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General Certificate of Secondary Education
 Summer 2003
 Higher Tier



**DESIGN AND TECHNOLOGY
 (PRODUCT DESIGN)**

**3544/H
 H**

Thursday 19 June 2003 1.30 pm to 3.30 pm

In addition to this paper you will require:

- blue or black pen, pencil, coloured pencils and ruler;
- a colour Insert Sheet (enclosed).

| For Examiner's Use | |
|---------------------|------|
| Number | Mark |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| TOTAL | |
| Examiner's initials | |

Time allowed: 2 hours

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Use the Insert Sheet included to help you answer the questions.
- Do all rough work in this book. Cross through any work you do not want marked.

Information

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

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

Question 1 is about research methods.

You should spend about 8 minutes on this question.

1 A new charity has been started to promote personal Health and Wellbeing. The charity will raise funds by selling products as shown on the enclosed colour Insert Sheet.

- (i) Name **three** different ways of researching suitable products for sale in the new charity shop.
- (ii) State how you would carry out this type of research.
- (iii) Explain why you have chosen it.

At least **one** of your answers must involve the use of a computer.

(a) Research method 1

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(3 marks)

(b) Research method 2

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.....

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(3 marks)

(c) Research method 3

.....

.....

.....

(3 marks)

Question 2 is about the properties of materials, components and processes.

You should spend about 15 minutes on this question.

- 2 All of the items on the colour Insert Sheet are associated with the new charity formed to promote personal Health and Wellbeing. Choose any **two** products that reflect the material areas you have studied.

Complete the table to describe the products.

| Name of products | 1 | 2 |
|--|---|---|
| (a) Name the specific materials or ingredients used for each product. | <i>(2 marks)</i> | <i>(2 marks)</i> |
| (b) Describe the properties or nutritional values of the materials or ingredients. | <i>(3 marks)</i> | <i>(3 marks)</i> |
| (c) State one advantage or disadvantage with regard to environmental or health issues associated with each product. | <i>(2 marks)</i> | <i>(2 marks)</i> |
| (d) What is the typical scale of production of this product? | <i>(1 mark)</i> | <i>(1 mark)</i> |

Turn over ►

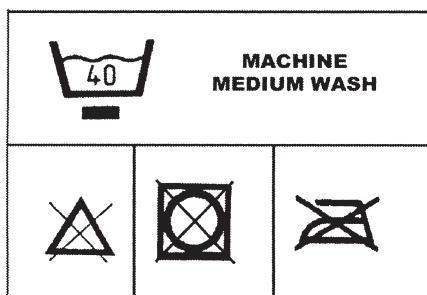
Question 3 is about consumer protection.

You should spend about 10 minutes on this question.

- 3 (a) Give the name of a method for protecting ideas from being copied.

.....
(1 mark)

- (b) The label from a pair of sports shorts is shown below.



- (i) Why does consumer protection legislation state that the manufacturer must include labelling of this type?

.....
.....
(2 marks)

- (ii) State **two** pieces of information that can be obtained from it.

1

.....

2

.....
(2 marks)

(c) The CD rack (**Figure 8**) has a BSI mark.

(i) What do the letters BSI stand for?

.....
(2 marks)

(ii) What would the manufacturer of the CD rack gain by having the BSI symbol on the product?

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

(iii) What would the manufacturer have to do to be able to put the BSI symbol on the product?

.....
.....
(2 marks)

12

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 4 is about manufacturing processes.

You should spend about 20 minutes on this question.

4 In this question you are required to choose **one** of the products from the colour Insert Sheet and describe how you would make a prototype of the product.

(a) What is meant by the term *prototype*?

.....
(1 mark)

(b) Name **three** production stages.

1
2
3
(3 marks)

(c) Using notes and sketches complete your description in the boxes provided.

Marks will be awarded for

Clarity of notes and the correct naming of equipment (6 marks)

Explanation and correct sequence of making processes. (8 marks)



- (d) Explain the health and safety precautions which should be taken using the equipment you have named when making the prototype.

.....

.....

.....

.....

(4 marks)

Turn over ►

Question 5 is about packaging of products.

You should spend about 13 minutes on this question.

- 5 (a) Give **three** reasons for the packaging of products.

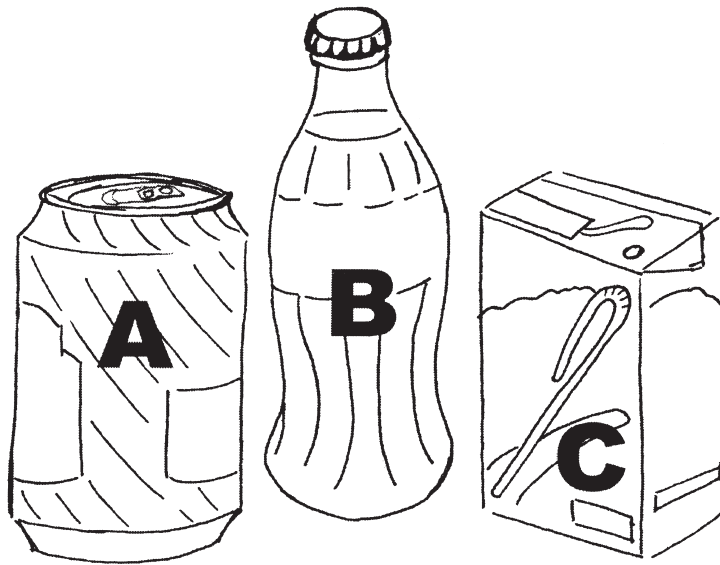
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.....

(3 marks)

- (b) The sketches below show drink packaging using a number of different materials.



(i) The large scale production of packaging creates environmental problems.

Identify **two** problems created by drinks packaging.

Explain how these problems may be solved.

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

(6 marks)

(ii) The packaging for Product C is made from composite material. Explain what composite material is and why it is used when packaging food products.

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

(4 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 6 is about the design of new products.

You should spend about 22 minutes on this question.

- 6** (a) From the colour Insert Sheet choose **one** product and use notes and sketches to show an initial idea for its packaging.

Marks will be awarded for

Quality of idea (3 marks)

Quality of notes (4 marks)

Quality of sketches (3 marks)

In part (b) of this question you will be asked to produce a surface development (net).

Initial Idea

- (b) Certain information needs to be shown on this packaging. In the space below, draw a surface development (net) of your final idea showing this information. Use notes to identify vital information.

Marks will be awarded for

Quality of drawing (7 marks)

Correct information (4 marks)

Final Idea



Turn over ►

Question 7 is about manufacturing systems and the environment.

You should spend about 16 minutes on this question.

7 Computer aided design (CAD) and computer aided manufacture (CAM) are now commonly used in the production of packaging.

(a) Name **three** processes that can be completed more easily during the design stage of packaging production, using CAD.

1

2

3

(3 marks)

(b) Give **two** examples with reasons, to explain how CAM is used in the production of packaging.

1

.....

2

.....

(4 marks)

- (c) Energy use is an important factor for manufacturing industry to consider as it is an additional cost, both financially and environmentally.

Name **two** examples of renewable energy sources and state the advantages and disadvantages of their use.

1

.....

.....

.....

.....

2

.....

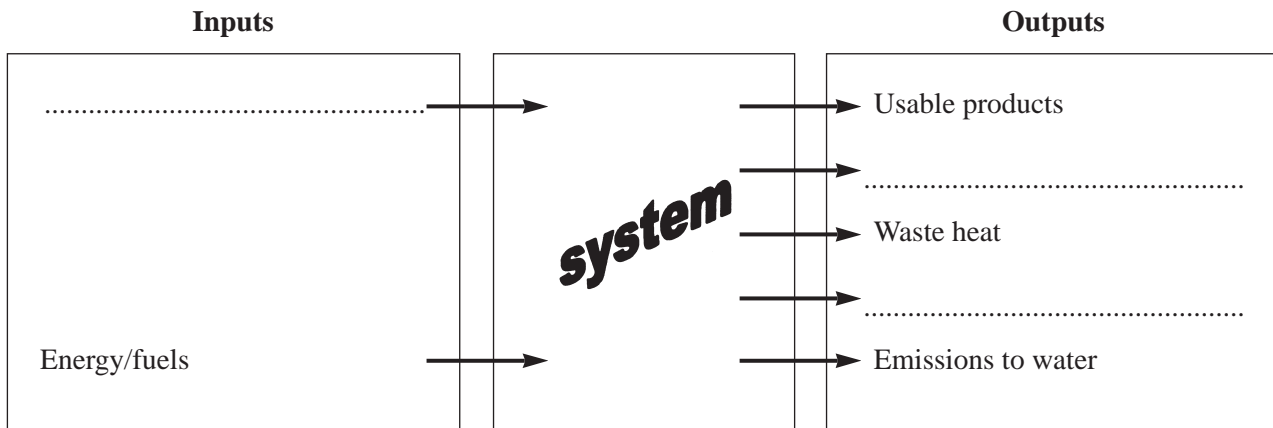
.....

.....

(6 marks)

- (d) The diagram below shows an environmental impact analysis for the production of packaging.

Complete the diagram by adding the missing inputs and outputs.



(3 marks)

Question 8 is about designing and evaluating.

You should spend about 16 minutes on this question.

8 The charity is to open its first ‘Health and Wellbeing’ charity shop.

The floor plan of the premises that are to be used by the charity is shown on page 15.

(a) Given below are two factors that need to be considered in the design of the charity shop.

- Range of goods to be sold.
- Easy movement of customers around the displays.

List another **four**.

.....

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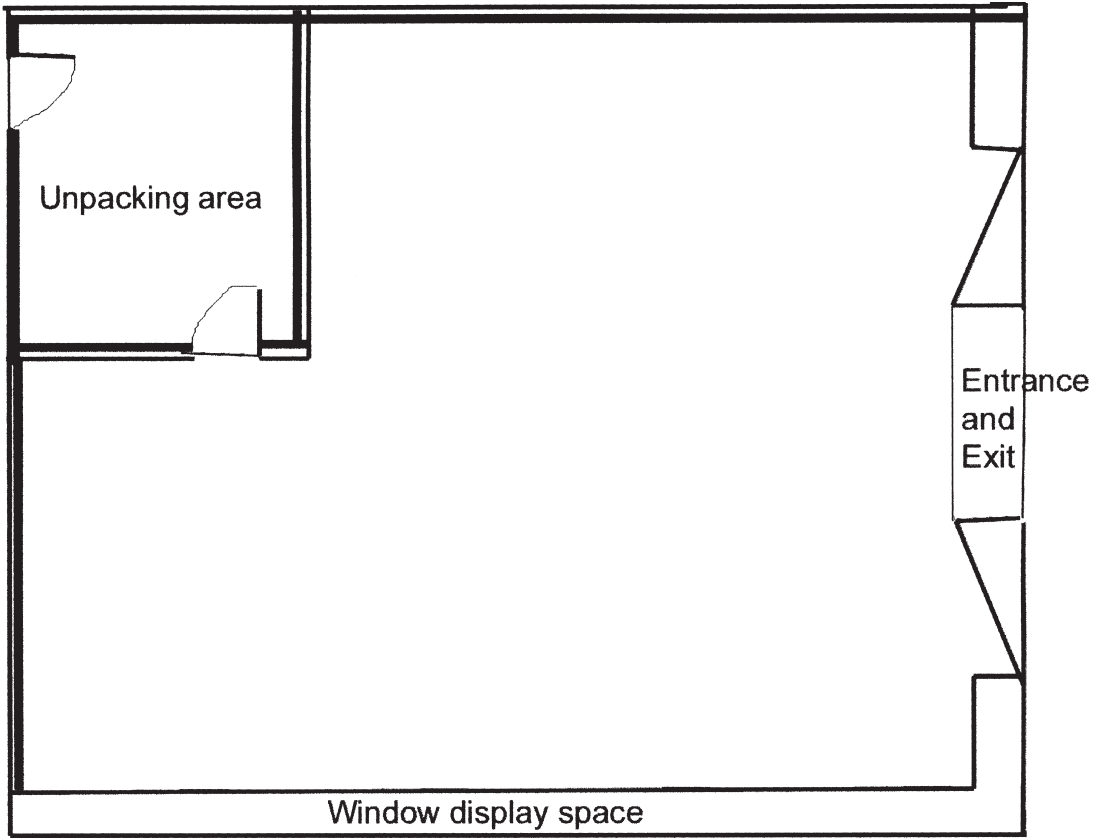
.....

.....

(4 marks)

(b) Use the shopfittings below to arrange a layout of the shop on the plan drawing.

| Shop fittings to be used on the plan | |
|---|---|
| <p style="text-align: center;">Use as many of these units as appropriate</p> <div style="border: 1px solid black; width: 80%; margin: 10px auto; padding: 5px; text-align: center;">Low level display unit</div> <div style="border: 1px solid black; width: 80%; margin: 10px auto; padding: 5px; text-align: center;">Full height shelving unit</div> | <p style="text-align: center;">Use only the number of units shown</p> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; text-align: center;">Cash desk</div> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; text-align: center;">Cash desk</div> <div style="border: 1px solid black; width: 40px; height: 100px; display: flex; align-items: center; justify-content: center; text-align: center;">Textile display unit</div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; text-align: center;">Security camera</div> <div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; text-align: center;">Security camera</div> </div> |



(8 marks)

(c) When you have completed your plan, explain your reasons for the placement of the fittings.

.....

.....

.....

.....

.....

.....

(4 marks)

END OF QUESTIONS

Design and Technology: Product Design - Higher Tier

The photographs on this sheet are for use in answering:

Questions 2, 3, 4 and 6



Figure 4 Reproduced with the kind permission of Chris Ostwald.

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