



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCE

Design and Technology

Product Design

Unit PD1D

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3D Design Unit 1 (PD1D)

Quality of Written Communication

The following marks are allocated to the quality of the candidate's written communication. Make a separate assessment of the candidate's overall ability as demonstrated across the paper using the criteria given below.

| <i>Performance Criteria</i> | Marks |
|--|--------------|
| The candidate will express complex ideas extremely clearly and fluently. Sentences and paragraphs will follow on from one another smoothly and logically. Arguments will be consistently relevant and well structured. There will be few, if any, errors of grammar, punctuation and spelling. | 4 |
| The candidate will express moderately complex ideas clearly and reasonably fluently, through well-lined sentences and paragraphs. Arguments will be generally relevant and well structured. There may be occasional errors of grammar, punctuation and spelling. | 3 |
| The candidate will express straightforward ideas clearly, if not always fluently. Sentences and paragraphs may not always be well connected. Arguments may sometimes stray from the point or be weakly presented. There may be some errors of grammar, punctuation and spelling, but not such as to suggest a weakness in these areas. | 2 |
| The candidate will express simple ideas clearly, but may be imprecise and awkward in dealing with complex or subtle concepts. Arguments may be of doubtful relevance or obscurely presented. Errors in grammar, punctuation and spelling may be noticeable and intrusive, suggesting weaknesses in these areas. | 1 |

NB This mark scheme is intended as a guide to the type of answer expected but is not intended to be exhaustive or prescriptive. If candidates offer other answers which are equally valid **they must be given full credit.**

Many responses at this level are assessed according to the **quality** of the work rather than the number of points included. The following level descriptors are intended to be a guide when assessing the quality of a candidate's response.

The candidate has a basic but possibly confused grasp of the issues.
Few correct examples are given to illustrate points made. Description may be unclear.

(low mark range)

The candidate has some knowledge but there will be less clarity of understanding.
Some correct examples given to illustrate points made. Description better but unclear or confused in parts.

(mid mark range)

The candidate has a thorough understanding of the issues and has provided relevant examples to support the knowledge shown. This candidate's answer shows clear evidence of understanding.

(high mark range)

In questions asking candidates to link properties to the product they must explain why the properties are useful in the product.

If only a list of generic properties is given
e.g. malleable, durable, recyclable, light-weight, cheap, readily available. **Max mark = 3**

Question 1**NB** Take care not to double penalise

- (a) (i)
- Chopping board-Birch, Pine, Beech, teak, oak, rubber wood etc. (No manufactured boards)
 - Washing up bowl-Polyethylene, HDPE, Polypropylene, etc Not acrylic
 - Bread bin-Stainless steel, aluminium
 - Soap Dispenser – PET, HDPE, etc Not acrylic.

If more than one material is given and one of them is incorrect, award no mark.

(2 x 1 mark)

- (ii)
- Basic explanation with a few basic points
E.g. *its 'strong', won't rust in use'* (1 - 2 marks)
 - Better explanation with a number of correct points linked to product/application
E.g. *'Its hard, resists scratches and abrasion, hygienic and easy to clean'.* (3 - 4 marks)
 - Full explanation with all points linked to the product/application. (5 – 6 marks) (2 x 6 marks)
- (iii)
- Basic diagram of a suitable manufacturing process with a few points labelled.
(1 mark for stating correct process) (1 - 3 marks)
 - Better diagram with all points labelled and some explanatory notes. (4 - 6 marks)
 - Detailed diagram with all points labelled and a good explanation of the process. (7 – 9 marks) (2 x 9 marks)

NB Accept press forming for bread bin. Accept rolling from sheet steel.

Give credit for additional components being described.

Do not accept vacuum forming for washing up bowl.

- (b) **NB** Do not mark **quality** of sketch
- Product sketched. Material or materials listed with basic justification (1 - 3 marks)
 - Product sketched. Material or materials listed with better justification
E.g. linking properties to application, cost, availability and or method of manufacture. (4 - 6 marks)
 - Product sketched. Material or materials listed with full justification, linking properties to application, cost, availability and or method of manufacture. (7 - 8 marks) (8 marks)

Total 40 marks

Question 2

- (a) Description of two KD joints and how they function with supporting diagrams, showing their use in manufacturing furniture.

1 mark for correct name of KD fitting

- Basic description of general use with several points omitted. Diagram unclear
OR 'dry' mortice and tenon, dovetail etc. (1 - 2 marks)

- Better description 1 or 2 points missing. Good diagram (3 - 4 marks)

- Full description with detailed explanation of function and use. Diagram correctly labelled.

Accept screws, nuts and bolts etc. (5 - 8 marks) (2 x 8 marks)

- (b) (i) **Advantages of KD fittings to the manufacturer**

- Speed of manufacture
- Flat pack storage-less warehousing
- Reduced transport costs
- Automated/CNC manufacture of joints
- Skilled joiners/cabinet maker not required
- Cheaper to manufacture

- (ii) **Advantages of KD fittings to the consumer**

- Easy to assemble with basic tools
- Easy transport home/upstairs
- Cheaper product
- Disassemble if move house
- Off the shelf purchase
- 'Satisfaction' of home assembly (2 x 6 marks)

Breakdown 1 –2 marks per relevant point (max 6)

Total 28 marks

Question 3(a) **Common application for the following materials:**

- (i) **Layout paper**-drafting designs. Can be used for overlays. Marker rendering etc.
- (ii) **Acrylic sheet**-Windows, fashion accessories/jewellery, signage etc.
- (iii) **Self adhesive vinyl**-CAD/CAM applications, lettering/logos etc. (not floor tiles, tape, etc).
- (iv) **Corrugated polypropylene sheet** ('Correx')-POS/flat-pack applications, modelling etc., packaging.

(Not roofing or insulation)

(4 x 1 mark)

(b) **Suitability for application**

NB Take care not to double penalise.

- (i) **Layout paper**-thin transparent nature. Grain of surface takes pen, marker etc well. Bleed proof versions available etc.
- (ii) **Acrylic sheet**-available in a range of colours, can be line bent, vacuum formed, cut, drilled, etc.
- (iii) **Self adhesive vinyl**-available in a range of colours, can be printed on. Long/wide roll etc.
- (iv) **Corrugated polypropylene sheet** (Correx)-available in a range of colours. Can be cut, bent, drilled etc.

(4 x 6 marks)

Breakdown 1 –2 marks per relevant point (max 6)

Total 28 marks

Question 4(a) (i) **ABS (Vacuum cleaners)**

- Impact resistance.
- Easy to injection mould.
- Variety of colours & surface finishes.
- Lightweight/insulator.
- Etc.

- (ii) • **Hardwood (window frames)**
- Resistant to weathering.
 - Can have a variety of finishes applied to it
 - Machines well (doesn't split etc).
 - Aesthetic qualities.
 - Availability/cost compares to UPVC.
 - Etc.

Give credit if specific hardwood named

(iii) **Polycarbonate (Mobile phone screens)**

- Cost compared to toughened glass.
- Greater impact resistance than glass and acrylic.
- Scratch resistance.
- Suitable for injection moulding.
- Clarity/optical properties.
- Etc.

Breakdown 1 - 2 marks per relevant point (max 6)

(3 x 6 marks)

- (b) (i) Any suitable material
Examples (but not exhaustive) alternative materials
- ABS – Acrylic
HIPS
Polycarbonate
HDPE
P.P.
Cast aluminium
Etc.
 - Hardwood – UPVC (Not PVC, ABS, Acrylic)
Aluminium/steel/cast iron.
Pine/softwood
 - Polycarbonate – Acrylic
Toughened glass
Laminated glass
(Not simply ‘glass’) (1 mark)
- (ii) **N.B.** take care not to double penalise
- Basic explanation with a few basic points (1 - 2 marks)
 - Better explanation with a number of correct linked to application or production (3 - 4 marks)
 - Full explanation with all properties linked to application or production (5 - 6 marks)
- Breakdown 1 – 2 marks per relevant point (max 6)
- (iii) Suitable health and safety precautions given
- E.g. Guarding of machines
- Personal Protective clothing 1 mark/relevant point
 - Training, etc.
 - Dust extraction
 - Fume extraction (max 3 marks)
- N.B.** max 1 mark for a list of health and safety clothing items e.g. goggles, mask, overalls etc. **Total 28 marks**

Question Total 96 marks

Quality of Written Communication 4 marks

Paper Total 100 marks