design criteria which will make your product suitable for the user.

Give **one** reason for each design criteria.

An example is given for you.

Design Criteria	Reason
<i>Should be inexpensive to buy</i>	<i>So that a young parent can afford to buy it</i>
1
2
3

(6 marks)

Question 1 continues on the next page

Turn over ►



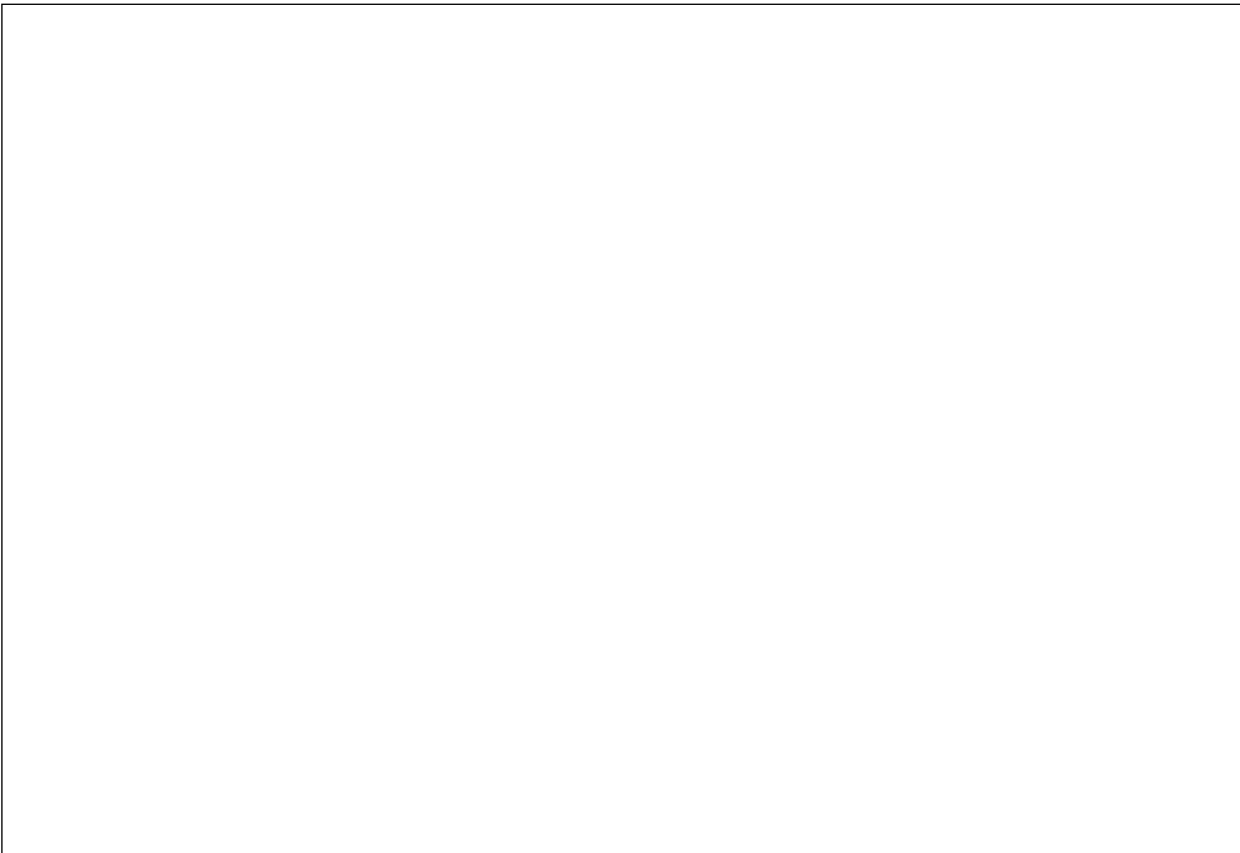
1 (b) Designers often use plants and flowers for inspiration when designing.



Create a repeat pattern based on the image board shown above.

Marks will be awarded for:

- innovative use of shapes and colour
- creative use of the image board
- showing how the pattern would be repeated.



(6 marks)



1 (c) Use your pattern from part 1 (b) to develop a design for your product.

Draw your design in the space below.

Marks will be awarded for:

- materials and construction techniques
- originality of idea
- use of the pattern designed in part (b)
- how well your design is communicated.

(12 marks)

Question 1 continues on the next page

Turn over ►



Section B

Answer **all** questions.

Question 2 is about materials.

You are advised to spend about 15 minutes on this question.

2 (a) (i) Give **three** examples of specific paper / card materials.

1

2

3

(3 marks)

2 (a) (ii) Choose **one** type of material from the list below. Circle your choice.

Give **three** specific examples of your chosen material.

Non-ferrous metals Synthetic textile fibres Hardwoods Mechanical components

Ceramics Manufactured boards Carbohydrate foods Thermoplastics

1

2

3

(3 marks)

Question 2 continues on the next page

Turn over ►



2 (b) Finishes are often applied to products.

2 (b) (i) Identify a product and a finish to be applied.

Product

Finish

(1 mark)

2 (b) (ii) Give **two** detailed reasons why a finish is applied to a product.

1

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(2 marks)

2

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.....

(2 marks)

2 (c) (i) Materials are sold in a range of standard shapes, sizes and forms.

Identify a material.

Give an example of a stock form it is available in.

Material

Stock form

(1 mark)

2 (c) (ii) Explain why materials are available in stock forms.

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(3 marks)



Question 3 is about sustainable product design.

You are advised to spend about 10 minutes on this question.

3 (a) Choose **three** words from the list below.

Explain what they mean in relation to environmental issues.

Reuse	Recycle	Reduce
Rethink	Repair	Refuse

3 (a) (i) Word 1

Explanation

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.....

.....

(2 marks)

3 (a) (ii) Word 2

Explanation

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(2 marks)

3 (a) (iii) Word 3

Explanation

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(2 marks)

Question 3 continues on the next page

Turn over ►



3 (b) Products have a carbon footprint.

<p>Games console</p> 	<p>Cotton dress</p> 	<p>Hair straighteners</p> 
<p>Dishwasher</p> 	<p>Dinner plates</p> 	<p>Soft drink</p> 

3 (b) (i) Select **one** of the products shown above.

Explain what contributes to its carbon footprint.

Product

Explanation

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(3 marks)

3 (b) (ii) Describe **two** ways to reduce a product's carbon footprint.

1

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(2 marks)

2

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(2 marks)



Question 4 is about manufacturing products.

You are advised to spend about 25 minutes on this question.

4 A Design and Technology teacher wants to teach the topic 'batch production'. Students will work in teams and each team will make 200 identical products.

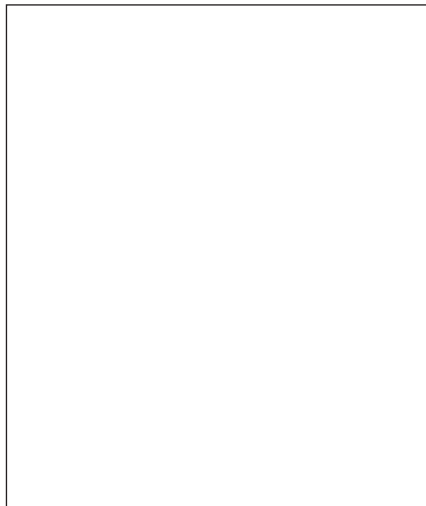
4 (a) Circle **one** of the following products.

chocolate shapes	greetings card and envelope
badge	juggling balls
pendant	LED key fob

In the box below show a simple sketch of the product to be made.

You will be asked to describe how the students will manufacture the product later in the question.

Marks will be awarded for the feasibility and quality of communication.



(4 marks)

4 (b) (i) Name a suitable main material for your product.

.....
(1 mark)

4 (b) (ii) Explain why the material you have chosen is suitable for this scale of production.

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(2 marks)

Question 4 continues on the next page

Turn over ►



4 (c) Draw a flowchart to show how your product would be made.

You should include quality control checks at each stage of manufacture.



(8 marks)



4 (d) Students will work in teams and each team will make 200 identical products.

In the space below, draw a layout to show how the production of your product would be organised.

Marks will be awarded for:

- feasible layout and order of processes
- identification of tools and equipment
- quality of communication.



(10 marks)

25

Turn over ►



Question 5 is about product evolution.

You are advised to spend about 20 minutes on this question.

5 Clothes irons have changed over the years.



5 (a) Identify **two** different design features from the pictures shown above to explain how irons have changed over time.

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(4 marks)



5 (b) The international ‘three dot’ code was introduced in the 1960s to label the heat settings on an iron thermostat.



Explain the benefits of the code to both the user and the manufacturer.

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(4 marks)

Question 5 continues on the next page

Turn over ►



- 5 (d)** Products often require maintenance by the user to keep them working properly.
On the picture below, label **two** parts of the iron which require maintenance.
Add notes to describe what the user should do.



(4 marks)

20

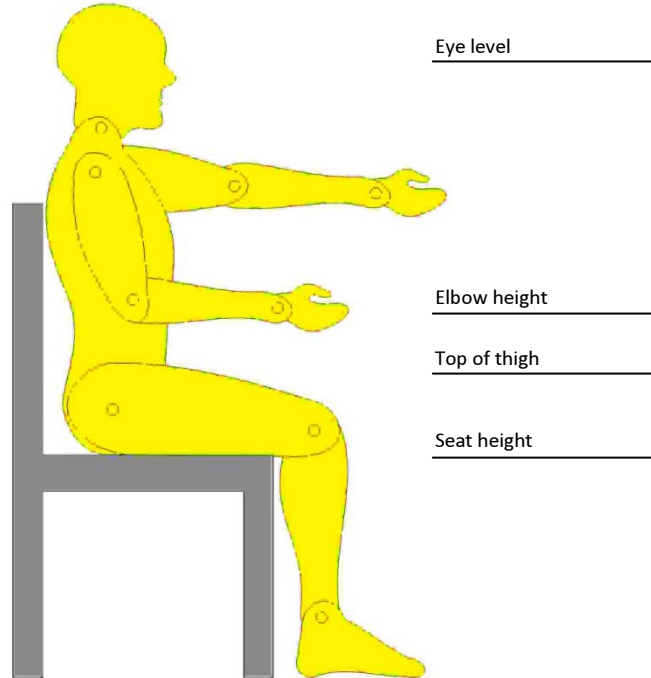
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Question 6 is about human factors in design.

You are advised to spend about 10 minutes on this question.

6 The diagram below shows anthropometric data used by furniture designers.



	Men			Women		
	5%	50%	95%	5%	50%	95%
Eye level	1173	1229	1326	1042	1131	1223
Elbow height	0583	0669	0750	0533	0614	0694
Top of thigh	0515	0559	0605	0474	0513	0558
Seat height	0395	0434	0476	0352	0388	0428

6 (a) (i) What is anthropometric data?

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(2 marks)

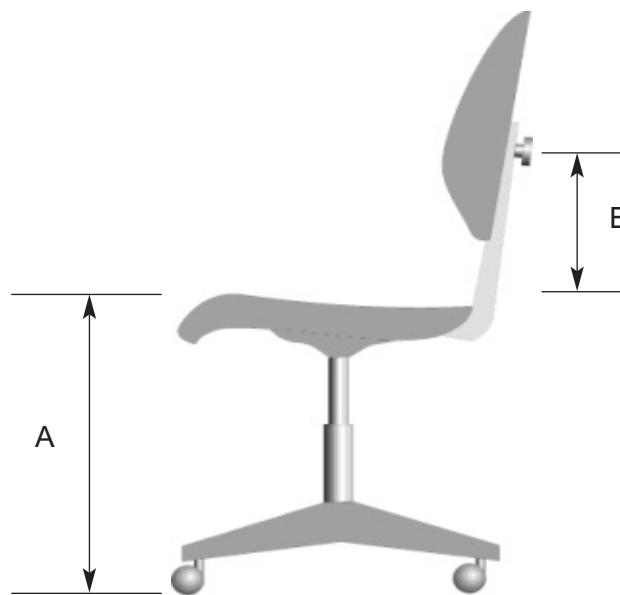


6 (a) (ii) Explain why the range 5th to 95th percentile in relation to anthropometric data is important when designing.

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(3 marks)

6 (b) The chair shown below can be adjusted to suit the user.



6 (b) (i) Explain how each adjustment could help the user to work more effectively at a desk.

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(3 marks)

6 (b) (ii) Using the data in the table opposite, give the range of measurements needed for dimension A shown in the above diagram.

Minimum

Maximum

(2 marks)

10

Turn over ►



Question 7 is about the history of design.

You are advised to spend about 10 minutes on this question.

7 Design Movements have been very influential over the last century.

7 (a) (i) Name a Design Movement.

..... (1 mark)

7 (a) (ii) Describe **two** features which are common to work from your chosen Design Movement.

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..... (2 marks)

7 (b) Explain the term *iconic design*.

Use examples of iconic products in your answer.

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..... (4 marks)

END OF QUESTIONS

7

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