



## **General Certificate of Secondary Education**

# **Design and Technology (Resistant Materials Technology) Foundation Tier (3545/F) Full Course**

For Publication

## **Mark Scheme**

*2007 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.

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

Possible responses:

1. Must be stylish attractive colourful etc.
2. Must be soundly constructed
3. Must be capable of being manufactured in quantity
4. Must be safe to use
5. Must hold computer games
6. Must be easy to access computer games, use of compartments
7. Must be stable
8. Must be durable
9. Big/strong etc (1) if not qualified
10. Environmentally friendly materials, processes etc
11. Cost effective
12. Knock Down potential for ease of delivery POS etc

*4 x 1 mark*

Any **four** relevant explanations

Possible responses:

1. You are more likely to sell a stylised design
2. The storage system must be capable of robust use
3. This will ensure that the price is kept low and the quality kept high
4. No one should injure themselves when using the storage system
5. This is the basic function of the design
6. If it is difficult to use customers will not buy it
7. If it falls over it could injure someone or break the CD cases
8. The customer will want the product to last for a few years

*4 x 1 mark*

**8 marks**

**2 Quality of sketches**

Quality 3D rendered sketches	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 explanation	3 marks
Simple explanation	2 marks
Labelling	1 mark

**Variety of Ideas**

Mark each idea separately against the following scheme:

An excellent idea which, differs in approach or principal, fulfils the design brief, specification and shows originality.	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 differs in approach or principle, fulfils some of the design brief and the specification.	3 marks
An idea which is a development of one of the other ideas.	2 marks
A simple idea or an idea which is very similar to the other ideas.	1 mark

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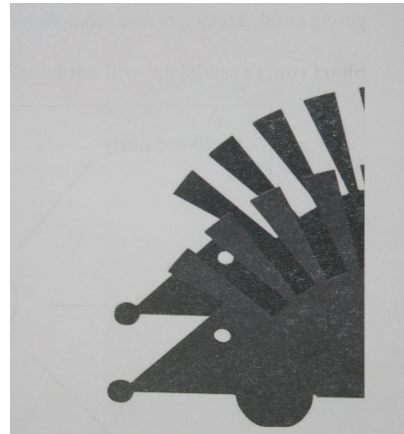
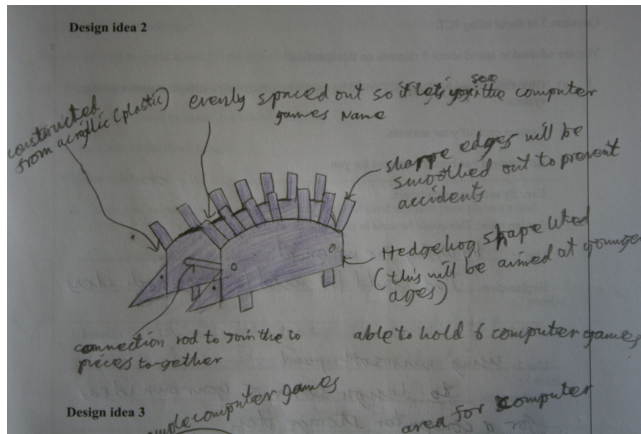
An idea which is similar to the hedgehog as shown overleaf, but which has been developed in some way by the candidate.

3 - 4 marks

An idea which is very similar to the hedgehog.

1 - 2 marks

3 x 6 marks



27  
marks

- 3 (a)** Any **three** correct ways of using ICT to help **design** the computer games storage system.

Possible responses:

1. Interrogating a CD Rom database
2. By using a word processing package e.g. Word
3. By using the internet
4. By using a graphics software package e.g. 2-D Design Corel Draw, Google Sketchup ProDesktop etc.
5. By using e-mail
6. By using video conferencing
7. By using a fax machine
8. By using a mobile phone
9. By using a digital camera
10. By using a scanner

*3 x 1 mark*

Any **three** relevant explanations

Possible responses:

1. To gain information about materials
2. To produce a letter requesting information from someone
3. To contact other relevant companies
4. To draft out ideas, easy to make changes, more accurate
5. To communicate with a manufacturer
6. To communicate with a group of people
7. To send a letter quickly to someone
8. To telephone someone for information
9. To photograph the manufacture if a project
10. To copy an image for use in a design folder

*3 x 1 mark*

- (b)** Any correct way of using ICT to help **make** the computer games storage system.

Possible responses:

1. By using a laser cutter
2. By using a 3D router
3. By using a CNC machine
4. Out-sourcing answers acceptable

*1 mark*

Any relevant explanation

1. To improve the accuracy of the components
2. To increase the speed of manufacture
3. To reduce the unit costs
4. Quality
5. Buy materials on-line

*1 mark*

**8 marks**

**4 (a) Design one could be made from wood, metal or plastic.**

Award **one** mark for the generic term plastic + thermo/setting plastic.

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

Possible responses:

- ABS
- GRP
- HIPS
- Polycarbonate
- Polypropylene
- HDPE (Polythene)
- PVC
- Acrylic

*2 x 1 mark*

Reasons

Possible responses:

- Immaculate surface finish
- Self coloured
- Ideal for quantity production
- Easily worked by hand
- Durable strong
- Weatherproof

*1 x 1 mark*

Award **one** mark for the generic term metal

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

Possible responses:

- Steel
- Aluminium
- Brass

*2 x 1 marks*

Reasons

Possible responses:

- Good strength to weight ratio
- Durable strong
- Cost (inexpensive)
- Suitable for quantity production

*1 x 1 mark*

Award **one** mark for the generic term wood + hardwood / softwood / manufactured board

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

Possible responses:

- Beech
- Ash
- Oak
- Teak
- Mahogany
- Pine
- Plywood
- mdf

*2 marks*

Reasons

Possible responses:

- Attractive
- Strong
- Durable

*1 mark*

(b) Use the descriptors below to award marks.

### **Quality of notes and sketches**

Detailed notes and quality sketches

*3 - 4 marks*

Simple notes and sketches

*1- 2 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*

or

### **Marking out CAD**

Screen

*1 mark*

With image

*1 mark*

Mouse or any control information

*1 mark*

Suitable graphics package e.g. Pro Desktop, 2D Design

*1 mark*

Corel Draw



### **Cutting and shaping**

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

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

or

### **Cutting and shaping CAM**

Transfer of data to *1 mark*

Laser cutter or CNC router – sketch or described *1 mark*

Process described per detail *1 mark*

Laid or held on bed – vacuum or cramp *1 mark*

Safety points *1 mark*

*Max. 4 marks*

### **Bending / joining**

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

Sufficient detail for some of the design to be bent and joined by a third party, some tools and equipment given. *1 - 2 marks*

### **Finishing**

Sufficient detail for most of the design to be finished by a third party, most tools and equipment given. *2 marks*

Sufficient detail for some of the design to be finished by a third party, some tools and equipment given. *1 mark*

or

### **Finishing (CNC cut)**

Reference to the fact that a laser cut stand would not need finishing as the laser produces a good quality finish.

or

A work piece coming from CNC router is not good enough to satisfy and needs further finishing which is described *2 marks*

‘No finish required’ without explanation. *1 mark*

**21  
marks**

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

<b>Personal safety equipment</b>	<b>Name</b>	<b>Process</b>	<b>Hazard</b>
<b>A</b>	<i>Ear defenders</i>	<i>When machining a piece of wood</i>	<i>The noise is too loud and could harm your hearing</i>
<b>B</b>	Apron Overall	Any general workshop process	Your clothes could become damaged or trapped by the process
<b>C</b>	Goggles	Any process where there is potential for damage to the eyes	Something could damage your eyes
<b>D</b>	Gloves	Any process where there is potential from damage to the hands	Your hands could be cut or burned
<b>E</b>	Dust mask	Any process where there is potential for damage to the respiratory system	You could inhale dust fumes.

**12 marks**

**6 (a) Remote control holder A**

Award **one** mark for the generic term wood + softwood/hardwood/manufactured board.

Award **two** marks for a suitable solid wood or manufactured board.

Possible responses:

- pine
- beech
- oak
- ash
- mahogany
- plywood
- MDF / chipboard if veneered

*2 x 1 mark*

Reasons

Possible responses:

- Attractive, takes a good finish
- Strong
- Durable
- Easily worked

*1 x 1 mark*

**Remote control holder B**

Award **one** mark for the generic term plastic + thermo/setting plastic.

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

Possible responses:

- ABS
- Acrylic
- HIPS
- Polycarbonate PC
- Polypropylene PP
- HDPE
- PVC
- GRP
- Glass

*2 x 1 mark*

Reasons

Possible responses:

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

*1 x 1 marks*

**Remote control holder C**

Award **one** mark for the generic term metal.

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

Possible responses:

- Steels
- Aluminium
- Could be a plastic

*2 x 1 marks*

Reasons

Possible responses:

- Good strength to weight ratio Aluminium lightweight
- Durable
- Cost (inexpensive, mild steel)

*1 mark*

**(b) Remote control holder A**

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

Possible responses:

- Varnish
- Paint
- Polish

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

Possible responses:

- Wax
- Polyurethane / acrylic varnish
- Stain
- Natural
- Oils

*2 x 1 marks*

### **Remote control holder C**

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

Possible responses:

- Paint
- Polish
- Plastic
- Spray
- Brasso

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

Possible responses

- Gloss paint
- 'Hammerite'
- 'Smoothrite'
- powder / plastic coating
- anodised (aluminium only)
- Cellulose spray
- Galvanize
- Brushed or engine turned (al or st. steel)
- Chromed
- Polish with brasso

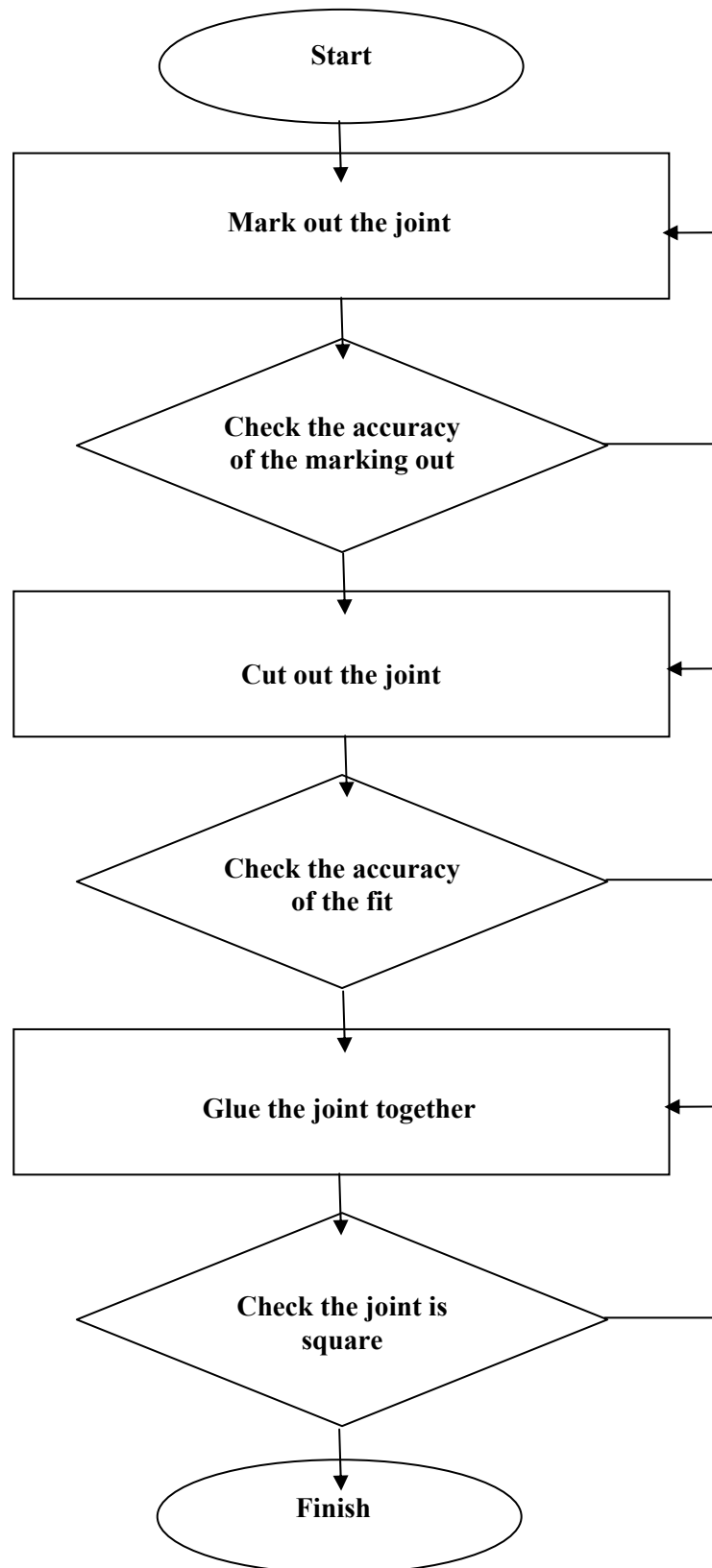
*2 x 1 marks*

**13 marks**

**7** Award **one** mark for **each** correctly placed statement. *8 x 1 marks*

Award **one** mark if **all** the vertical arrows are correctly placed *1 mark*

Award **one** mark for **each** correctly placed feedback arrow. *3 x 1 marks*



**12 marks**

**8** Award one mark for each correctly placed letter. *4 x 1 marks*

Award one mark for each correctly named file. *4 x 1 marks*

Shape	Letter	Tool name
<b>1</b>	B	Round / rat tail file
<b>2</b>	C	Half round file
<b>3</b>	A	Hand or flat file accept Bastard
<b>4</b>	D	Needle / warding file

**8 marks**



- 9** (a) Award **one** mark for **two** correctly identified advantages.

Possible responses:

1. There is no cord / portable
2. There is no chuck key
3. It can be used as a powered screwdriver
4. It is battery powered
5. It has a comfortable grip / better balanced single hand use
6. Free-standing
7. Variable torque
8. Won't electrocute you

*2 x 1 mark*

Award **one** mark each for **two** suitable explanations.

1. Therefore no one will trip over it
2. This makes it more convenient to change drills
3. therefore it is more versatile
4. It does not need a mains connection
5. It will be more pleasant to use

*2 x 1 mark*

- (b) Award **one** mark for **one** correctly identified disadvantage.

Possible responses:

- The battery has a limited amount of charge
- The cordless drill is less powerful than the mains operated drill.
- Only one handle for control etc.

*1 x 1 mark*

Award **one** mark each for **one** suitable explanation.

*x 1 mark*

**6 marks**

- 10** (a) Award **one** mark for **three** correctly identified types of market research.

Possible responses:

- Asking consumers to complete a questionnaire
- Carrying out an interview with potential customers
- Having a telephone conversation with a potential customer
- Emailing potential customers
- www, look in books/magazines
- focus groups
- look at existing research
- wikipedia

*3 x 1 marks*

- (b) Award up to **two** marks for a correct explanation.

Possible responses:

- To find out the consumers' preferences
- To find out if there is a demand for the product
- One explanation well reasoned

*2 x 1 marks*

- (c) Award **one** mark for **three** correctly identified methods of advertising.

Possible responses:

- On TV
- On the radio
- Via the newspaper
- Via magazines
- Via email
- Via the telephone
- Via a flier/in shops
- Posters/billboards
- Internet/pop-ups
- A promotion

*3 x 1 marks*

- (d) Award up to **two** marks for a correct explanation.

Possible responses:

- To make consumers aware of the product
- To improve sales of the product
- Profit related

*2 x 1 marks*

**10 marks**