

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

Leave blank

General Certificate of Secondary Education
Summer 2003

DESIGN AND TECHNOLOGY
Resistant Materials Technology

3545/H

HIGHER TIER

H



Tuesday 3 June 2003 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

- Write your name and other details in the spaces provided above.
- Answer **all** the questions in the spaces provided.

Information

- The maximum mark for this paper is 125.
- An insert of colour images has been provided for use in answering questions in this paper.
- The number of marks is given in brackets at the end of each question or part-question.
- Wherever calculations are needed you should show your working.
- All dimensions are given in millimetres unless otherwise stated.
- You are reminded of the need for good English and clear presentation.

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

Questions 1–6 on this paper relate to the Design Brief given below.

Design Brief

A specialist manufacturer of equipment for the disabled has asked you to design a suitable workstation for the personal computer equipment shown below and in **Figure 1** of the colour insert sheet.

The workstation must be adaptable to accommodate the needs of both wheelchair and other users.

The wheelchair user requires a work height that is 100 mm higher than a conventional workstation.



Figure 1

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

Question 1 is about using ICT when designing.

You should spend about 5 minutes on this question.

1 Give and explain **three** ways in which ICT could be used during the **design** of the computer workstation.

1

Explanation

.....

(2 marks)

2

Explanation

.....

(2 marks)

3

Explanation

.....

(2 marks)

6

TURN OVER FOR THE NEXT QUESTION

Turn over ▶

Question 2 is about the Design Specification.

You should spend about 5 minutes on this question.

- 2 Give and explain **five** design requirements of a computer workstation which will satisfy the design brief.

Requirement 1

Explanation

.....
(2 marks)

Requirement 2

Explanation

.....
(2 marks)

Requirement 3

Explanation

.....
(2 marks)

Requirement 4

Explanation

.....
(2 marks)

Requirement 5

Explanation

.....
(2 marks)

Question 3 is about design ideas.

You are advised to read questions 3, 4 and 5 before attempting this question.

You should spend about 30 minutes on this question.

3 Study the information given in the **Design brief** and your **Design specification**. Use this information to help you sketch **three** different design ideas for a computer workstation which will satisfy the design brief.

Remember to:

- accommodate the wheelchair user;
- 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 sketching; *(5 marks)*
- quality of notes; *(3 marks)*
- quality of evaluation. *(3 × 2 marks)*

Idea 1

Evaluation

.....

Idea 2

Evaluation

.....

Idea 3

Evaluation

.....

Turn over ▶

Question 4 is about the construction of your chosen idea.

You should spend about 20 minutes on this question.

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

Chosen idea

(a) Name the main method which would be used to join together the computer workstation.

Method
(1 mark)

(b) Describe in detail, with notes and sketches, how the joint you have named in question 4(a) could be made.

This question is worth 10 marks.

Marks will be awarded for:

- marking out and preparation; (3 marks)
- construction of the joint; (4 marks)
- naming all the tools and equipment used. (3 marks)

(c) A batch of 50 workstations is to be made.

Explain clearly how the manufacturer would ensure the accuracy and quality of the construction of the workstation.

Explanation

.....

.....

.....

.....

.....

.....

.....

.....

(5 marks)

Turn over ►

Question 5 is about different users of the computer workstation.

You should spend about 10 minutes on this question.

- 5 Using notes and sketches clearly show the method you have chosen to raise the work height by 100 mm.

This question is worth 10 marks.

Marks will be awarded for:

- quality of design; *(5 marks)*
- quality of sketches; *(3 marks)*
- quality of notes. *(2 marks)*

Question 6 is about health and safety.

You should spend about 10 minutes on this question.

- 6 (a) Melamine-covered-chipboard is a sheet material often used in the construction of cabinets, cupboards, tables and shelves.

Give and explain **three** safety precautions you would take when cutting this board with the jigsaw shown as **Figure 2** on the sheet of colour photographs.

Safety precaution 1

Explanation

.....

.....

(2 marks)

Safety precaution 2

Explanation

.....

.....

(2 marks)

Safety precaution 3

Explanation

.....

.....

(2 marks)

(b) It is essential to have a safe environment within the workplace.

Give **four** safe working conditions:

Working condition 1
.....
(1 mark)

Working condition 2
.....
(1 mark)

Working condition 3
.....
(1 mark)

Working condition 4
.....
(1 mark)

10

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 7 is about environmental issues.

You should spend about 10 minutes on this question.

- 7 (a) Name a resistant material which you consider to be environmentally friendly and give your reasons why.

Material

(1 mark)

Reasons

.....

.....

.....

.....

.....

(4 marks)

- (b) Name a non-environmentally friendly resistant material and explain the harmful effects it causes during its lifecycle.

Material

(1 mark)

Explanation

.....

.....

.....

.....

.....

(4 marks)

Question 8 is about materials, finishes and industrial practice.

You should spend about 25 minutes on this question.

8 Study the display cabinet shown as **Figure 3** on the sheet of colour photographs.

The display cabinet is being produced by a furniture manufacturer in batches of 500.

(a) Choose a suitable **specific** material from which to make each part and give **two** reasons for your choice.

Part A (the framework)

Material

Reason 1

Reason 2

(3 marks)

Part B (the shelf)

Material

Reason 1

Reason 2

(3 marks)

Part C (the metal leg)

Material

Reason 1

Reason 2

(3 marks)

Part D (the backboard)

Material

Reason 1

Reason 2

(3 marks)

QUESTION 8 CONTINUES ON THE NEXT PAGE

Turn over ►

(b) A cabinet is being made as a “one off” product in a workshop.

(i) Choose a suitable specific finish for **Part C** (the metal leg).

Finish
(1 mark)

(ii) Describe using notes and sketches the stages in preparing and applying the finish you have named in part (b)(i) to **Part C** (the metal leg).

This question is worth 8 marks.

Marks will be awarded for:

- describing the various stages; (4 marks)
- naming all the tools and equipment used. (2 marks)
- quality of notes and sketches. (2 marks)

- (c) Explain how the finish would be applied to **Part C** (the metal leg) if it was being made as part of a batch of 500 in an industrial environment.

Explanation

.....

.....

.....

.....

.....

.....

.....

.....

(5 marks)

Turn over ►

Question 9 is about industrial practice.

You should spend about 5 minutes on this question.

9 Study **Figure 3** on the sheet of colour photographs.

A batch of 500 display units is to be made by a furniture manufacturer.

Explain why the furniture manufacturer would use computer-aided manufacturing techniques (CAM).

Explanation

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(5 marks)

END OF QUESTIONS

5