



## **General Certificate of Secondary Education**

# **Design and Technology Resistant Material Technology 3555/H**

**Higher Tier: Short Course**

## **Mark Scheme**

*2008 examination - June series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: [www.aqa.org.uk](http://www.aqa.org.uk)

Copyright © 2008 AQA and its licensors. All rights reserved.

#### COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

**1** Any **four** correctly identified requirements.

Possible responses:

1. Must be stylish
2. Must be capable of being manufactured in quantity
3. Must be safe to use
4. Must be ergonomically designed
5. Must be waterproof
6. Must be stable
7. Must be durable
8. Must be portable
9. Must be lightweight 4 × 1mark

Any **four** relevant explanations

1. You are more likely to sell a stylised design
2. This will ensure that the price is kept low and the quality kept high
3. No one should injure themselves when using the seating
4. The user should find it comfortable to sit on
5. It could be out in wet weather
6. It should not fall over when being sat on
7. The customer will want the product to last for a few years
8. The customer may wish to carry the picnic furniture to the picnic site 4 × 1mark

**Total      8 marks**

## 2 Quality of sketches

- Quality 3D sketches with colour 5 – 6 marks
- Quality line sketches or an attempt at 3D sketches 3 – 4 marks
- Simple line sketching 1 – 2 marks

### Quality of notes

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

### Situation 1

- Design of a seat 1 mark
- Design of eating surface 1 mark
- Referenced to young children 1 – 2 marks
- Referenced to the zoo 1 – 2 marks

### Situation 2

- Design of a seat 1 mark
- Design of eating surface 1 mark
- Referenced to the family 1 – 2 marks
- Referenced to the country park 1 – 2 marks

### Quality of evaluation

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

Evidence of analytical thinking

(2 or more points considered) 2 marks

(1 point considered) 1 mark

**Total 21 marks**

**3 Quality of sketches**

- Quality 2D or 3D sketches 2 marks
- Simple 2D sketches 1 mark

**Quality of notes**

- Detailed notes 2 marks
- Labelling 1 mark

**Method of manufacture**

**Batch production**

Look for details relating to: Injection moulding/die casting

A suitable and very detailed method of manufacture. 9 – 10 marks

A suitable and detailed method of manufacture. 7 – 8 marks

A suitable method of manufacture, some detail given. 5 – 6 marks

A suitable method of manufacture, limited detail given. 3 – 4 marks

A suitable method of manufacture, identified. 1 – 2 marks

**Unsuitable method of batch production (vacuum forming/ compression moulding)**

A detailed method of manufacture. 4 marks

A good outline of a method of manufacture. 3 marks

A basic outline of a method of manufacture. 2 marks

A named method of manufacture. 1 mark

**One off production**

Look for details relating to:

A suitable and detailed method of construction. 4 marks

A suitable method of construction, with some inaccuracies. 3 marks

Incorrect method of construction, but would function. 2 marks

Incorrect method of construction, little chance of success. 1 mark

**Total 14 marks**

**4 Serving spoon A**

- Award **one** mark for a suitable light coloured hardwood  
**Not pine/mahogany/teak**

Possible responses:

- beech
- birch
- sycamore
- maple
- ash

1 × 1 mark

Reasons

Possible responses:

- Attractive
- Strong
- Durable
- Safe
- Hygienic

2 × 1 mark

**Serving spoon B**

- Award **one** mark for a suitable specific plastic.
- **not acrylic**

Possible responses:

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

1 × 1 mark

Reasons

Possible responses:

- Immaculate surface finish
- Self coloured
- Ideal for quantity production/easy to mould
- Durable
- Hygienic
- Re-cyclable

2 × 1 mark

**Total**

**6 marks**

**5 (a)** Award **one** mark for correctly identifying the mechanism.

- Chain and sprocket (chain wheel/ring) 1 mark

**(b)** Award **one** mark for **one** correctly identified advantage.

Possible responses:

- It can take a greater force
- It does not slip
- It is more durable 1 mark

**(c) (i)** Award **one** mark for correctly identifying another mechanism.

Possible responses:

- Brakes
- Suspension
- Steering
- Gear change mechanism
- Wheel bearing 1 mark

**(ii)** Award up to **four** marks for a suitable sketch.

Quality detailed sketch 4 – 3 marks

Simple sketch 2 – 1 marks

**(iii)** Award up to **four** marks for a detailed description of how the mechanism should be maintained using the following scheme.

Four or more pieces of information given. 4 × 1 marks

**Or** Two pieces of information that have been explained. 2 × 2 marks

**(iv)** Award up to **four** marks for a suitable explanation.

Look for the following details:

- Extends the life of the machine
- The machine runs efficiently
- The machine runs smoothly
- The machine is safer to use 4 marks

**Or** Two pieces of detailed explanations 2 × 2 marks

**Total      15 marks**

**6** Award **one** mark for **each** correctly entered cell.

<b>Symbol</b>	<b>Meaning</b>	<b>Process</b>
<b>A</b>	<i>Safety glasses must be worn</i>	<i>When drilling a piece of metal</i>
<b>B</b>	A dust <b>mask</b> must be worn	When sanding a piece of wood/spray painting
<b>C</b>	Ear defenders/protection/muffs/plugs must be worn	When machining a piece of wood
<b>D</b>	Gloves must be worn	When handling hot/sharp/toxic materials
<b>E</b>	Highly flammable	When using a solvent based adhesive/spray painting
<b>F</b>	Electrical hazard	When maintaining electrical equipment

**Total 10 marks**



- 7 (a) Award **one** mark for identifying an ergonomic feature and **one** mark for describing its function. 1 mark

Look for the following details:

- The curve of the body to match the curve of the hand
- The dome shape to fit the palm of the hand
- The positioning of the buttons to match the index and forefinger
- The positioning of the ball to match the position of the thumb
- The colour of the ball for easy identification

3 × 2 marks

- (b) Award up to **four** marks for a suitable explanation of how anthropometrics has been used in the design of the mouse.

Look for the following details:

- The size of the average hand will have been found
- This will be used to determine the size of the mouse
- The length of average length of the fingers will have found
- This will have been used to determine the position of the buttons

2 × 2 marks

**Total 10 marks**

- 8 (a) Award **one** mark for **three** correctly identified reasons.

Possible responses:

- They are expensive to buy
- They keep children inside/health issues
- Parents have less contact with their children
- Can encourage violent/antisocial behaviour

3 × 1 mark

Award **one** mark for **three** correct explanations.

3 × 1 mark

- (b) Award **one** mark for **three** social/moral/environmental factors that a **manufacturer** must consider.

Possible responses:

- Cheap labour should not be exploited during the manufacture of a product
- It should be made from recyclable materials
- It should be made from renewable materials
- It should be made from bio-degradable materials
- Its manufacture should not have a negative affect on the environment

There should be no extreme violent content

It should not offend any particular group of people

It should not harm anyone

3 × 1 mark

Award **one** mark each for three correct explanations.

3 × 1 mark

**Total 12 marks**