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| Surname | | | | | | Other Names | | | | | |
| Centre Number | | | | | | Candidate Number | | | | | |
| Candidate Signature | | | | | | | | | | | |

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| For Examiner's Use |
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General Certificate of Secondary Education
June 2006

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

**3544/H
H**



Thursday 25 May 2006 9.00 am to 11.00 am

For this paper you must have:

- a pen, pencil, ruler, eraser, 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 | | 8 | |
| 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.

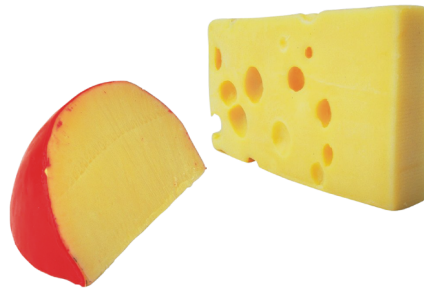
1 (a) Select **two** of the products below.

List **two** properties of the material that they are made from and state whether or not they are suitable for recycling.

Cotton Shirt



Cheese



Porcelain Teacup



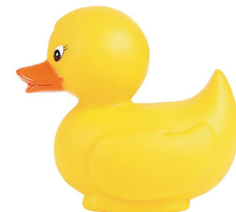
Laminate Playing Cards



Aluminium Alloy Scooter



Polypropylene Toy



Plywood Skateboard



(i) Name of product

List **two** properties of the material from which it is made.

.....

.....

(2 marks)

Is this material suitable for recycling?

(1 mark)

(ii) Name of product

List **two** properties of the material from which it is made.

.....

.....

(2 marks)

Is this material suitable for recycling?

(1 mark)

(b) Composite materials are created to improve the properties of materials.

(i) Name **two** materials which could be combined to make a composite material.

Material 1

Material 2

(2 marks)

(ii) Using a specific product explain where and why this composite material would be used.

.....

.....

.....

(3 marks)

Question 2 is about designing.
You are advised to spend about 10 minutes on this question.

2 (a) Select **three** of the following terms and explain how they can help with the development of a product.

- Market Research
- Prototype
- Ergonomics
- Design Brief
- Evaluation
- Anthropometrics
- Product Analysis
- Questionnaire

(i) Term

Explanation

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

(2 marks)

(ii) Term

Explanation

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

(2 marks)

(iii) Term

Explanation

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

(2 marks)

(b) Name **two** different applications of ICT (Information Communication Technology) and explain in detail how they might be used at the ideas, development or testing stages of the design process.

(i) ICT application
.....
(1 mark)

(ii) Explanation of use
.....
(2 marks)

(iii) ICT application
.....
(1 mark)

(iv) Explanation of use
.....
(2 marks)

Turn over for the next question

12

Turn over ►

Question 3 is about designing products.
You are advised to spend about 25 minutes on this question.

- 3 (a) Drive-in fast-food outlets sell hot and cold drinks in disposable containers.

Figure 1 shows two drinks containers.

Figure 1



- (i) Explain why these containers can be easily knocked over.

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.....
.....

(2 marks)

- (ii) Give **one** special quality that a hot drinks container should have.

.....

(1 mark)

- (iii) Explain why this quality is important.

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

(2 marks)

- (iv) State a suitable material from which to make a hot drinks container.

.....

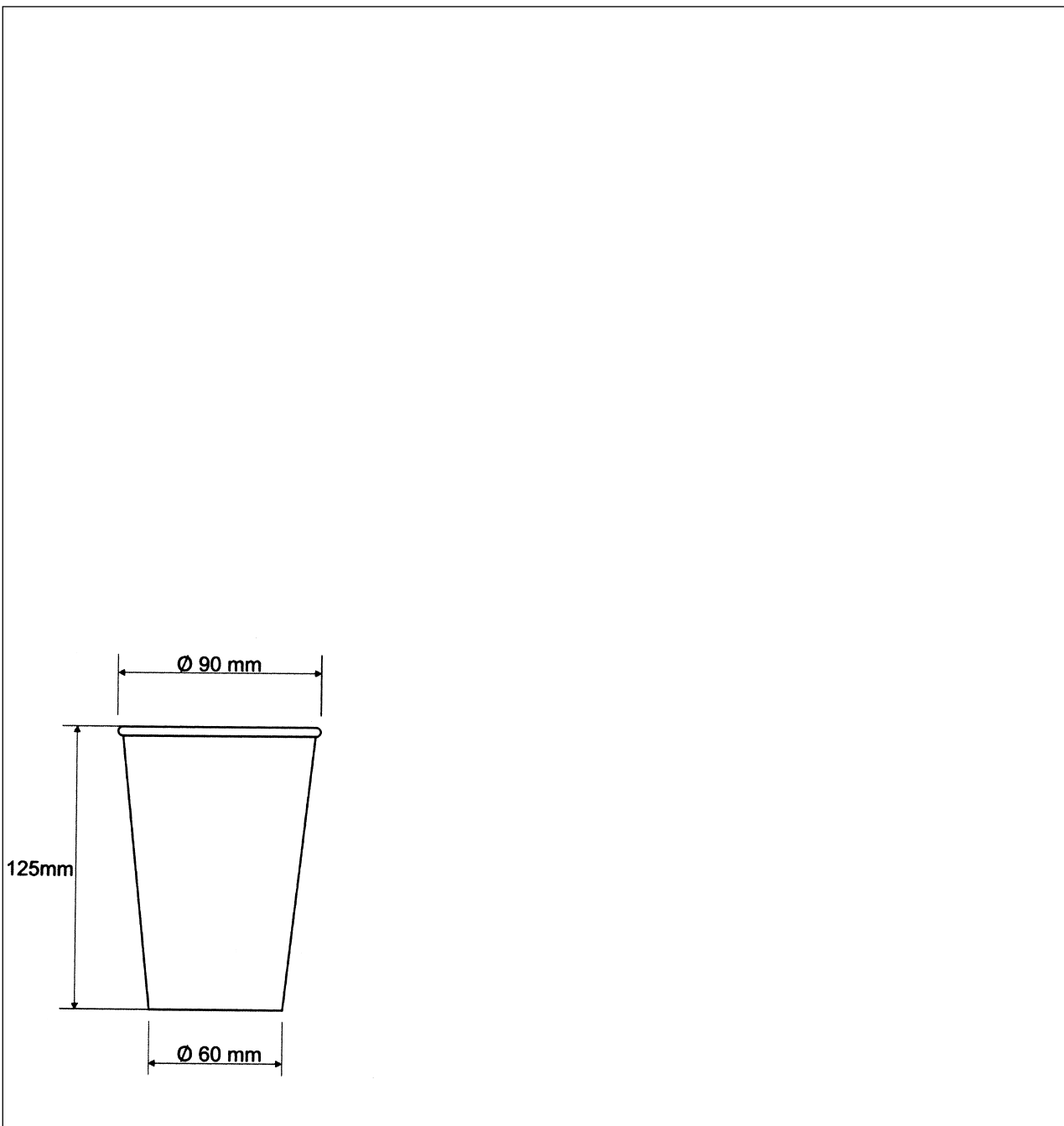
(1 mark)

(b) Design a method of carrying more than one of the drinks containers shown in **Figure 1**. Include the following specification points in your design.

- The carrier must hold up to four drinks securely.
- The carrier must be rigid.
- The carrier must be easy to hold.
- The carrier must be made from one piece of stiff card.
- The carrier should be easy to fold.
- The carrier should be held in place without using any adhesives.

The dimensions of the drinks containers are shown below.

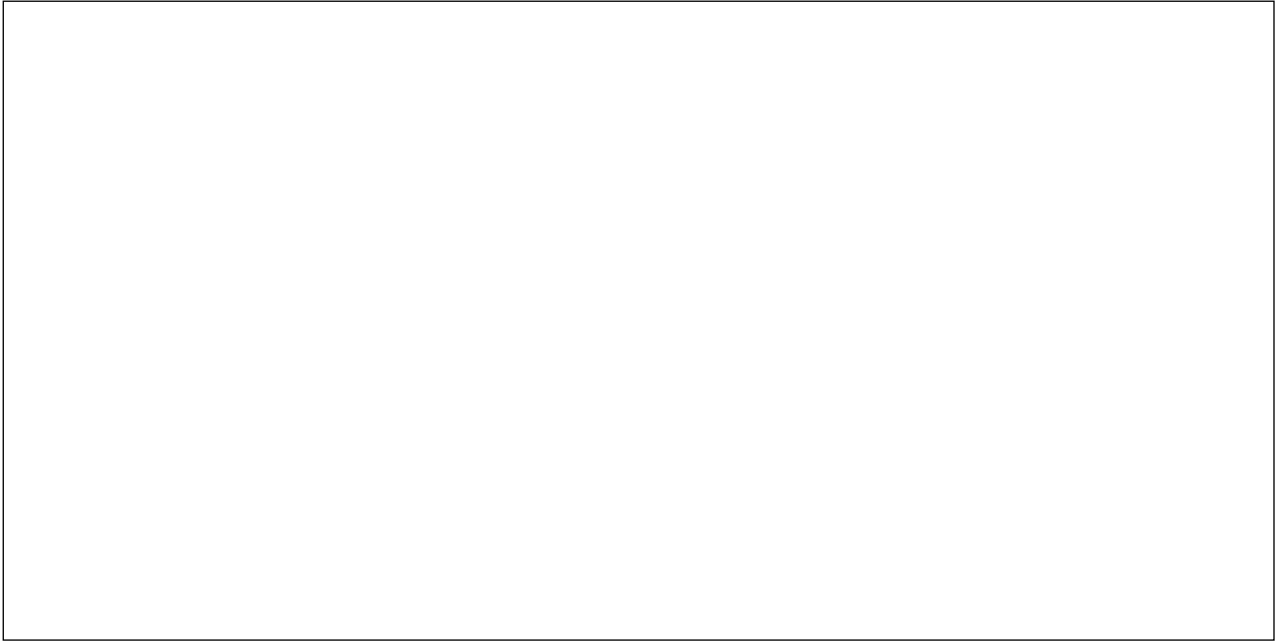
(i) Using notes and sketches show **one** idea for the drinks carrier.



(10 marks)

Turn over ►

(ii) Explain, using notes and sketches, how the carrier fits and locks together.



(4 marks)

(c) Use notes and sketches to describe how the carrier would be printed, cut out and creased in commercial production.



(6 marks)

Question 4 is about products that have similar functions.
You are advised to spend about 10 minutes on this question.

4 (a) Cameras are designed for different markets.

Select **two** cameras from below and explain **one** advantage and **one** disadvantage of each camera.



(i) **One** advantage of using camera

.....

.....

.....

(2 marks)

Turn over ►

(ii) **One** disadvantage of using camera

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

(2 marks)

(iii) **One** advantage of using camera

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

(2 marks)

(iv) **One** disadvantage of using camera

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

(2 marks)

(b) Explain **four** ways in which a television set has improved in recent years.

(i)
.....

(1 mark)

(ii)
.....

(1 mark)

(iii)
.....

(1 mark)

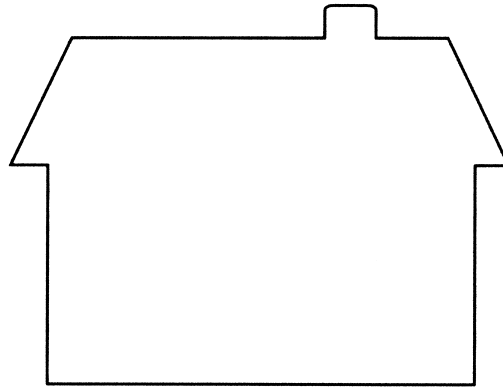
(iv)
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(1 mark)

Question 5 is about the design and manufacture of new products.
You are advised to spend about 30 minutes on this question.

- 5 Hillside school has developed a reward scheme for pupils completing homework on time. The Headteacher has asked the Technology Department (Food, Textiles, Resistant Materials, Graphics, Ceramics) to make a number of products that could be given away to celebrate excellent work.

The same house outline shape will be used for all material areas.



500 identical house shapes are required.

- (a) Choose a material you are familiar with and explain why it is suitable for this scale of production.

(i) Material

.....
(1 mark)

(ii) Reason

.....
.....
(1 mark)

Question 5 continues on the next page

Turn over ►

(b) Use sketches and notes to explain how you would make 500 of the house shapes.

Marks will be awarded for:

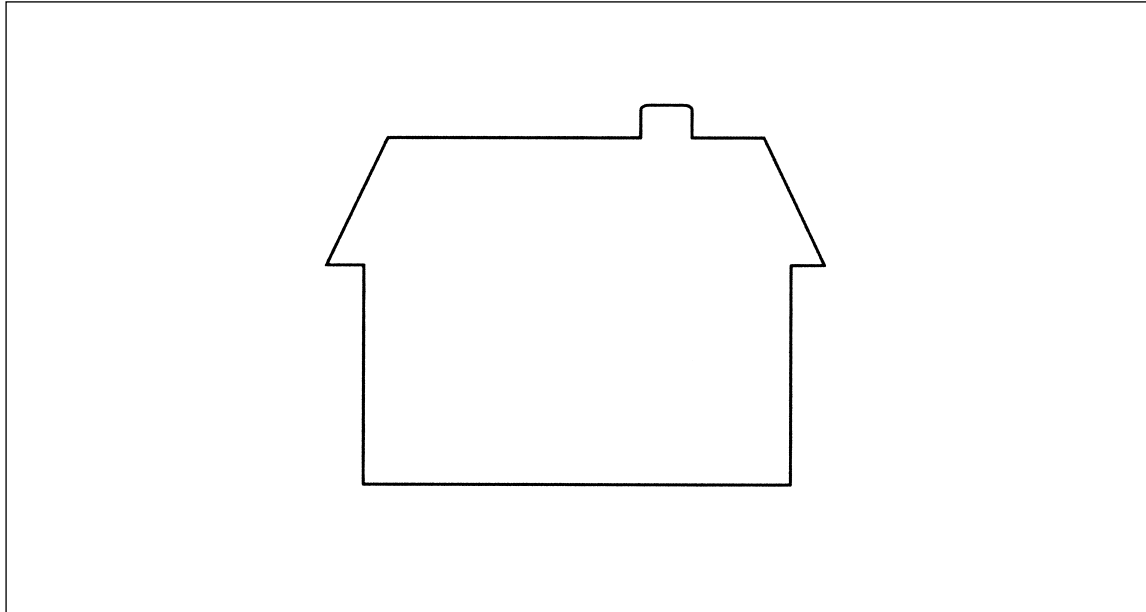
- (i) an accurate description of each stage of the process; *(4 marks)*
- (ii) correct naming of tools and equipment; *(3 marks)*
- (iii) quality of communication. *(3 marks)*

Use the space below to complete your answer.



Tools and equipment

- (c) Use sketches and notes to improve the house design by adding a door and **three** windows. Your notes should explain in detail how this would be achieved.



(4 marks)

- (d) Explain what quality control measures or quality assurance system you would put in place to ensure that each of the house shapes is exactly the same.

.....

.....

.....

.....

(3 marks)

- (e) (i) Explain the importance of risk assessment when manufacturing.

.....

.....

.....

(2 marks)

- (ii) Give an example of risk assessment in the manufacturing of the 500 house shapes.

.....

.....

.....

(2 marks)

Question 6 is about putting products into full scale production.
You are advised to spend about 10 minutes on this question.

6 In the development of a product, designers will use modelling and testing, which can be undertaken in a number of different ways.

(a) Select **two** of the processes below and explain the benefits of using these processes.

- 3D-Modelling
- Food Analysis
- Rapid Prototyping
- Wear Testing
- Computer Generated Modelling

Process

Explanation

.....

.....

.....

(2 marks)

Process

Explanation

.....

.....

.....

(2 marks)

(b) (i) Explain the term *Quality Assurance* and how it benefits the consumer.

.....

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.....

.....

(4 marks)

(ii) Explain how you have used Quality Control in your coursework project.

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

(c) (i) Give an example of a product manufactured using batch production techniques and explain the reasons for choosing this scale of production.

Product

Explanation

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

(ii) Give an example of a product manufactured using continuous production techniques and explain the reasons for choosing this scale of production.

Product

Explanation

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.....

(3 marks)

Question 7 is about consumer information and packaging.
You are advised to spend about 15 minutes on this question.

7 (a) There are a variety of reasons why packaging is used.

State and explain **two** reasons for packaging a product.

Reason 1

.....

.....

(2 marks)

Reason 2

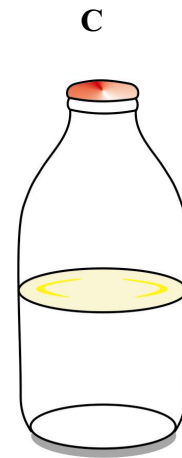
.....

.....

(2 marks)

(b) Select **one** of the milk containers below.

Give **one** advantage and **one** disadvantage of the container.



Container

Advantage

.....

.....

(2 marks)

Disadvantage

.....

.....

(2 marks)

(c) Explain the advantages of using biodegradable materials for packaging.

.....

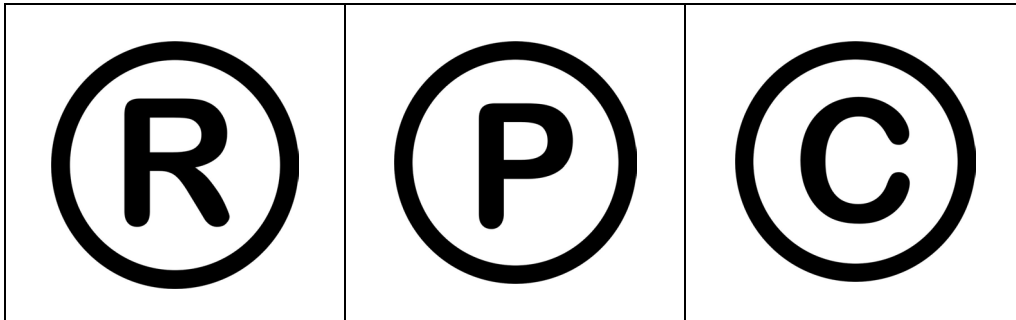
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(3 marks)

(d) Choose **one** of these symbols and explain what it means.



Symbol

Explanation

.....

.....

(2 marks)

(e) Explain why recycling is an important consideration for consumers.

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.....

.....

(3 marks)

Question 8 is about the use of ICT systems.
You are advised to spend about 10 minutes on this question.

8 (a) (i) Explain **one** advantage to a designer of using the Internet.

.....
.....
(1 mark)

(ii) Explain **one** disadvantage to a designer of using the Internet.

.....
.....
(1 mark)

(b) Using specific examples to illustrate your answer, explain in detail the advantages of using CAM in the development of a prototype.

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(3 marks)

(c) Discuss the advantages which result from using CAM for high volume production.

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(3 marks)

END OF QUESTIONS

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