

General Certificate of Secondary Education

Design & Technology (Resistant Materials Technology) Higher Tier 3555/H

Mark Scheme

2006 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.

Any **four** correctly identified requirements.

Possible responses:

Must be entertaining / interesting Must be soundly constructed Must be capable of being manufactured in quantity Must be safe to use Must made from non toxic materials Must have no small / detachable parts Weight related responses

Ergonomics related responses

Must have be educational 4 x 1 mark

Four correct explanations 4 x 1 mark

NB. Avoid obvious repeats

Quality of sketches

Quality 3D sketches with colour or rendering

4 - 5 marks
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

Variety of ideas

Mark Situation 1 against the following scheme.

An excellent idea which fulfils the design brief, specification and the given situation, shows originality 5 - 6 marks. An good idea which fulfils most of the design brief, specification and the given situation, shows some originality 3 - 4 marks

A simple idea which fulfils some of the design brief, specification and the given situation Copy from insert sheet

1 −2 marks 0 marks (developed 1 mark)

Mark Situation 2 against the following scheme

An excellent idea using a sophisticated, or a number of simple, workable, mechanism. e.g. chain of gears, multiply use of cams and followers, shows originality

5 – 6 marks

A good idea with a simple, workable, mechanism e.g. 2 meshing gears, single cam and follower, shows some originality

3 - 4 marks

A simple idea with an identifiable mechanism, little chance of working

1-2 marks

2 x 6 marks

Quality of evaluation

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

Evidence of analytical thinking

Two or more points considered (Qualified points)

2 marks
One point considered

1 mark

Quality of Sketching

Good line sketching 2 marks
Simple line sketching 1 mark

Quality of notes

Full explanation of the function of the mechanism
with good use of technical terminology
Good explanation of the function of the mechanism
with good use of technical terminology
2 marks
Explanation of the function of the mechanism
1 marks

Details of mechanism

Award marks using the following scale:

Clear details of the function of the mechanism 4-5 marks

Input motion / output motion direction/type gear ratio, name of mechanism, labelled, good description.

Some details of the function of the mechanism 2-3 marks

Limited details of the function of the mechanism 1 mark

Use the descriptors below to award marks

NB. If the candidate's answer describes a 'one off' production method they can only access a maximum of 2 marks for each section

Marking out (traditional)

Sufficient detail for the design to be marked out
by a third party, **using a template**3 - 4 marks
Sufficient detail for most of the design to be marked out
by a third party, tools and equipment given

1 - 2 marks

or

Marking out (CAD)

Sufficient detail for the design to be drawn by a third party, **using CAD**

3 - 4 marks

- Screen with image
- Software package 2D-Desgner, Corel draw, Pro-Desktop
- Multiple images
- Dimensioning
- Tessellation and reducing waste

Sufficient detail for most of the design to be drawn by a third party, **using CAD**

1 - 2 marks

Shaping and/or drilling (traditional)

Sufficient detail for the design to be shaped and/or drilled by a third party, **using a jig/template**and a mechanical method of cutting/drilling

3 - 4 marks
Sufficient detail for the most of the design to be shaped and/or drilled by a third party, **using a jig/template**and a mechanical method of cutting/drilling

1 - 2 marks

or

Shaping and drilling (CAM)

Sufficient detail for the design to be shaped and drilled by a third party **using CAM**

3 - 4 marks

- Transferring data
- Laser or CNC router
- Process
- Power settings
- Safety
- Clamping

Sufficient detail for most of the design to be shaped and drilled by a third party **using CAM**

1 - 2 marks

Joining the frame to the base

Sufficient detail for the frame to be joined to the base by a third party **using a jig.**Sufficient detail for most of the frame to be joined to the base by a third party, some tools and equipment given

3 - 4 marks

1 - 2 marks

Finishing

Sufficient detail for most of the design to be finished by a third party, most tools and equipment given.

1 - 2 marks

Award one mark for a suitable advantage.

Possible responses:

They are quick to construct

They do not need any special tools

They have a high quality finish

They can be disassembled and reused 1 mark

Award **one** mark for a suitable explanation 1 mark

Award one mark for a suitable disadvantage.

Possible responses:

They are expensive to buy

You are constrained to the regular shapes of the blocks

1 mark

Not an accurate representation of the finished product.

Award **one** mark for a suitable explanation 1 mark

4 marks

Question 6

Award one mark for each correct answer

Hazard	Risk to user	Precaution
Picking up hot plastic	You could burn your hands	Wear heat protective gloves / gauntlets/use tongs
Hot plastic gives off fumes	You could damage your respiratory system / Poison you	Ensure the area is well ventilated by opening a window, switching on an air extraction system. Wear a safety mask
Plastic adhesive touches clothing	You could damage your clothing	Wear an apron (leather)

Ouestion 7

(a) **High chair A** - Award **one** mark for a suitable specific solid / laminated wood.

Material - Possible responses:

Pine

Beech

Oak

Ash

Mahogany

Or any other light coloured wood

(not plywood)

1 mark

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

Reasons - Possible responses:

Attractive

Strong

Durable

Cost (qualified) not 'cheap'

Capable of being bent

Any environmental related issue

2 x 1 mark

High chair B - Award **one** mark for a suitable specific plastic.

Material - Possible responses:

ABS

PET

HIPS

Polycarbonate PC

Polypropylene PP

HDPE

PVC

GRP

Not Acrylic

1 mark

Award one mark each for two correct reasons

Reasons - Possible responses:

Immaculate surface finish (hygiene related response, e.g. wipe clean)

Self coloured

Strong

Ideal for quantity production (easily moulded/shaped)

Durable 2 x 1 mark 6 marks

(b) High chair A

Award one mark for any suitable specific finish e.g.

Polyurethane/acrylic varnish/accept trade names Cellulose sealer

No oils 1 mark 1 mark

(c) Award **one** mark for a correct answer.

Must be a non toxic finish

The finish must not contain lead 1 mark 1 mark

8 marks

Question 8

Award up to two marks each for suitably expanded explanations.

Look for the following details:

Most plastics are made from oil which is a non renewable resource Moving crude oil around the world can lead to ecological disasters when tankers get into trouble Plastic produces toxic gases when the oil is refined Leads to acid rain Leads to global warming Plastics are mainly non biodegradable Some plastics are incapable of being re cycled

NB. Avoid repeating marks

(a) Award up to one mark **each** for suitable advantage.

Possible responses:

To research their design

To e mail their idea to others

To sell their product

To source materials for their product

Any market related process

Communication between designer/manufacture/customer

Avoid obvious duplication

3 x 1 mark **3 marks**

(b) Award up to one mark **each** for suitable advantage.

Possible responses:

Quicker and easier must be qualified

Avoid obvious repetition

More professional quality

More accurate

Quicker to edit (cut, copy, resize)

Easier to apply a rendering

Can be stored electronically

Can be sent electronically 3 x 1 mark 3 marks

(a) Award **one** mark each for **two** features.

Possible responses:

It is a multi activity play centre It is brightly coloured It is has been ergonomically designed for the young child

2 x 1 mark

Award **one** mark each for two correct explanations

2 x 1 mark

4 marks

(b) Award up to **two** marks **each** for correctly identified and explained developments.

Look for the following details:

Material technology

Durability
Colour pigment
Weather resistance
Mouldablity

Manufacturing technology

Sophisticated moulds Automated machinery

8 x 1 mark

8 marks