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Centre Number					Candidate Number				
Candidate Signature									

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General Certificate of Secondary Education  
June 2004



**DESIGN AND TECHNOLOGY  
RESISTANT MATERIALS TECHNOLOGY  
Higher Tier**

**3545/H  
H**

Wednesday 9 June 2004 1.30 pm to 3.30 pm

**In addition to this paper you will require:**

- a pen, pencil, ruler, eraser, pencil sharpener and coloured pencils;
- an insert of colour photographs (enclosed).

For Examiner's Use			
Number	Mark	Number	Mark
1			
2			
3			
4			
5			
6			
7			
8			
Total (Column 1)	→		
Total (Column 2)	→		
TOTAL			
Examiner's Initials			

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 in the spaces provided.
- All working must be shown.
- 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.
- Wherever calculations are needed you should show your working.
- You are reminded of the need for good English and clear presentation.

**This paper includes a colour insert sheet.**

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**Questions 1–4 on this paper relate to the Design Brief given below.**

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**Design brief**

A garden tool manufacturer has asked you to design a *tool transporter*. The *tool transporter* should assist frail or elderly persons to transport small, essential items around the garden.

Examples of items which may need transporting are shown in **Figure 1** on the colour insert sheet.

A black and white copy of **Figure 1** is shown below.

Figure 1 shows a variety of tools, equipment  
and products used in gardening.

**Figure 1**

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

**Question 1 is about the design specification.**

**You should spend about 10 minutes on this question.**

1 (a) Give **three** design requirements of the *tool transporter*. Explain each of your answers.

Requirement 1: .....

Explanation: .....

.....  
(2 marks)

Requirement 2: .....

Explanation: .....

.....  
(2 marks)

Requirement 3: .....

Explanation: .....

.....  
(2 marks)

(b) Give **two other** design requirements which are specific to the needs of the frail and elderly.

Requirement 1: .....

Explanation: .....

.....  
(2 marks)

Requirement 2: .....

Explanation: .....

.....  
(2 marks)

**Question 2 is about design ideas.**

**You should spend about 35 minutes on this question.**

- 2 Study the information given in the **design brief** and your **design specification** (Question 1). Use this information to help you sketch **three** different design ideas for a *tool transporter* which will satisfy the design brief.

Remember to:

- design for the elderly;
- add notes to explain your sketches;
- evaluate each idea.

This question is worth 32 marks.

Marks will be awarded for:

- **three** different ideas;                    (3 × 6 marks)
- quality of sketches;                       (5 marks)
- quality of notes;                         (3 marks)
- quality of evaluations.                 (3 × 2 marks)

**Idea 1**

Evaluation: .....

.....

**Idea 2**

Evaluation: .....

.....

**Idea 3**

Evaluation: .....

.....

**Turn over ▶**

**Question 3 is about the construction of your chosen idea.**

**You should spend about 15 minutes on this question.**

**3** Choose **one** of your design ideas from **Question 2**.

Chosen idea: Number .....

Using notes and sketches, clearly show the **main** method of construction for your *tool transporter*.

This question is worth 11 marks.

Marks will be awarded for:

- suitable method of construction; (6 marks)
- quality of sketches; (3 marks)
- quality of notes. (2 marks)

Turn over ►

Question 4 is about using ICT when designing and making.

You should spend about 15 minutes on this question.

- 4 Assume that a batch of 500 *tool transporters* are to be made.

Figure 2 shows a self-adhesive vinyl label which is to be applied to the *tool transporter*.

# *The Tool Transporter*

Figure 2

- (a) Explain the factors that may have influenced the choice of material to be used for the label.

Explanation: .....

.....

.....

.....

.....

.....

(4 marks)

- (b) Describe how the label would be designed and manufactured using computer-aided design (CAD) and computer-aided manufacturing (CAM) techniques.

Design: .....

.....

.....

.....

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.....

(4 marks)



Manufacture: .....

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(4 marks)

(c) Use notes and sketches to show how the labels would be applied to the *tool transporters* in the same place.

Marks will be awarded for:

- method; (3 marks)
- notes and sketches. (2 marks)

# ***The Tool Transporter***

**Question 5 is about ergonomics.**

**You should spend about 10 minutes on this question.**

**5** Study the gardening tools shown in **Figure 3** on the colour insert sheet.

(a) Explain how anthropometric data has influenced the design of the garden tools.

Explanation: .....

.....

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*(4 marks)*

(b) Choose **one** of the garden tools and describe its ergonomic features.

Chosen garden tool: .....

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*(6 marks)*

**TURN OVER FOR THE NEXT QUESTION**

**Turn over ►**

**Question 6 is about materials and finishes and industrial practice.**

**You should spend about 13 minutes on this question.**

**6** Study the garden furniture shown in **Figure 4** on the colour insert sheet.

- (a) Name **one** suitable, **specific** material from which to make each type of garden furniture and give **two** reasons for your choice.

**Garden furniture A**

Material: .....  
(1 mark)

Reason 1: .....  
.....

Reason 2: .....  
.....  
(2 marks)

**Garden furniture B**

Material: .....  
(1 mark)

Reason 1: .....  
.....

Reason 2: .....  
.....  
(2 marks)

**Garden furniture C**

Material: .....  
(1 mark)

Reason 1: .....  
.....

Reason 2: .....  
.....  
(2 marks)

- (b) Choose **one** *specific* finish, suitable for the materials you have chosen for **garden furniture A** and **garden furniture C**.

**Garden furniture A**

Finish: .....  
(1 mark)

**Garden furniture C**

Finish: .....  
(1 mark)

- (c) **Garden furniture B** has been manufactured by injection moulding.

Explain why this method of manufacture is only suited to large-scale production.

Explanation: .....  
.....  
.....  
.....  
.....  
.....  
.....  
(4 marks)

**TURN OVER FOR THE NEXT QUESTION**

**Turn over ►**

**Question 7 is about packaging and advertising.**

**You should spend about 12 minutes on this question.**

**7** Study **garden furniture A** shown in **Figure 4** on the colour insert sheet.

This type of furniture is usually sold as a *flat pack*.

(a) Name **one** suitable, **specific** material for its packaging.

Material: .....  
(1 mark)

(b) Explain **one advantage** and **one disadvantage** to the **customer** of selling the furniture as *flat pack*.

Advantage: .....  
.....  
(2 marks)

Disadvantage: .....  
.....  
(2 marks)

(c) Explain the advantages to the **manufacturer** of selling the furniture as *flat pack*.

Advantages: .....  
.....  
.....  
.....  
.....  
.....  
(4 marks)

(d) Name **two** pieces of information that you could find, in symbol form, on the outside of this type of packaging.

Information 1: .....  
(1 mark)

Information 2: .....  
(1 mark)

(e) Explain why this information is presented as symbols.

Explanation: .....

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(4 marks)

15

**TURN OVER FOR THE NEXT QUESTION**

**Turn over ►**

Question 8 is about industrial processes.

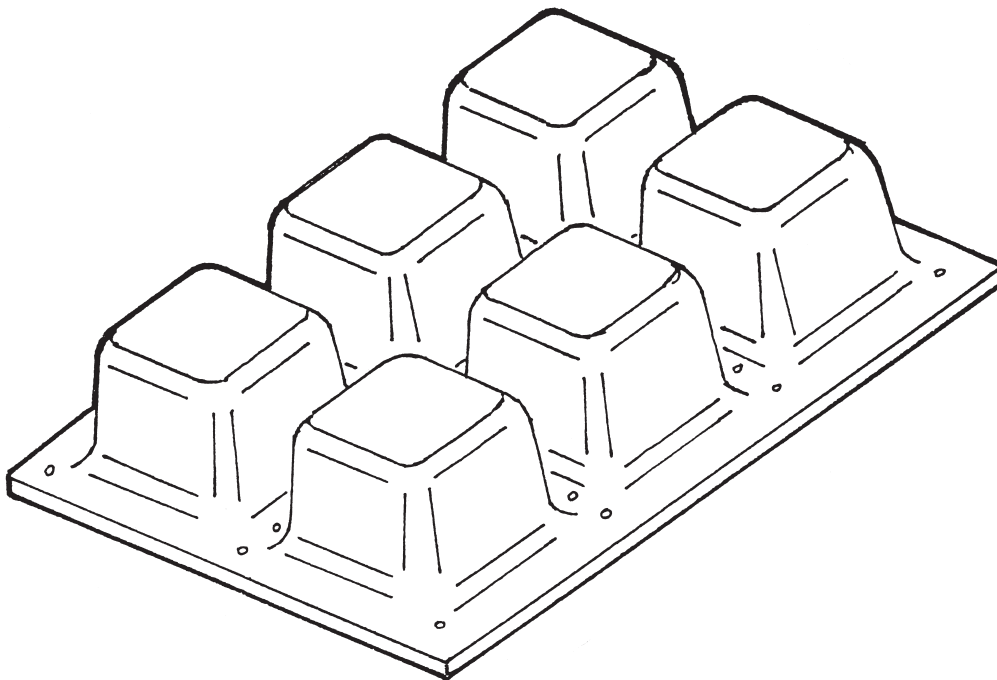
You should spend about 10 minutes on this question.

8 Study **Figure 5 (the seed tray)**, shown on the colour insert sheet.

- (a) Name **one** suitable, **specific** material from which to make the seed tray.

Material: .....  
(1 mark)

**Figure 6** shows a drawing of a former/mould used to vacuum form a similar seed tray to that shown as **Figure 5** on the colour insert sheet.



**Figure 6**



(b) Use arrows and labels to indicate clearly **three** important features of the former / mould.

Explain the function of each feature.

Feature A: ..... (1 mark)

Explanation: ..... (2 marks)

Feature B: ..... (1 mark)

Explanation: ..... (2 marks)

Feature C: ..... (1 mark)

Explanation: ..... (2 marks)

(c) Name **one** suitable, **specific** material which could be used to make the former / mould.

Material: ..... (1 mark)

(d) Webbing / curtaining is a problem which can sometimes occur when vacuum forming.

Explain the likely causes of this problem.

Explanation ..... (4 marks)

**END OF QUESTIONS**

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**DESIGN AND TECHNOLOGY  
RESISTANT MATERIALS TECHNOLOGY:  
Full and Short Courses  
Higher Tier**

**H**

This insert is provided for use in the examination.

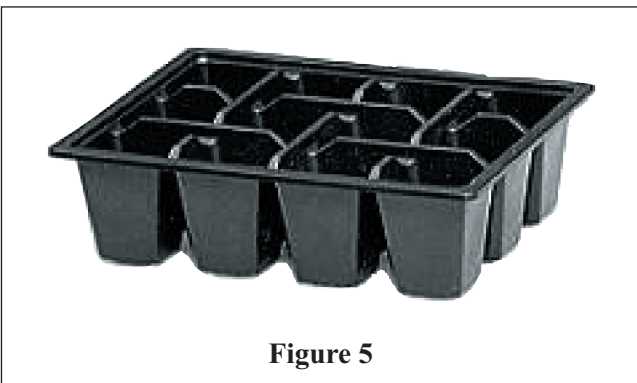
Figure 1 shows a variety of tools, equipment  
and products used in gardening.

**Figure 1**

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This insert page should **not be** sent to the examiner.

Turn over ►



**Figure 4**