

GCSE 2004

June Series



Mark Scheme

Design and Technology: Resistant Materials Technology *(3545/Full Course Higher)*

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The answers given in the following mark schemes are neither exhaustive nor exclusive. Candidates whose answers do not appear directly on the mark scheme, but who have demonstrated knowledge, understanding, or skills relevant to the question will receive appropriate credit for their answers.

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ASSESSMENT AND QUALIFICATIONS ALLIANCE
GENERAL CERTIFICATE OF SECONDARY EDUCATION

June Examination 2004

Design and Technology: Resistant Materials Technology

Full Course Higher Tier

Question 1

- (a) Any **three** correctly identified requirements.

Possible responses:

- Must securely hold the garden tools and equipment
- Must be soundly constructed/strong
- Must be capable of being manufactured in quantity
- Must be safe to use
- Must fit into the garden environment
- Must allow easy movement around the garden
- Must be weather proof
- Storing when not in use
- Any reference to environmentally friendly materials
- Durable

(3 x 1 mark)

Three correct explanations

(3 x 1 mark)

- (b) Any **two** correctly identified requirements which address the specific needs of the elderly

Possible responses:

- Must be lightweight
- Must be compact
- Must have high handles/adjustable
- Must be comfortable to use
- Ease of movement
- Reference to seating

(2 x 1 mark)

Two correct explanations

(2 x 1 mark)

Total 10 marks

Question 2

Variety of ideas

Mark each idea separately against the following scheme

- An excellent idea which, differs in approach or principal, fulfils the design brief and the specification. (6 marks)
 - A very good idea which differs in approach or principal, fulfils the design brief and the specification. (5 marks)
 - A good idea which differs in approach or principle, fulfils **most** of the design brief and specification. (4 marks)
 - An idea which fulfils some of the design brief and the specification. (3 marks)
-
- An idea which is very similar to the other ideas. (2 marks)
 - A simple idea. (1 mark)

(3 x 6 marks)

Quality of sketches

- Quality 3D, rendered 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
(2 or more points considered) (2 marks)
- Some evidence of analytical thinking
(1 point considered) (1 mark)

Total 32 marks

Question 3

Method of construction

A suitable, detailed process given.	(6 -5 marks)
A suitable detailed process, with some inaccuracies /omissions	(4 - 3 marks)
Limited details of process given.	(2 marks)
Recognisable process identified.	(1 mark)

Or

Assembly only answers

Complete assembly details given	(3 marks)
Some assembly details given	(2 marks)
Simple assembly details given.	(1 mark)

Quality of sketches

• Quality 3D sketches	(3 marks)
• Quality 2D or simple 3D sketches or	(2 marks)
• Simple 2D sketches	(1 mark)

Quality of notes

• Detailed notes	(2 marks)
• labelling	(1 mark)

Total 11 marks

Question 4

- (a) Award **one** mark **each** for an influential factor/feature and **one** mark for a suitable qualification.

Possible responses:

- It needs to be weather proof as it is used outside in wet conditions.
- It needs to be easy to wipe down as the garden cart is likely to get dirty.
- It needs to be a contrasting colour so that it will stand out on the garden cart.
- It should have a shiny attractive finish as it is advertising the product
- It should be quick to apply to the garden cart as this will save time and money for the manufacturer.

Not Cheap

Not Readily available

(4 x 1 mark)

- (b) Award **one** mark **each** for details relating to the design of the label using computer aided design(CAD)

Design

Possible responses:

- Use of a suitable software programme
- Inputting text
- Manipulating text
- Reference to testing and prototyping
- Reference to saving

(4 x 1 mark)

Award **one** mark **each** for details relating to the manufacture of the label using computer aided manufacture(CAM)

Manufacture

Possible responses:

- Use of vinyl/laser cutter
- Design is down loaded to vinyl/laser cutter
- Knife/laser cuts out the lettering
- Safety
- Reference to quality control
- Reference to quantity production

(4 x 1 mark)

(c) Possible responses

- Use of JIG or template
- OR
- Use of raised or recessed surface
- OR
- Marking out on product
- OR
- Use of robotics

Detailed description	(3 marks)
Some detail	(2 marks)
Limited description	(1 mark)
Notes and sketching detailed notes and/or sketching	(2 marks)
Limited Information	(1 mark)

Total 17 marks

Question 5

(a) Award **one** mark **each** for an influential factor **one** mark for a suitable qualification.

Look for details relating to:

- The size of the tools
 - The shape of the tools
 - Explanation of anthropometric data
- (4 x 1 mark)

(b) Award **one** mark for **each** of a relevant ergonomic feature and a suitable description

- The shape of the handle
 - The positioning of switches
 - The colour coding of various parts
 - The use of safety features
 - Rounded edges
 - Textured surface
 - Noise
- (6 x 1 mark)

Total 10 marks

Question 6

(a) **Garden furniture A** - Award **one** mark for any suitable solid wood

Possible responses:

- Beech
- Ash
- Oak
- Teak
- Mahogany
- Pine

(1 x 1 mark)

Award **one** mark each for **two** suitable reasons

Possible responses:

- Attractive
- Strong
- Durable
- Weather proof
- Environment related

(2 x 1 mark)

Garden furniture B - Award **one** mark for any suitable specific plastic

Possible responses:

- ABS
- GRP
- HIPS
- Polycarbonate
- Polypropylene PP
- HDPE
- PVC

Not Acrylic (Perspex)

(1 x 1 mark)

Award **one** mark each for **two** suitable reasons

Possible responses:

- Immaculate surface finish
- Self coloured
- Ideal for quantity production
- Durable
- Weatherproof

(2 x 1 mark)

Garden furniture C - Award **one** mark for any suitable specific metal

Possible responses:

- Steel
- Aluminium

(1 x 1 mark)

Award **one** mark each for **two** suitable reasons

Possible responses:

- Good strength to weight ratio
- Durable

- Cost (inexpensive) (steel)
 - Suitable for quantity production
 - Weatherproof
- (2 x 1 mark)

(b) **Garden furniture A**

Award **one** mark for any suitable specific finish.

Possible responses:

- Natural
- Wax
- Varnish
- Stain
- Teak Oil
- Ronseal
- Sikkens

(1 x 1 mark)

Garden furniture C

Award **one** mark for any suitable specific finish

Possible responses

- Chrome plating (Steel)
- Anodised (aluminium only)
- Cellulose spray/lacquer
- No finish required (aluminium/stainless steel/polished)

(1 x 1 mark)

(c) Award **one** mark for **each** the following details and **one** mark for a suitable qualification:

- The initial set up cost of the machinery is very expensive
- The cost of producing a mould is very expensive
- The production of a mould is a highly skilled job
- The cost can only be recouped by producing in high volumes.

Total 15 marks

Question 7

- (a) Award **one** mark each for a correct material.

Possible responses:

- Cardboard
- Bubble/shrinkwrap
- Expanded polystyrene

(1 x 1 mark)

- (b) Award up to **two** marks depending upon the quality of each explanation

Advantage

Possible responses:

- They are easier to store when you get them back home
- They are easier to transport in the back of a car

(2 x 1 mark)

Disadvantage

Possible responses:

- You have to assemble them yourself
- They can be awkward to carry
- Non environmentally friendly responses

(2 x 1 mark)

- (c) Award **one** mark **each** for an advantage and one mark for a suitable qualification.

Possible responses:

Advantages

- They take up less space
- They are easier to handle
- They are easier to stack
- They are easier to transport
- The manufacturer does not have to employ people to assemble the furniture
- Advertising
- Cost effective

(4 x 1 mark)

- (d) Award **one** mark each of the following details and **one** mark for a suitable qualification:

Possible responses:

- The weight of the box
- A picture of the furniture
- A bar code
- An umbrella
- A stacking symbol
- A this way up symbol
- Logos
- Number of parts
- Time taken to assemble
- Number of people required to carry
- Number of people required to assemble
- Recyclable
- Material
- Finish
- Safety related
- Tools required to assemble

(2 x 1 mark)

- (e) Award **one** mark each of the following details and **one** mark for a suitable qualification:

- There are no language barriers
- Does not require the handler to have any reading skills
- Quick way of giving information
- It stands out on the packaging

(4 x 1 mark)

Total 15 marks

Question 8

- (a) Award **one** mark for any suitable specific plastic

Possible responses:

- HIPS
- Polycarbonate
- Polypropylene PP
- HDPE
- PVC
- Styrene

Not acrylic (Perspex)

(1 x 1 mark)

- (b) Award **one** mark each for correctly naming an important feature:

Possible responses:

- Rounded corners
- Draft / tapered side / sloping sides
- Extraction holes
- Smooth sides
- Gap between the pots is large enough

(3 x 1 mark)

Award up to **two** marks for a correct explanation of each feature

Possible responses:

- Rounded corners – prevents thinning on the corners and thus avoids splitting the plastic. A rounded corner provides greater strength.
- Draft / tapered side / sloping sides – Allows the former to be removed from the mould.
- Extraction holes – Enables the air to be removed from deep valleys providing thus reducing the chance of webbing
- Smooth sides – Assist the removal of the former from the mould. Provides a smooth finish to the mould.

(3 x 2 marks)

- (c) Award **one** mark for any suitable specific wood / metal

Possible responses:

- MDF
- Any suitable close grain hardwood
- Aluminium
- Steel

(1 x 1 mark)

- (d) Award **one** mark each for any correct detail relating to the cause of ‘webbing’.

Possible responses:

- Incorrect heating of the plastic
- Plastic may be too hot
- Plastic may be too cold
- Several formers have been placed too close together
- Extraction holes have not been used
- The vacuum is not sealing correctly

(4 x 1 mark)

Total 15 marks

