

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

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General Certificate of Secondary Education
Summer 2003

DESIGN AND TECHNOLOGY
Resistant Materials Technology

FOUNDATION TIER

3545/F

F



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			
10			
11			
Total (Column 1)			
Total (Column 2)			
TOTAL			
Examiner's Initials			

Questions 1–5 on this paper relate to the Design Brief given below.

Design Brief

A furniture manufacturer has asked you to design a computer workstation for the family personal computer equipment, shown below. (See also the colour version in **Figure 1** on the enclosed colour insert sheet).



Figure 1

Answer **all** questions in this paper.

Question 1 is about market research.

You should spend about 5 minutes on this question.

- 1** Give and explain **three** checks that a **customer** should carry out before buying a computer workstation.

Check 1

Explanation

.....

.....

(2 marks)

Check 2

Explanation

.....

.....

(2 marks)

Check 3

Explanation

.....

.....

(2 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 2 is about using ICT when designing.

You should spend about 6 minutes on this question.

- 2** Give and explain **three** ways in which ICT could be used during the **design** of the computer workstation.
(An example has been completed for you.)

Example: *By using a spreadsheet.*

Explanation: *This could be used to calculate the cost of the materials.*

1

Explanation

.....
(2 marks)

2

Explanation

.....
(2 marks)

3

Explanation

.....
(2 marks)

Question 3 is about the Design Specification.

You should spend about 8 minutes on this question.

- 3** Give **four** design requirements of a computer workstation. Give a reason for each requirement.

(An example has been completed for you.)

Example

Requirement: The workstation should be of a "flat-pack" type construction.

Explanation: So that it can be transported easily.

Requirement 1

Explanation

(2 marks)

Requirement 2

Explanation

(2 marks)

Requirement 3

Explanation

(2 marks)

Requirement 4

Explanation

(2 marks)

Question 4 is about design ideas.

You should spend about 30 minutes on this question.

- 4** Study the information given in the **Design Brief** and your **Design Specification** (Question 3). Use this information to help you sketch **three** different design ideas for a computer workstation. Add notes to explain each of your ideas.

This question is worth 29 marks.

Marks will be awarded for:

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

Idea 1

Idea 2

Idea 3

Turn over ►

Question 5 is about the evaluation and construction of your chosen idea.

You should spend about 10 minutes on this question.

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

Chosen idea

(a) Explain why you have chosen this idea.

Explanation

.....

.....

(2 marks)

(b) Using notes and sketches clearly show the **main** method of construction for your chosen idea.

This question is worth 8 marks.

Marks will be awarded for:

- a suitable method of construction; *(4 marks)*
- quality of sketches; *(2 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 that should be taken 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) The edging on melamine-covered-chipboard is often applied using a solvent based contact adhesive.

The symbols shown as **Figure 3** and **Figure 4** on the sheet of colour photographs are safety markings which are found on a tin of contact adhesive.

Give the meaning of each, and explain the precaution that should be taken when this symbol is present.

Figure 3

Meaning

(1 mark)

Precaution

(1 mark)

Figure 4

Meaning

(1 mark)

Precaution

(1 mark)

Turn over ►

Question 7 is about environmental issues.

You should spend about 10 minutes on this question.

- 7 (a)** Give and explain **two** reasons why Pine is considered to be an environmentally friendly material.

Reason 1
(1 mark)

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

Reason 2
(1 mark)

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

- (b)** Give and explain **two** reasons why Acrylic is considered to be a non-environmentally friendly material.

Reason 1
(1 mark)

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

Reason 2
(1 mark)

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

Question 8 is about materials and finishes.

You should spend about 12 minutes on this question.

- 8** Study the display cabinet shown as **Figure 5** 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 for each part and give **one** reason for your choice.

Part A (the framework)

Material (2 marks)

Reason (1 mark)

Part B (the shelf)

Material (2 marks)

Reason (1 mark)

Part C (the metal leg)

Material (2 marks)

Reason (1 mark)

- (b) Choose a suitable **specific** finish for each of the materials you have chosen in (a).

Part A (the framework)

Finish (1 mark)

Part B (the shelf)

Finish (1 mark)

Part C (the metal leg)

Finish (1 mark)

- (c) Give **two** reasons why it is important to apply a finish to **Part C (the metal leg)**.

Reason 1

Reason 2 (2 marks)

Turn over ►

Question 9 is about components.

You should spend about 5 minutes on this question.

- 9** (a) Below is a list of some of the parts used to make the display cabinet shown as **Figure 5** on the sheet of colour photographs.

shelves	legs	framework	back of cabinet
hinges	light bulb	electrical wire	

Place a circle around each of the **four** parts which a manufacturer is most likely to have bought from another supplier, rather than manufacture themselves.

(4 marks)

- (b) Give and explain **one** reason why a furniture manufacturer would choose to buy these parts from another supplier rather than manufacture the parts themselves.

Reason

Explanation

.....
(2 marks)

- (c) Study **Figure 5** on the sheet of colour photographs.

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

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

Explanation

.....

.....

.....

.....

.....
(4 marks)

Question 10 is about making.

You should spend about 9 minutes on this question.

10 Study **Figure 5** on the sheet of colour photographs.

In the development of the display cabinet a prototype of the leg shown as **Part C (the metal leg)** was made in sheet metal in a workshop.

Complete the table below by naming **one** tool which would be used in each process.

This question is worth 6 marks.

Process	Tool
Marking out	
Cutting	
Shaping	
Drilling	
Bending	
Cleaning and finishing	

6

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 11 is about materials and making.

You should spend about 15 minutes on this question.

11 Study the exploded drawing of the frame and tabletop shown as **Figure 6** below.

The frame is made from tubular mild steel. The table top is made from melamine covered MDF.

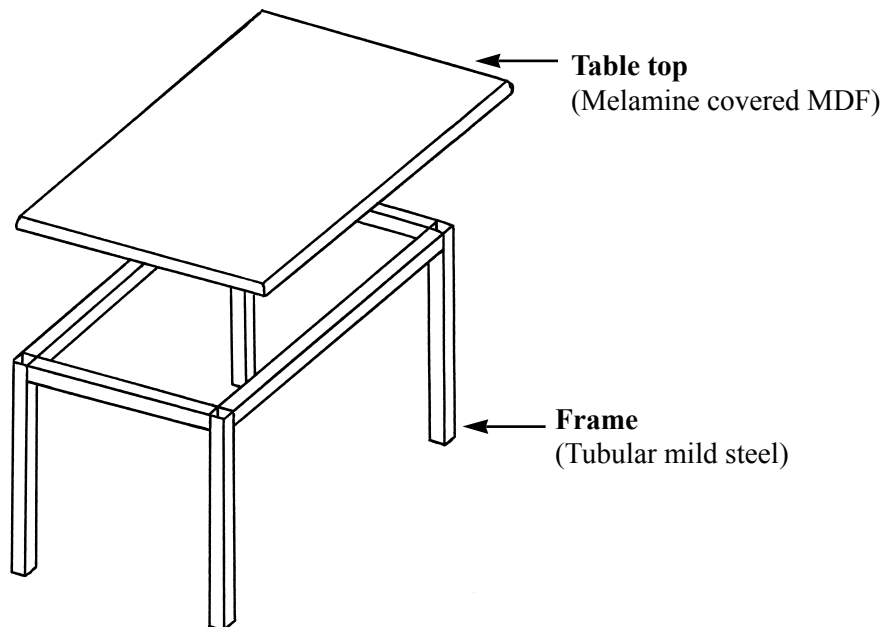


Figure 6

- (a) In the space below use notes and sketches to show the method you would use to attach the table top to the frame.

This question is worth 5 marks.

Marks will be awarded for:

- method of joining; (3 marks)
- quality of notes. (2 marks)

- (b) Complete the chart below to show the stages in the process of joining the table top to the frame.

Name **one** tool used in each process.

This question is worth 9 marks.

Process	Tool
Marking out (2 marks) (1 mark)
Preparation (2 marks) (1 mark)
Fixing (2 marks) (1 mark)

END OF QUESTIONS