

Surname					Other Names				
Centre Number					Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
June 2007

**DESIGN AND TECHNOLOGY
(PRODUCT DESIGN)
Written Paper
Higher Tier**

**3544/H
H**



Friday 25 May 2007 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 blue or black ink or ball-point pen. Use pencil and coloured pencils only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The maximum mark for this paper is 125.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use			
Question	Mark	Question	Mark
1		5	
2		6	
3		7	
4			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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

Question 1 is about materials.

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

1 (a) The table below shows different types of material.

Choose **two** types of material and complete the row. (You should only complete **two** rows.)

The first material in each row has been completed for you.

Type of material		Material name 1 (Examples)	Material name 2	Material name 3	Material name 4
Paper/Card	⇒	Duplex board			
Timber	⇒	Oak			
Metal	⇒	Copper			
Plastic	⇒	Acrylic			
Ceramic	⇒	Stoneware			
Food	⇒	Cereal			
Textiles	⇒	Wool			

(6 marks)

(b) (i) Name a material and a product you could make from this material.

Name of material

Name of product

(1 mark)

(ii) Explain how you can protect the material you have named from degrading over time.

.....

(2 marks)

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

Choose **two** of the materials shown below.

Draw a line to link your chosen material with the correct description.

An example has been completed for you.

Material	Description
Metal	A3, thickness, weight and colour
Textiles	Rough sawn, PSE, sheet size and mouldings
Paper/Card	Sheet, rod, bar, and tube
Timber	Granules, sheet, rod, powder and foam
Food	Slip, body, pigment and oxides
Plastic	Roll width, linear metre, weight and ply
Ceramic	Fresh, frozen, dehydrated, liquid and canned

(2 marks)

Turn over ►

(b) There are benefits in re-using a product (or part of it) rather than recycling the materials.

(i) Give an example of such a product or product parts.

.....
(1 mark)

(ii) Explain what the benefits might be.

.....
.....
.....
.....
(3 marks)

(c) Some products have a limited life span.

Using a specific example, explain what this means.

.....
.....
.....
.....
(3 marks)

Turn over for the next question

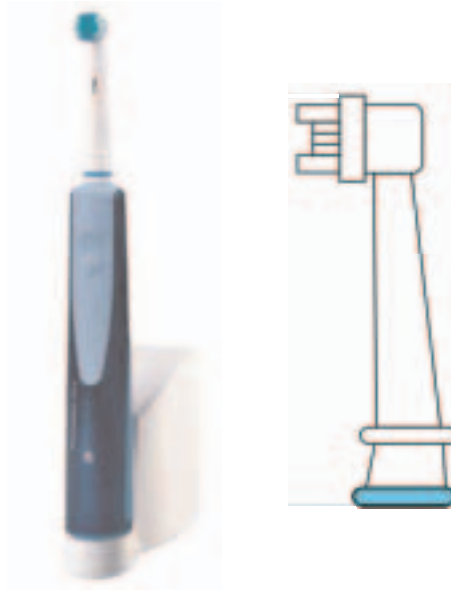
Turn over ►

Question 3 is about product analysis and packaging.

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

3 A rechargeable electric toothbrush and a replacement brush head are shown in **Figure 1**.

Figure 1



(a) (i) Explain, in detail, the advantages of using a rechargeable electric toothbrush.

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

(3 marks)

(ii) Explain, in detail, the disadvantages of using a rechargeable electric toothbrush.

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

(3 marks)

(b) The replacement head for the rechargeable electric toothbrush is a push-pull fitting.

The user instructions are in three stages.

Use diagrams to complete the following user instructions.

Changing a brush head – user instructions	
<p>Stage 1</p> <p>Hold the body of the electric toothbrush.</p> <p>Pull the replacement head away from the toothbrush body.</p>	<p>Add diagram</p>
<p>Stage 2</p> <p>Clean the body of the electric toothbrush.</p>	<p>Add diagram</p>
<p>Stage 3</p> <p>Hold the body of the electric toothbrush.</p> <p>Correctly align the replacement head.</p> <p>Push into the body of the electric toothbrush.</p>	<p>Add diagram</p>

(6 marks)

Question 3 continues on the next page

Turn over ►

(c) A replacement brush head for a rechargeable electric toothbrush is shown in **Figure 2**.

Packaging is needed for the replacement brush heads.

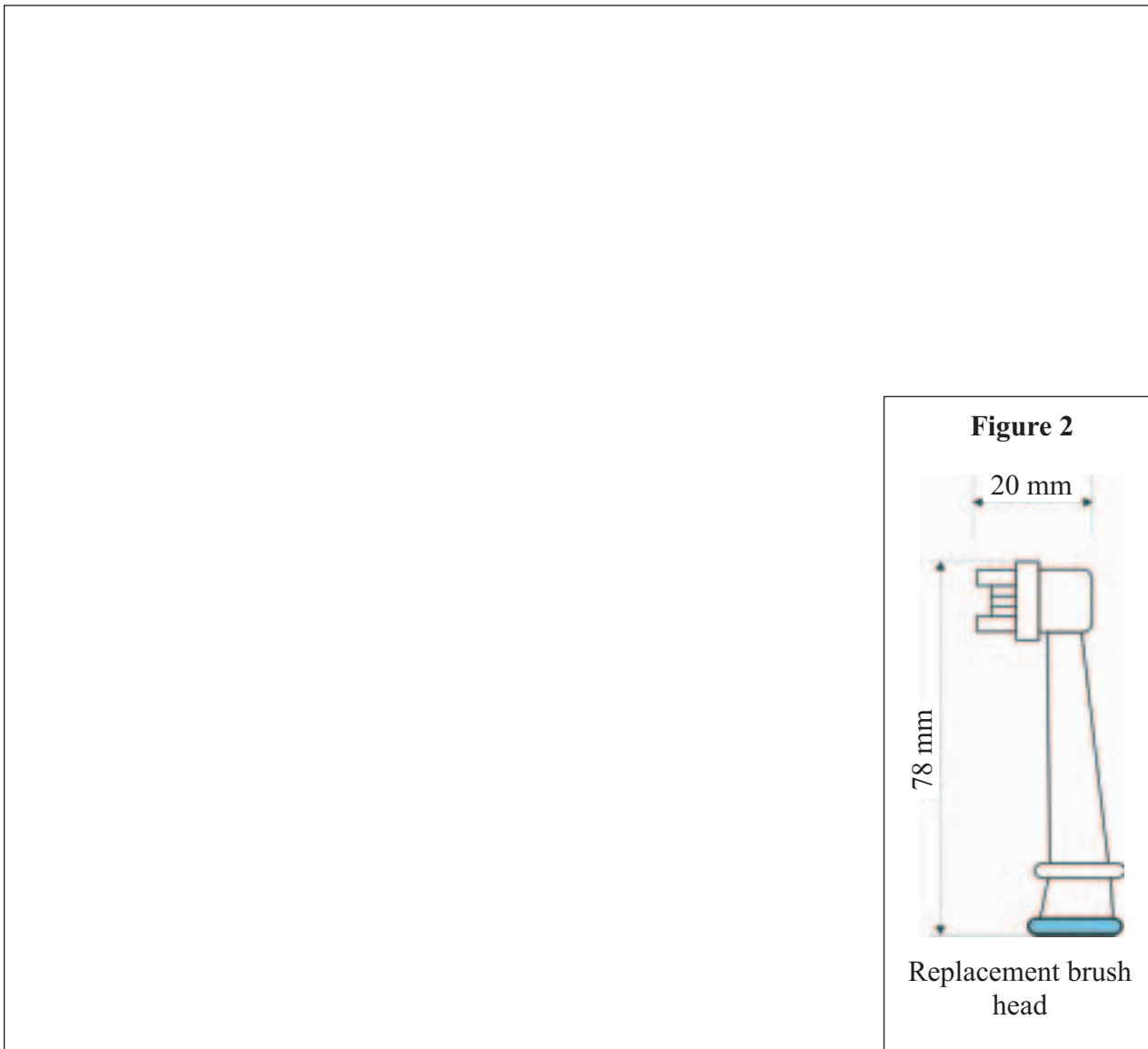
This should be mainly produced from card.

Draw a suitable package, full size, which can be hung on a rack in a supermarket and hold four replacement brush heads.

The replacement brush heads should be visible but sealed for hygiene reasons.

Use the following checklist to help you to add notes to your drawings to explain,

- how the packaging will be hung *(2 marks)*
- where the name and company logo will be printed *(1 mark)*
- where the instructions will be printed *(1 mark)*
- what other specialist materials will be used *(2 marks)*
- how the replacement heads will be visible. *(2 marks)*



(d) In the box below show clearly how you include the following requirements;

- how the packaging will be sealed for hygiene reasons *(1 mark)*
- what printing method will be used *(1 mark)*
- how the card part of the package will be cut out. *(2 marks)*



Question 4 is about similar products with different functions.

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

4 The range of footwear shown below has different uses.

A – Wellington boot



B – Beach shoe



C – Evening shoe



D – Sports shoe



(a) Choose **two** of the above products and describe the type of consumer that would be attracted to the chosen product.

In each case give reasons why the chosen product would be suitable.

(i) Footwear selected

Type of consumer

.....

.....

(2 marks)

(ii) Reasons

.....

.....

(2 marks)

(iii) Footwear selected

Type of consumer

.....

.....

(2 marks)

(iv) Reasons

.....

.....

(2 marks)

(b) In the development of the product a shoe manufacturer will use anthropometric data.
Explain how anthropometric data helps to improve the product.

.....

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(3 marks)

(c) Footwear products from a single company are often manufactured in many different countries.

(i) Explain the advantages of this type of production.

.....

.....

.....

(2 marks)

(ii) Explain the disadvantages of this type of production.

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(2 marks)

Question 5 is about the manufacture of new products.

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

- 5 Your Headteacher has asked the Design and Technology department (Food, Textiles, Resistant Materials, Graphics, Electronics and Ceramics) to make a number of Christmas tree decorations for the school Christmas fayre.

The decorations will be sold in packs of three.

Two shapes have already been chosen.

You are required to design the third shape, which must be easily produced in a batch of 500.

- (a) Add your shape in the box below to complete the pack.



(3 marks)

- (b) (i) Choose a suitable material to make the Christmas tree decorations.

.....
 (1 mark)

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

.....

 (2 marks)

- (iii) Explain what finishing methods may be used.

.....

 (2 marks)

- (c) Use notes and sketches to explain how you would make 500 packs of the Christmas tree decorations.

Marks will be awarded for:

- (i) an accurate description of each stage of the production process *(4 marks)*
- (ii) correct naming of tools and equipment *(3 marks)*
- (iii) ensuring all 500 packs are the same *(3 marks)*
- (iv) quality of communication. *(3 marks)*

Use the space below to complete your answer.

Tools and equipment

Question 5 continues on the next page

Turn over ►

- (d) Using notes and sketches design a method of attaching the Christmas tree decorations to a tree.

(3 marks)

- (e) Explain the procedures you would put in place to ensure that all the decorations are of suitable quality for sale at the Christmas fayre.

.....

.....

.....

(3 marks)

- (f) Explain what safety issues you would need to consider to ensure that the students involved in the production of the Christmas tree decorations are not put at risk.

.....

.....

.....

(3 marks)

Turn over for the next question

Turn over ►

Question 6 is about the style of products.

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

6 Many successful products remain popular for long periods of time.

Some examples are shown below.



Reproduced by kind permission of Dyson Ltd.



(a) With reference to **one** of the products shown above explain why it has become successful.

.....

.....

.....

.....

.....

.....

(3 marks)

(b) Designers have developed an approach to designing called Retro Design.

Some examples of this are shown below.



(i) Explain what qualities a product should have to become a Retro product.

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(3 marks)

(ii) Explain the qualities of a Classic design or a design movement you have studied.

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.....

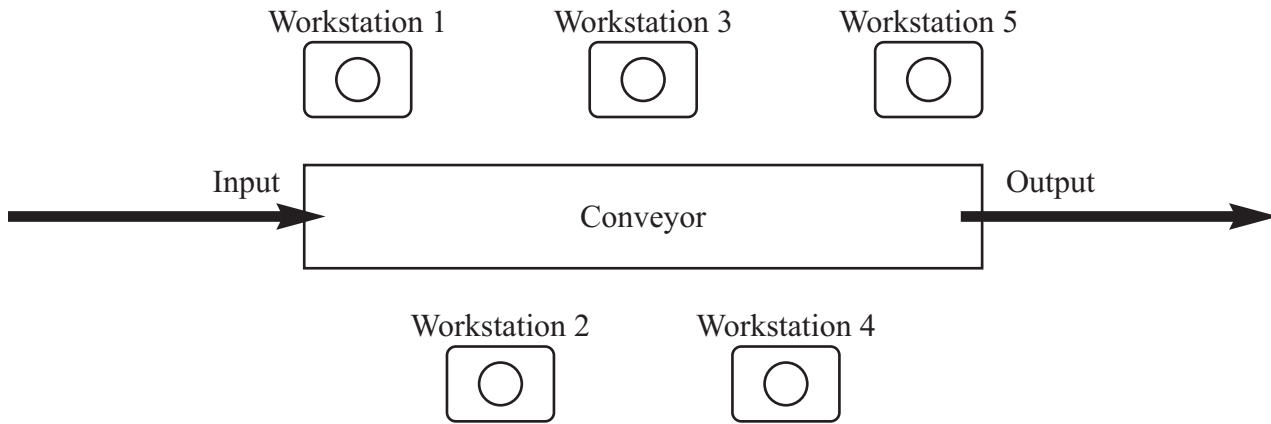
(3 marks)

Turn over ►

Question 7 is about the organisation of people and production.

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

7 (a) The diagram below shows an assembly line system.



(i) Explain the principles of an assembly line system.

.....

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(2 marks)

(ii) Explain the disadvantages to the assembly line workers of this system.

.....

.....

.....

(2 marks)

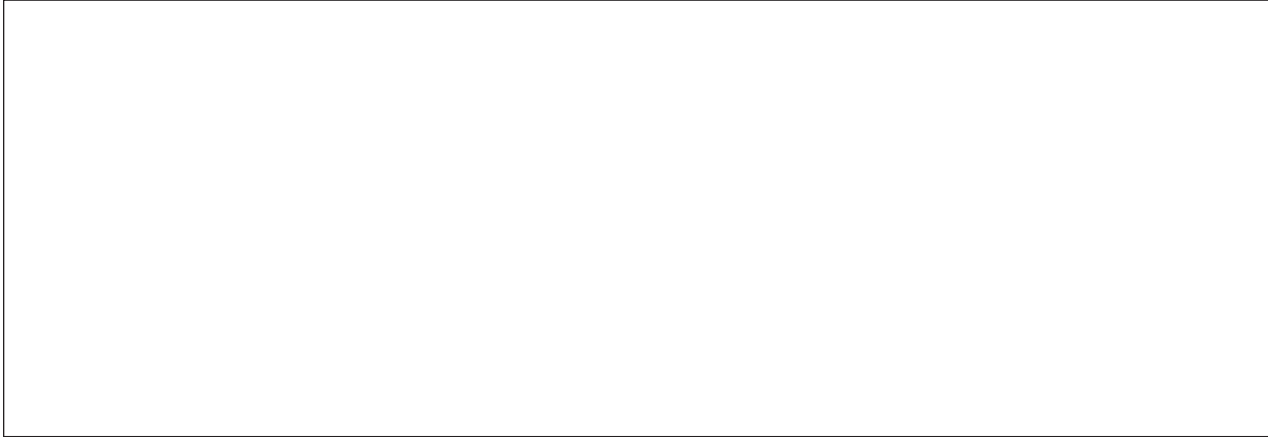
(b) Circle one of the following products.

- Pizza
- Board game
- Clock
- Cushion
- Mirror
- Dish

Using notes and sketches draw your selected product and describe how you would assemble this product.

The product should be able to be assembled in a school technology room and have at least **four** stages of assembly.

(i) Sketch your selected product and add notes to explain the separate parts.



(3 marks)

(ii) Using notes and sketches show how you would assemble your selected product.
If your product has more than four stages of assembly, you should only show the first four stages.

Stage 1




Stage 2



Stage 3



Stage 4



(4 × 2 marks)

Turn over ►

(c) Choose **two** of the following manufacturing terms.

Explain what they mean.

- Just in time
- Batch production
- Continuous production
- Quality assurance
- Tolerances
- HACCP

(i) Chosen term 1

Explanation

.....

.....

.....

(3 marks)

(ii) Chosen term 2

Explanation

.....

.....

.....

(3 marks)

(d) (i) What does the term CNC mean?

.....

(1 mark)

(ii) Explain how CNC could be used.

.....

.....

.....

(3 marks)

END OF QUESTIONS

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