



General Certificate of Secondary Education

Design and Technology Resistant Material Technology 3545/H

Higher Tier

Mark Scheme

2008 examination - June series

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1 Any **five** 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

5 × 1mark

Any **five** 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
9. The customer may wish to carry the picnic furniture to the picnic site

5 × 1mark

Total 10 marks

2 Quality of sketches

- Quality 3D rendered 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

Situation 3

- Design of a portable seat 1 mark
- Design of a portable eating surface 1 mark
- Details of mechanism/disassembly 1 – 2 marks
- Portability – handle, lightweight, compact 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 33 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
- elm

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 PMMA

Possible responses:

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

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

Serving spoon C

- Award **one** mark for a suitable specific metal
- Not aluminium/steel

Possible responses:

- Stainless Steel
- Silver/EPNS
- Plated copper/brass 1 × 1 mark

Reasons

Possible responses:

- Good strength to weight ratio
- Durable
- Cost (inexpensive, steel)
- Hygienic
- Springy
- Malleable
- Ductile 2 × 1 mark

Total 9 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
- It can be repaired 1 mark

Award **one** mark for **a** correct explanation 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 16 marks

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

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

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
- Wireless
- Texture
- Weight

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 hand will have been found.
- This will be used to determine the size of the mouse
- The length of 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) (i) Award **two** marks for a suitable smart material

Possible responses:

- Polymorph

1 mark

(ii) Award up to **four** marks for details relating to the advantages of using polymorph.

Look for details relating to:

- Quick to produce
- Can be easily moulded into shape
- Gives an accurate shape
- Has a high quality finish
- Can be re-used
- Can be modelled
- Cost effective

4 × 1 mark

(b) Award up to six marks for details relating to the advantages and disadvantages of using computer modelling.

Look for details relating to:

Advantages

- Quicker than modelling in a material
- The model can be quickly altered
- The appearance of the model can be quickly altered
- The model can be virtual tested
- Easy to share electronically
- Minimises waste

Disadvantages

- The initial set up cost are expensive
- If the computer crashes you may lose all your work
- If the computer crashes valuable time is lost
- You can not hold/use a virtual design

6 marks

Total 11 marks

- 9 (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
- Lack of social skills

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