



General Certificate of Secondary Education

Design and Technology: Product Design (3544)

Foundation Tier

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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

Copyright © 2005 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.

ASSESSMENT AND QUALIFICATIONS ALLIANCE
GENERAL CERTIFICATE OF SECONDARY EDUCATION

June Examination 2005

DESIGN AND TECHNOLOGY: PRODUCT DESIGN

FOUNDATION TIER

Question 1

(a) 1 mark each up to a maximum of 8 marks

Trees and plants	Oil
Starch, cardboard, cartridge paper, beech, MDF, Lentils, chipboard, pine, cotton	Nylon, acrylic, polyester, PVC, polythene
animals	Ground
Wool, tuna, cheese, lard, silk,	Copper, earthenware clay, mild steel, aluminium, porcelain

Accept any 8 correct answers

(8 marks)

(b) Timber, paper/card, natural and regenerated textiles – cotton, wool, silk, linen, acetate, viscose, all food materials. (1 mark)

(c) Metals, plastics, ceramics, synthetic fibres. (1 mark)

Total 10 marks

Question 2

- (b) Design is aesthetically pleasing and made up entirely of geometric shapes. (5-6 marks) (6 marks)

Design is visually disjointed or shapes other than geometric ones have been used. (3-4 marks)

An attempt has been made to draw a product but the arrangement is poor and shapes other than geometric ones have been used. (1-2 marks)

A maximum of 2 marks if only one geometric shape is used.

- (c) Main process is clearly explained and is feasible. All vital information included. Specific materials have been named. (4 marks) (4 marks)

Main process is clearly explained and is feasible but there may be some gaps in vital information. (3 marks)

Process is noted but these are brief and hard to follow. Some gaps in vital information. May use generic terms. (2 marks)

At least one piece of vital information included. (1 mark)

Accept answers which relate to their own manufacture of a model or prototype as well as those related to commercial manufacture.

- (d) Colour **and/or** tone/texture has been applied carefully and gives a strong impression of the material used. Candidate shows understanding of form/light/shadow. (4 marks) (4 marks)

Candidate has made a good attempt to add colour **and/or** tone/texture but the end result may be messy or lacking skill. (3 marks)

Colour/tone/texture has been applied to the majority of the design. (2 marks)

Some colour or tone/texture has been added. (1 mark)

Total 14 marks

Question 3

- (a) Three distinctly different answers required such as:
- | | |
|---|----------|
| Plays music | (1 mark) |
| pocket sized | (1 mark) |
| has headphones/earpieces | (1 mark) |
| operating controls (do not accept just “buttons”) | (1 mark) |
| easy to carry | (1 mark) |
| shape/style | (1 mark) |
| batteries | (1 mark) |

Any combination up to a maximum of 3 marks (3 marks)

- (b) (i) Any named product such as trainers, cycles, clothing, electrical goods where there has been some development. (1 mark)

- (ii) Changes due to areas such as:
- | | |
|--|-----------|
| New markets created | (2 marks) |
| Development of new technologies | (2 marks) |
| Development of new materials | (2 marks) |
| Development of new manufacturing methods | (2 marks) |
| Fashion trends | (2 marks) |
| Social changes | (2 marks) |

- Accept:
- | | |
|-----------------|-----------|
| Technology push | (2 marks) |
| Market pull | (2 marks) |

1 mark each for brief answer which might be generic, 2 marks for fuller answer which is clearly related to the named product, maximum of 4 marks. (4 marks)

Total 8 marks

Question 4

(a) Requirements

Any sensible requirement such as:

Easily foldable, must insulate pizza, printed image, easy to carry etc.

Accept generic packaging criteria – preserve, protect, contain, inform, transport, which can all relate to take away pizza but do not accept display for this context, recycle. (1 mark each)

Reasons

Sensible answers related to requirements such as:

Easily foldable - saving time, staff ability

Must insulate – keep hot, prevent bacterial growth

Printed image – advertise/promote product or company

Easy to carry – might need to carry several, must fit into delivery box

Benefits to the environment

(1 mark each)

Any combination of correct answers up to a maximum of 4 marks

(4 marks)

(b) Any of the following:

low cost, good insulator, strength to weight ratio, rigid, easy to print onto, recyclable. (1 mark each)

Up to a maximum of 2 marks where candidate has included more than one criteria

(2 marks)

(c) (i) Mixture of two materials.

Created to improve the properties.

(2 marks for full explanation)

(1 mark for single word answer)

(2 marks)

(ii) improve insulation,

moisture retention,

grease prevention etc.

hygiene, etc

(2 marks for full explanation)

(1 mark for single word answer)

(2 marks)

(d) Sketch or symbol which relates to litter

Well drawn simple symbol

(3-4 marks)

(4 marks)

Basic rough sketch

(1-2 marks)

Give half marks credit for recycling logo

Well drawn symbol

(2 marks)

Basic rough sketch

(1 marks)

(e) (i) Accurate square which is 120mm – acetate provided

(3 marks)

(3 marks)

Within 2mm tolerance

(2 marks)

Resembles a square but may be freehand drawn or inaccurate.

(1 mark)

(ii) Pizza Chef is drawn well with letter forms easily readable and well positioned. Spelling is correct and the design has some visual impact. (5-6 marks) (6 marks)

Text is well drawn but the candidate has used “bubble writing” or similar font which is not commercially viable. (3-4 marks)

Text is poorly drawn or poorly positioned on the overall layout. (2 marks)

Poorly drawn text and poorly positioned. (1 mark)

Maximum of 5 marks if design relies on more than one colour

(f) Any suitable program such as Photoshop, Corel Draw, 2D Design Tools Publisher, etc. (2 marks) (2 marks)

Unsuitable named program, such as Word. (1 mark)

Drawn by hand and scanned or drawn directly in graphics program. Text applied in named program. (3 marks) (3 marks)

Use of digital camera to capture image text done in named program. (2 marks)

Use of clip art. (1 mark)

Total 28 marks

Question 5

- (a) (i) Any suitable material which can be moulded, stamped, milled etc, Plywood, MDF, aluminium, Polystyrene, felt, fabric (specific), clay, card, biscuit mix, pastry, acrylic, etc. (1 mark)
- (ii) Any sensible reason related to chosen material such as:
Ease of production, cost of material, availability (2 marks) (2 marks)
Single word answer (1 mark)
- (b) An accurate description of the process such as casting, injection moulding, laser-cutting, die-cutting, milling etc. is required. The process chosen must be feasible for this quantity and related to school production.
- (i) Clear and accurate description where candidate shows a full understanding of the process and has taken account of repeatability through moulds, jigs, formers CAD/CAM etc. (4 marks) (4 marks)
Candidate shows some understanding but response is lacking in some areas. (2-3 marks)
Simple division of labour with no reference to manufacturing aids. (1 mark)
- (ii) Correctly named tools & equipment (up to three examples). - appropriate to the process described (1-3 marks) (3 marks)
- (iii) Clarity of communication:
Drawings and notes are easy to follow. Candidate has laid out process sequentially. (3 marks) (3 marks)
Drawings and notes are detailed but they are not easy to follow or may be superficial in detail. (2 marks)
Clear sketches without notes or clear notes without sketches. (1 mark)
- (c) Appropriate decoration techniques might include: printing, painting, texturing, engraving, glazing, icing, embossing, embroidery etc. depending on the material used.
Decoration is appropriate to the leaf and adds visual impact. The process, which will be suitable for a batch of 50 is clearly explained and takes account of repeatability and accuracy. (3-4 marks) (4 marks)

Decoration is generally appropriate to the leaf and adds visual impact. The process is reasonably explained but may not take account of repeatability and accuracy or may not be suitable for the scale of production. (2 marks)

Decoration provides some visual impact. (1 mark)

(d) Response needs to deal with quality systems and should take note of manufacturing aids.

A full response which might include:

QA is clearly accounted for through the choice of process, such as CAM, which ensures consistency. Materials are checked, samples are taken at various stages. Final check against agreed sample.

(3 marks)

(3 marks)

A more superficial response may refer to checks being made at various stages of production.

(2 marks)

Final inspection against agreed sample only.

(1 mark)

(e) Any 2 sensible safety rules which is related to named processes such as:

Tie back loose hair, wear goggles, clamp work prior to drilling, ensure guards are in place etc. (2 x1 mark)

Any 2 sensible reasons related to rule which shows understanding such as:

Loose hair can get tangled in moving machinery
Particles from drilling might damage unprotected eyes
Work might spin round and cause danger etc.

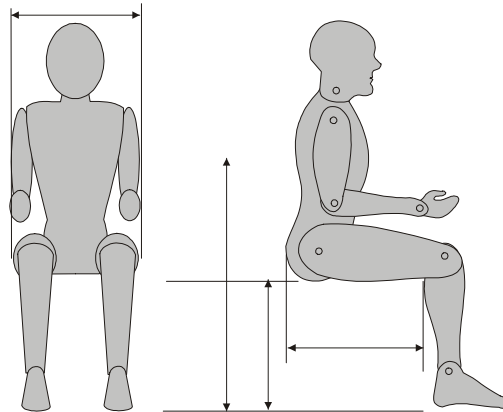
(2 x 1 mark)

(4 marks)

Total 24 marks

Question 6

- (a) Diagram and notes which show:
- | | | |
|---|-----------|-----------|
| Seat height - floor to under knee when seated. | (1 mark) | |
| Seat depth – calves to rear of buttocks when seated. | (1 mark) | |
| Seat width – width of hips. | (1 mark) | |
| Backrest/Headrest height. | (1 mark) | |
| Clarity of communication. | (2 marks) | (6 marks) |
| (To achieve 2 marks for C of C must show at least 2 measurements) | | |







- (b) Anthropometrics (2 marks) (2 marks)
Ergonomics (1 mark)
- (c) (i) Improvements to grip with slimming of body, improved texture (3-4 marks) (4 marks)
- Attempt at finger grips or improved texture (1-2 marks)
- Give higher mark if well drawn or notes added, lower mark if communication is poor.
- (ii) Full explanation (2 marks) (2 marks)
Single word answer (1 mark)

- (d) A clear plan which makes good use of the space available and provides a reduced working triangle between sink, cooker and fridge. Cooker and fridge moved but not adjacent to one another. Accept a linear layout (person at apex) Triangle clearly shows that candidate understands the concept (4 marks) (4 marks)
- Positioning offers limited improvement and may be poorly communicated through diagram. (3 marks)
- An attempt has been made to move items but understanding is not obvious or there may be serious flaws in the revised design. (2 marks)
- Diagram might be unclear or poorly drawn. (1 mark)
- (e) Explanation which is clear and logical showing full understanding of working triangles. References to less movement/reaching. (3 marks) (3 marks)
- Shows some understanding of reducing the amount of movement between working areas. (2 marks)
- Has explained the thinking but there is a serious flaw in the design concept. (1 mark)

Total 21 marks

Question 7

- (a) Fully correct answer (2 marks)
 Partially correct answer (1 mark)
Reward any two up to a maximum of 4 marks (4 marks)

 <p>Hand wash only, usually 40 degrees</p>	 <p>Product suitable for freezing</p>
 <p>Low battery, recharge/replace</p>	 <p>Product easily damaged by flame e.g. (upholstery)</p>

- (b) Complete answer for full marks (2 marks each)
 Component identified such as “tyres” but without maintenance task (1 mark)

Any from:

Bike

Chain - tension/oil,

brakes – cable adjustment/check blocks,

Tyres – pressure/tread wear,

steering head – undue play adjusted,

crank – undue play adjusted,

wheel nuts – tight,

bearings- tight, wheel

handlebar – tight,

seat – correct height/tight etc.

Cleaner

Empty and clean pan,

change filters,

unclog brushes,

check tubes for blockages,

check cable for damage

Computer

Defragmentation,

disk cleanup,

virus checks,

file management,

download software updates etc.

cleaning

charging the battery

Up to maximum of 6 marks

(6 marks)

Total 10 marks

Question 8

- (a) Any sensible answer which relates to chosen product such as:
 block models, vacuum formed casings, construction kits, paper/card models, using cheaper materials, Pasticine/clay models computer modelling such as Prodesktp, spreadsheet/nutritional modelling for chocolate bar.
- | | | |
|---|-----------|-----------|
| Full, answer which includes material and how done | (3 marks) | (3 marks) |
| Brief answer which omits either material or process | (2 marks) | |
| Single word/phrase answer | (1 mark) | |
- (b) Any sensible test described such as:
 Durability/wear testing,
 consumer surveys,
 ergonomic testing,
 taste panel tests,
 tests against specification,
 tests to destruction,
 flammability,
 washing etc.
- | | | |
|-----------------------------|----------------|-----------|
| Full answer | (2 marks each) | (4 marks) |
| Single word/phrase answers. | (1 mark each) | |
- (c) Confidence that some independent testing/approval
 have taken place
- | | | |
|--|-----------|-----------|
| | (3 marks) | (3 marks) |
| Reference to British Standards or similar acceptable | (2 marks) | |
| Product is safe | (1 mark) | |

Total 10 marks