



General Certificate of Secondary Education

Design and Technology: Resistant Materials Technology Foundation Tier *Specification 3545*

Mark Scheme

2005 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.

Foundation 3545

Question 1

Any **four** correctly identified requirements.

Possible responses:

Must securely hold the stationery equipment.

Must be soundly constructed.

Must be capable of being manufactured in quantity.

Must be safe to use.

Must fit into the office environment.

Must allow easy access to stationery equipment.

Must be cost effective.

Must be portable.

Must be a suitable size.

Must be stable in use.

Must not damage the furniture it stands on.

Must be sustainable/appropriate for the target market. (4 x 1 mark)

Accept strong

Four correct explanations (4 x 1 mark)

Total 8 marks

Question 2

Quality of sketches:

Full marks can be awarded if only one or two ideas have been shown.

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

Quality of notes:

Detailed explanation	5-6 marks	
Simple explanation	3-4 marks	
Labelling	1-2 marks	(6 marks)

Variety of ideas:

Mark each idea separately against the following scheme:

An excellent idea which, differs in approach or principle, fulfils the design brief, specification and shows originality.	6 marks
A very good idea which differs in approach or principle, 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 differs in approach or principle, 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)

Total 29 marks

Question 3

- | | |
|--|--------------|
| (a) Any two correct reasons required which relate to the design criteria. | (2 x 1 mark) |
| (b) Any two correctly identified tests. | |

Possible responses:

Any tests related to the performance of the organiser.

Any safety related tests.

Any tests related to durability.

Any tests related to consumer testing.

Any tests carried out by professional bodies (BSI).

(2 x 2 marks)

Stating a test

1 mark

Explanation why or how

1 mark

Total 6 marks

Question 4

- (a) Award **two** marks for the material and **one** mark for the reason.
Design one and design two could be made from wood, metal or plastic..

Material: Plastic

Award **one** mark for the generic term plastic. +

1 mark

Thermoplastic & thermo-setting plastic and inappropriate answers

Award **two** marks for any suitable specific plastic.

2 marks

Possible responses:

ABS

GRP

HIPS

Polycarbonate

Polypropylene

HDPE

PVC

Acrylic

(2 marks)

Reason

Possible responses:

Immaculate surface finish

Self coloured

Ideal for quantity production

Durable

Weatherproof

(1 mark)

Material: Metal

Award **one** mark for the generic term metal. +
Inappropriate answers e.g. Gold, silver

1 mark

Award **two** marks for any suitable specific metal

2 marks

Possible responses:

Steel / stainless

Aluminium

Brass

(2 marks)

Reasons

Possible responses:

Good strength to weight ratio

Durable

Cost (inexpensive)

Suitable for quantity production

(1 mark)

Material: Wood

Award **one** mark for the generic term wood. +
Inappropriate answers e.g. chipboard.

1 mark

Award **two** marks for any suitable hardwood / softwood /
manufactured board.

2 marks

Possible responses:

Beech

Ash

Oak

Teak

Mahogany

Pine

Plywood

MDF

(2 marks)

Reasons:

Possible responses:

Attractive

Strong

Durable

(1 mark)

For all the above ‘cheap’ and ‘light’ gain 0 marks

Accept ‘easy to cut/manufacture’, only if relates to a specific
material e.g. *aluminium*.

(b) Quality of notes and sketches:

Detailed notes and quality sketches

3-4 marks

Simple notes and sketches

1-2 marks

(4 marks)

Marking out:

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

3-4 marks

Sufficient detail for some of the design to be marked out by a third party, some tools and equipment given. 1-2 marks (4 marks)

Cutting out and shaping:

Sufficient detail for most of the design to be cut out and shaped by a third party, most tools and equipment given. 3-4 marks

Sufficient detail for some of the design to be cut out and shaped by a third party, some tools and equipment given. 1-2 marks (4 marks)

Joining/bending:

Sufficient detail for most of the design to be shaped/bent by a third party, most tools and equipment given. 3-4 marks

Sufficient detail for some of the design to be shaped/bent by a third party, some tools and equipment given. 1-2 marks (4 marks)

Finishing:

Sufficient detail for most of the design to be finished by a third party, most tools and equipment given. 3-4 marks

Sufficient detail for some of the design to be finished by a third party, some tools and equipment given. 1-2 marks (4 marks)

Total 23 marks

Question 5

Award **one** mark each for a correct response

Possible responses:

- Check that the drill guard is working.
- Check that the emergency stop button is working.
- Check that the wiring is in good order.
- Check that the drill bits are sharp.
- Check that the isolator switch is working.
- Check that the drill bit is secure in the chuck.
- Check that the work piece is secured to the table. 2 x 1 mark
- Check that there are no worn parts. (2 marks)

0 marks for any reference to personal protection, goggles etc

Award **one** mark for a suitable explanation 2 x 1 mark (2 marks)

Total 4 marks

Question 6

(a) **Magazine file A**

Material:

Award **one** mark for the generic term wood. + 1 mark
Inappropriate answers e.g. *Chipboard, card, cardboard, pine, MDF*

Award **two** marks for any suitable specific wood.

Possible responses:

Plywood 2 marks (2 marks)

Reason:

Possible responses:

Attractive

Strong

Durable

Available in large sheets

Smooth surface

Recyclable

Light weight 1 mark (1 mark)

Magazine file B

Material:

Award **one** mark for the generic term metal. + 1 mark
Inappropriate answers e.g. *Brass*.

Award **two** marks for any suitable specific metal.

Possible responses:

Steels - any

Aluminium 2 marks (2 marks)

Reason:

Possible responses:

Good strength to weight ratio

Durable

Cost (inexpensive) if qualified

Suitable for quantity production

Recyclable

Attractive

Light weight 1 mark (1 mark)

Magazine file C

Material:

Award **one** mark for the generic term plastic + 1 mark
Inappropriate answers e.g. *Thermoplastic, thermosetting*.

Award **two** marks for any suitable specific plastic.

Possible responses:

Acrylic

ABS

HIPS
 Polycarbonate PC
 Polypropylene PP
 HDPE
 PVC

2 marks (2 marks)

Reason:

Possible responses:
 Immaculate surface finish
 Self coloured
 Ideal for quantity production
 Durable
 Cost (inexpensive) if qualified
 Recyclable
 Attractive
 Light weight

1 mark (1 mark)

(b) **In each case the material and the reasons should match the photograph.**

(i) **Magazine file A**

Award **one** mark for a low level response:

Possible responses:
 Paint
 Varnish
 Glass paper - rub it down
 Laminate
 Veneer
 Acrylic
 Polish

1 mark

Award **two** marks for any suitable specific finish:

Possible responses:
 Wax
 Polyurethane Varnish
 Stain
 Acrylic paint/varnish

2 marks (2 marks)

(ii) **Magazine file B**

Award **one** mark for a low level response:

Possible responses:
 Paint
 Lacquer
 Wet & dry paper emery cloth- rub it down - brasso
 Spray paint
 Car paint

1 mark

Award **two** marks for any suitable specific finish:

Possible responses:

Gloss paint, acrylic paint

‘Hammerite’

‘Smoothrite’

Powder/plastic coating

Anodised (aluminium only)

Cellulose spray

Aluminium or stainless steel, no finish required

Galvanize

Chrome Plate

2 marks (2 marks)

Total 13 marks

Question 7

- (a) Any stability related response
Spreads the load

1 mark

Qualification

1 mark (2 marks)

- (b) (i) Award **one** mark for a correct response:

Castor/wheel

1 mark (1 mark)

- (ii) Any movement related response

1 mark

Qualification

1 mark (2 marks)

Total 5 marks

Question 8

- (a) Award **one** mark for a correct response:

Screw/screw thread

(1 mark)

0 marks for Cramp G cramp

- (b) Award **one** mark **each**, for **two** correct responses.

When the handle is turned around, the mechanism shown as **Part E** converts **ROTARY (accept rotating rotation)** motion into **LINEAR** motion.

(2 marks)

Total 3 marks

Question 9

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

	Input	Process	Output
The lamp	<i>The handle is turned in a clockwise direction</i>	<i>The mechanism turns</i>	<i>The lamp is clamped to the table</i>
The paper punch	<i>The handle is pushed down</i>	<i>The mechanism pushes the cutters/ punches down</i>	<i>The paper is punched/ the holes are made</i>
The pencil sharpener	<i>The handle is turned round</i>	<i>The cutters shave the pencil</i>	<i>The pencil is sharpened</i>

(6 marks)

Total 6 marks

Question 10

(a) Award **one** mark for **each** correctly entered cell.(b) Award **one** mark for a suitable product.

Scale of Production	Description	Product
One-off production	<i>A single product is made. Very labour intensive</i>	<i>e.g. The Millennium Dome, expensive jewellery. Must be a unique product</i>
Batch Production	<i>Machinery can be used to make batches of different products</i>	<i>e.g. CD racks</i>
Mass Production	<i>Many identical products can be made</i>	<i>e.g. Cars</i>
Continuous/flow line Production	<i>Non stop production 24/7</i>	<i>e.g. Oil</i>

(8 marks)

Total 8 marks

Question 11

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

Description	Tool
Measuring a 50 mm length of nylon rod	A Ruler
Measuring a 1100 mm width on a sheet of MDF	D Tape measure
Marking a line parallel to an edge on a piece of wood	C Marking gauge
Marking a line at right angles to an edge on a piece of wood	B Tri square

(4 marks)

Total 4 marks

Question 12

(a) Award **one** mark for **each** correctly identified product.

Only items from the given list. No repeats.

CE	Any product	1 mark	(1 mark)
BEAB	Electric iron Electric lawn mower	1 mark	(1 mark)
BTMA	Child's tricycle, sunglasses, baseball hat, board game	1 mark	(1 mark)

(b) Any **two** correctly identified reasons

Possible responses:

Any reference to the symbol showing that the product has been tested/passed tests. 1 mark (1 mark)

Any reference to the symbol giving reassurance to the customer of the products' safety. 1 mark (1 mark)

Two correct explanations:

Quality, a quality product - consumer confidence
Suitability for the target market - can children play with it?
Safe, because it has passed tests.

(2 x 1 mark)

Total 7 marks

Question 13

- (a) Award **one** mark for each of the following details.

Possible responses for the smaller one (reverse for the larger one to give a similar mark):

The materials cost less
There are fewer parts used
It is smaller in size
It is a simpler shape
It is more suited to quantity production
It is less complex
Lower manufacturing costs

(3 marks)

- (b) Award **one** mark for each of the following details.

Possible responses if candidate opts for picture 1:

It has a large handle
It has a longer handle
It is more stable
It is heavier so will stay put
It contains more staples
It looks more comfortable to use

Possible responses if candidate opts for picture 2:

It is smaller, more compact
It can be used single handed
It is more portable - goes in a pocket – can be used anywhere
It looks more comfortable to use

(3 marks)

- (c) Award **one** mark for each of the following details.

Possible responses if candidate opts for picture 1:

(0 marks if candidate opts for picture 2)

It is made from stronger materials
It is made from more durable materials
It is a heavy duty construction
It has a large handle
It has a longer handle
It is more stable
It is heavier so will stay put
It contains more staples
It looks more comfortable to use

(3 marks)

Total 9 marks

TOTAL MARKS ON PAPER 125