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General Certificate of Secondary Education
June 2004



**DESIGN AND TECHNOLOGY
RESISTANT MATERIALS TECHNOLOGY
Foundation Tier**

**3545/F
F**

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).

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.

For Examiner's Use			
Number	Mark	Number	Mark
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Total (Column 1)	→		
Total (Column 2)	→		
TOTAL			
Examiner's Initials			

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

Design brief

A garden tool manufacturer has asked you to design a *tool transporter*. The *tool transporter* should help the gardener move small tools and equipment around the garden.

Examples of the tools and equipment which may need moving around the garden 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 this paper.

Question 1 is about the design specification.

You should spend about 5 minutes on this question.

1 Give **four** design requirements of the *tool transporter*.

Explain each of your answers.

(An example has been completed for you.)

Example: The tool transporter should make gardening easier.

Explanation: The gardener will not have to carry lots of tools around the garden.

Requirement 1:

Explanation:

.....
(2 marks)

Requirement 2:

Explanation:

.....
(2 marks)

Requirement 3:

Explanation:

.....
(2 marks)

Requirement 4:

Explanation:

.....
(2 marks)

Question 2 is about design ideas.

You should spend about 30 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*.

Remember to:

- add notes to explain each of your ideas.

This question is worth 27 marks.

Marks will be awarded for:

- **three** different ideas; *(3 × 6 marks)*
- quality of sketches; *(5 marks)*
- quality of notes; *(4 marks)*

Idea 1

Idea 2

Idea 3

Turn over ▶

Question 3 is about the evaluation and 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

(a) Give **two** reasons why you have chosen this idea.

Reason 1:

.....
(1 mark)

Reason 2:

.....
(1 mark)

(b) Using notes and sketches, clearly show how the **main** part of your design would be made.

This question is worth 10 marks.

Marks will be awarded for:

- a suitable method of making; (6 marks)
- quality of sketches; (2 marks)
- quality of notes. (2 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 4 is about using ICT when designing and making.

You should spend about 10 minutes on this question.

4 Figure 2 shows a label which is to be applied to your *tool transporter*.

The Tool Transporter

Figure 2

The label is to be made from self-adhesive vinyl.

(a) Give **two** reasons why you think this is a suitable material.

Explain each of your answers.

Reason 1:

Explanation:

.....

(2 marks)

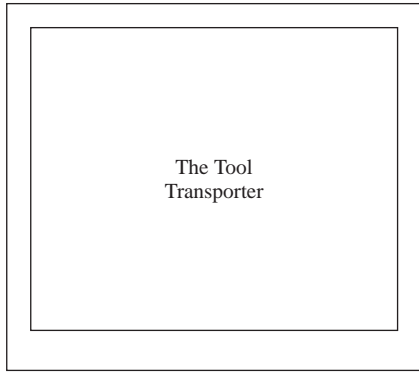
Reason 2:

Explanation:

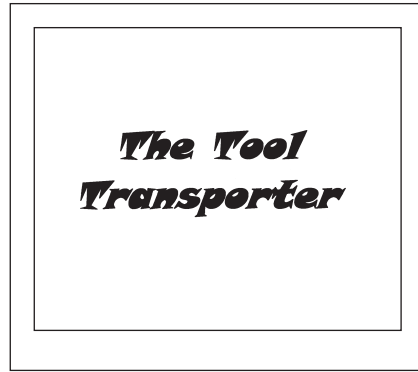
.....

(2 marks)

Study **Screens 1** and **2** shown below.



Screen 1



Screen 2

(b) Name **two** changes that have been made to the text.

Change 1:

.....

(1 mark)

Change 2:

.....

(1 mark)

(c) Give **two** advantages of manufacturing the label using a computer aided machine such as a vinyl cutter.

Explain each of your answers.

Advantage 1:

Explanation:

.....

(2 marks)

Advantage 2:

Explanation:

.....

(2 marks)

QUESTION 4 CONTINUES ON THE NEXT PAGE

Turn over ►

- (d) Give **two** quality control checks that the manufacturer would make during the design and manufacture of the label.

Explain the need for the quality control checks.

Quality control check 1:

Reason:

(2 marks)

Quality control check 2:

Reason:

(2 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 5 is about ergonomics.

You should spend about 15 minutes on this question.

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

(a) Give **two** reasons why the garden tools should not be used without a handle.

Explain each of your answers.

Reason 1:

Explanation:

.....

(2 marks)

Reason 2:

Explanation:

.....

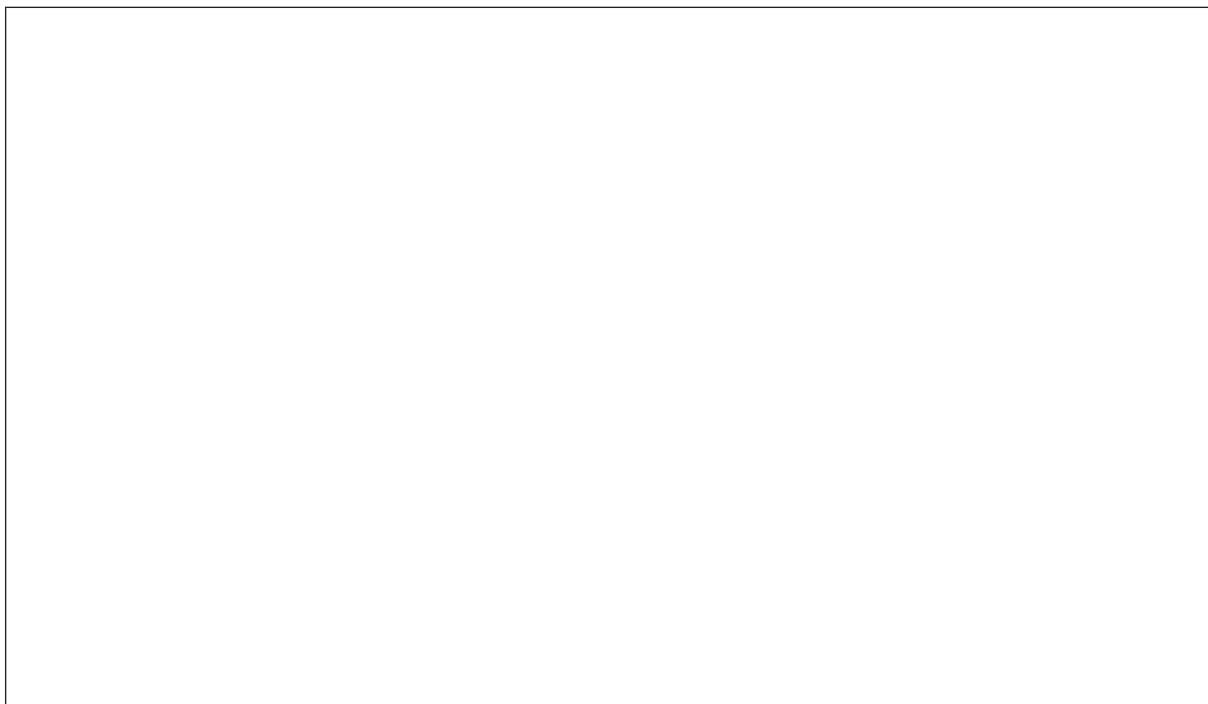
(2 marks)

(b) In the space provided, sketch an ergonomically designed handle that is suitable for use with the garden tools.

This question is worth 7 marks.

Marks will be awarded for:

- an ergonomically designed handle; *(5 marks)*
- quality of sketch. *(2 marks)*



(c) Give **two** ergonomic features of the handle you have drawn in Part (b).

Explain why you think each one is a good ergonomic feature.

Feature 1:

Explanation:

.....

(2 marks)

Feature 2:

Explanation:

.....

(2 marks)

15

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 6 is about materials and finishes.

You should spend about 10 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 **one** reason for each choice.

Garden furniture A

Material: (2 marks)

Reason:
..... (1 mark)

Garden furniture B

Material: (2 marks)

Reason:
..... (1 mark)

Garden furniture C

Material: (2 marks)

Reason:
..... (1 mark)

- (b) Name **one specific** finish, suitable for each of 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) Give **two** reasons why **garden furniture B** may not need a finish.

Reason 1:
(1 mark)

Reason 2:
(1 mark)

13

TURN OVER FOR THE NEXT QUESTION

Question 7 is about evaluation and customer choice.

You should spend about 5 minutes on this question.

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

- (a) Write **four** questions which you would include in a survey to find out which type of garden furniture customers prefer.

Question 1:

.....

(1 mark)

Question 2:

.....

(1 mark)

Question 3:

.....

(1 mark)

Question 4:

.....

(1 mark)

Garden furniture B has a number of advantages over **garden furniture A**.

- (b) Give **two** advantages to the **customer** of buying **garden furniture B**.

Explain each of your answers.

Advantage 1:

Explanation:

.....

(2 marks)

Advantage 2:

Explanation:

.....

(2 marks)

Question 8 is about packaging.

You should spend about 10 minutes on this question.

8 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 **three** advantages of packaging the garden furniture as a *flat pack*.


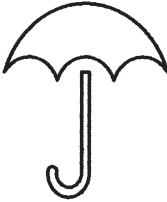
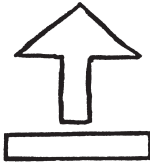
Advantage 1: (1 mark)

Advantage 2: (1 mark)

Advantage 3: (1 mark)

(b) The chart below shows **three** symbols which are displayed on the outside of the *flat pack*.

Explain the information that each symbol gives and why it is important.

	<p>Explanation:</p> <p>.....</p> <p>Why important:</p> <p>.....</p> <p style="text-align: right;">(2 marks)</p>
	<p>Explanation:</p> <p>.....</p> <p>Why important:</p> <p>.....</p> <p style="text-align: right;">(2 marks)</p>
	<p>Explanation:</p> <p>.....</p> <p>Why important:</p> <p>.....</p> <p style="text-align: right;">(2 marks)</p>

Question 9 is about health and safety.

You should spend about 5 minutes on this question.

- 9** Solvent based adhesives are commonly used to bond together acrylic surfaces.

Complete the chart shown below.

Hazard	Risk to user	Precaution
Adhesive comes into contact with skin	Adhesive irritates/burns skin	Wear disposable gloves/use a spatula/brush
Adhesive catches fire		
Adhesive comes into contact with eyes		
Fumes are inhaled by the user		

(6 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 10 is about making.

You should spend about 15 minutes on this question.

10 **Figure 5 (the seed tray)**, shown on the colour insert sheet, has been vacuum formed from low density polyethylene (LDPE).

(a) Give **two** reasons why this is a suitable material for a seed tray.

Reason 1: (1 mark)

Reason 2: (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 sheet of colour photographs.

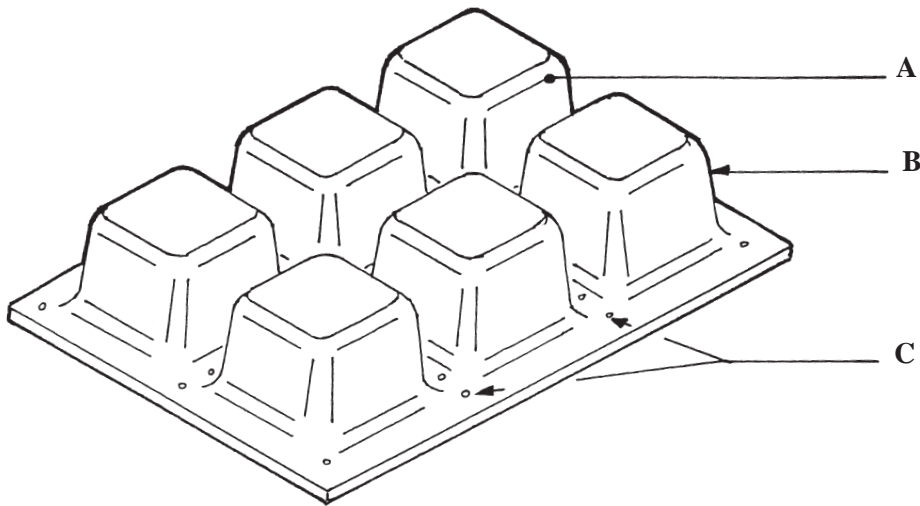


Figure 6

(b) **A, B** and **C** are **three** important features of the former / mould. Name each of the features.

Feature A: (1 mark)

Feature B: (1 mark)

Feature C: (1 mark)

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

Material: (2 marks)

- (d) Complete the table by writing each of the following phrases, in the correct order, to show the process of vacuum forming the seed tray.

Switch on the vacuum pump

Place the former/mould into the machine

Raise the former/mould

Heat the plastic sheet

Cool and remove former/mould

Lower the former/mould

Stage 1	
Stage 2	
Stage 3	
Stage 4	
Stage 5	
Stage 6	

(6 marks)

END OF QUESTIONS

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

F

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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Insert to

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Figure 3



Garden furniture A

Reproduced with the kind permission of *Homebase Ltd.*



Garden furniture B

Reproduced with the kind permission of *Argos Ltd.*



Figure 5



Garden furniture C

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Figure 4