



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

# June 2003

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## GCSE

### Design and Technology

### Resistant Materials Technology

3545 (Full Course)

## Higher

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**Design and Technology: Resistant Materials Technology****Full Course Higher Tier**Question 1

Any **three** correct ways of using ICT to help design the workstation.

Possible responses:

- (i) Interrogating a CD Rom database.
- (ii) By using a word processing package.
- (iii) By using a spreadsheet
- (iv) By using a graphics software package.
- (v) By using e-mail
- (vi) By using video conferencing
- (vii) By using a fax machine
- (viii) By using a mobile phone
- (ix) By using a digital camera
- (x) By using a scanner
- (xi) By using the internet

(3 x 1 mark)

**Three** correct explanations

Possible responses:

- (i) To gain information about materials
- (ii) To produce a letter requesting information from someone
- (iii) To calculate the cost of materials
- (iv) To sketch out designs
- (v) To communicate with a manufacturer
- (vi) To communicate with a group of people
- (vii) To send a letter quickly to someone
- (viii) To telephone someone for information
- (ix) To photograph the manufacture if a project
- (x) To copy an image for use in a design folder
- (xi) To gain information about materials

(3 x 1 mark)

**Total 6 marks**

**Question 2**

Any **five** correctly identified requirements.

Possible responses:

- Must be soundly constructed
- Must securely hold the computer and all the accessories
- Must be comfortable to sit at
- Must be capable of being manufactured in quantity
- Must be safe to use
- Must fit into the home environment/Aesthetics
- Must allow easy access to the computer and its accessories
- Must be capable of home assembly
- Must be a flat pack construction
- Must be an interesting design
- Must have a flat work area
- Must accept a wheelchair
- Must have a table which will rise / fall by 100mm
- Environmental issues
- Material related answers
- Accommodate wiring

(5 x 1 mark)

**Five** correct explanations

(5 x 1 mark)

**Total 10 marks**

Question 3

## Variety of ideas

Mark **each** idea separately against the following scheme

- An excellent idea which differs in approach or principle, fulfils the design brief and the specification. (6 marks)
- A very good idea which differs in approach or principle, fulfils most of the design brief and the specification. (5 marks)
- A good idea which differs in approach or principle, fulfils some of the design brief and specification. (4 marks)
- A simple idea which differs in approach or principle, fulfils some of the design brief and specification. (3 marks)

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- An idea which fulfils most of the design brief and specification but is similar to the other ideas. (2 marks)
  - A simple idea (1 mark)

## Quality of sketches

- Quality rendered 3D sketches (4 - 5 marks)
- Quality line sketches or an attempt at 3D sketches (2 - 3 marks)
- Simple line sketching (1 mark)

## Quality of notes

- Detailed explanations (3 marks)
- Simple notes (2 marks)
- Labelling (1 mark)

## Quality of Evaluation

Award up to **two** marks for **each** evaluation using the following scale:

- Good analytical thinking (3 or more points considered) (2 marks)
- Some evidence of analytical thinking (1 or 2 points considered) (1 mark)
- (3 x 2 marks)

**Total 32 marks**

Question 4

## (a) Joining method

A correct method of joining the mainframe together (1 mark)

## (b) Marking out and Preparation

Sufficient detail for the joining method to be marked out and prepared by a third party. (3 marks)

Sufficient detail for most of the joining method to be marked out and prepared by a third party. (2 marks)

Some of the joining method could be marked out and prepared by a third party (1 mark)

## Construction of the joint

Sufficient detail for the chosen method of joining to be completed by a third party (4 marks)

Sufficient detail for the most of the chosen method of joining to be completed by a third party (3 marks)

Some of the chosen method of joining could be completed by a third party (2 mark)

A method of joining can be identified (1 mark)

## Tools and equipment

All tools and equipment are identified (3 marks)

Most tools and equipment are identified (2 marks)

Some tools and equipment are shown (1 mark)

## (c) Look for details re.

- Use of jigs
- Use of fixtures
- Use of critical points
- Use of quality assurance
- Use of quality control
- Templates
- Assembly line

For each of the above award one mark for mentioning the technique and one mark for applying it to their chosen joint up to a maximum of 5 marks.

(5 marks)

**Total 16 marks**

**Question 5**

## Quality of design

Award one mark each for a design which :

- Raises and lowers the work height
- Is a workable solution
- Is easy to use
- Involves the use of a mechanism
- Involves the use of a sophisticated mechanism (5 x 1 mark)

## Quality of Sketching

- Very good line sketching (3 marks)
- Good line sketching (2 marks)
- Simple line sketching (1 mark)

## Quality of notes

- Explanation (2 marks)
- Labelling (1 mark)

**Total 10 marks**

**Question 6**

(a) Any **three** correctly identified safety precautions.

Possible responses:

- Ensure you are wearing goggles / glasses
- Ensure you are wearing an apron / overall
- Ensure you have the work securely clamped down
- Ensure you have the cord / flex away from the blade
- Do not place the jigsaw onto a workbench before it has come to a stop
- Dust extracting / ventilation
- Supervision / permission
- Ear protection
- Keep your hands away from the blade
- Safety checks on jigsaw
- Personal safety items (not gloves)
- Clear workspace

(3 x 1 mark)

**Three** correct explanations

(3 x 1 mark)

(b) Any **four** correctly identified safe working conditions.

Possible responses:

- Ensure the area is well ventilated
- Ensure there is sufficient lighting
- Ensure the floor area is kept clear of debris
- Ensure machinery is well maintained
- Ensure all safety mechanisms are well maintained
- Ensure the correct safety equipment is always available
- Ensure there is a trained first aider on the premises
- Ensure there are first aid materials on hand

(4 x 1 mark)

**Total 10 marks**

Question 7

## (a) Material

Any natural timber / cellulose base plastics

(1 x 1 mark)

Reasons

- Converts CO<sup>2</sup> into O<sup>2</sup>
- Is a renewable resource
- Provides a habitat for flora and fauna
- Does not pollute the atmosphere
- Recyclable

Award one mark each for any of the above or two marks each for an answers which expand on two of the above.

(4 x 1 mark)

## (b) Material

- Any specific metal
- Any specific plastic
- Any specific manufactured board
- Mahogany

(1 x 1 mark)

Reasons

- Scars the land when the raw material is extracted
- Produces toxic gases when it is refined / smelted
- Leads to acid rain
- Leads to global warming
- Leads to fertile soil being washed away
- Is non biodegradable
- Moving crude oil around the world can lead to ecological disasters when tankers get into trouble
- Gives off carcinogenic dust when machined

Award one mark each for any of the above or two marks each for answers which expand on two of the above.

(4 x 1 mark)

**Total 10 marks**



**Question 8**

(a) **Part A** - Any suitable **light** coloured hard / softwood.

Possible responses:

- Birch
- Beech
- Ash
- Oak
- Pine
- Sycamore
- Ramin

(1 x 1 mark)

Reasons

- Attractive
- Strong
- Capable of being cut to shape
- Capable of being joined
- Capable of being shaped
- Relatively lightweight
- Durable
- Cost (expensive / inexpensive)

(2 x 1 mark)

**Part B**

Possible responses:

- Glass
- Acrylic
- Polycarbonate

(1 x 1 mark)

Reasons

- Clear
- Immaculate surface finish
- Capable of being cut to length
- Rigid
- Appearance
- Low maintenance

(2 x 1 mark)

**Part C**

Possible responses:

- Cast (Aluminium, iron, steel)
- Steels
- Aluminium

(1 x 1 mark)

Reasons

- Good strength to weight ratio
- Capable of being cut to shape
- Capable of being joined

- Capable of being shaped
- Durable
- Cost (inexpensive)
- Suitable for quantity production (2 x 1 mark)

**Part D**

Any suitable manufactured board with a relevant applied finish (1 x 1 mark)  
Reasons (Pine tongue and groove and matchboarding)

Possible responses:

- Attractive
- Strong
- Stable
- Flat surface
- Available in large sizes (2 x 1 mark)

(b) (i) Possible responses:

- Gloss paint
- ‘Hammerite’
- ‘Smoothrite’
- powder / plastic coating / dip coating
- anodised (aluminium only)
- (Cellulose) spray
- Stove enamel
- Buffing/polishing (Aluminium/stainless only) (1 x 1 mark)

(b) (ii) Describing the various stages

Possible responses:

- Cleaning the surface
- Keying the surface
- Heating the metal
- Brushing or spraying or dipping the finish.

Award one mark each for any of the above or two marks each for answers which expand on two of the above. (4 x 1 mark)

Naming the tools and equipment

All tools and equipment named or sketched (2 marks)  
Most tools and equipment named or sketched (1 mark)

Quality of notes and sketches

Good quality notes and sketches (2 marks)  
Simple labelling and sketches (1 mark)

(c) Reference should be made to a mechanised/CAM system

Possible responses:

- Use of CAM
- Spray booth with conveyor belt
- CNC robotic arm
- Electrostatic spraying

*Detailed explanation* (5 - 4 marks)

*Good explanation* (3 - 2 marks)

*Simple explanation* (1 mark)

**Total 26 marks**

### Question 9

Look for details such as;

- To speed up the manufacturing process
- To reduce the unit cost of manufacturing the display cabinet
- To produce a higher quality product
- To improve the consistency of each product
- To employ less skilled labour
- A less skilled process

Award one mark each for any of the above or two marks each for answers which expand on any of the above.

(5 x 1 mark)

**Total 5 marks**

**Total Paper 125 Marks**