

General Certificate of Education
June 2006
Advanced Subsidiary Examination



DESIGN AND TECHNOLOGY: PRODUCT DESIGN PD1D
(3D DESIGN)
Unit 1 Materials and Components

Tuesday 6 June 2006 9.00 am to 10.30 am

For this paper you must have:

- an unlined answer book (7024) which is provided separately
- normal writing and drawing instruments
- a colour Insert Sheet (enclosed)

Time allowed: 1 hour 30 minutes

Instructions

- Use blue or black ink or ball-point pen. Use pencil and coloured pencils only for drawing.
- Write the information required on the front of your answer book. The *Examining Body* for this paper is AQA. The *Paper Reference* is PD1D.
- Answer **three** questions.
- Answer Question 1 and any **two** of Questions 2 to 4.
- Use the Insert Sheet included to help you answer **Question 1**.

Information

- The maximum mark for this paper is 100.
4 of these marks are for the Quality of Written Communication.
- 40 marks are allocated to Question 1 and 28 to each of Questions 2 to 4.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in all answers.

Advice

- Illustrate your answers with sketches and/or diagrams wherever you feel it is appropriate.

Answer Question 1.

1 (a) Study the photographs on the Insert Sheet provided.

Choose **two** products from the list below and answer the questions which follow.

- Wooden play house
- Plastic food packaging
- Metal drinks can

- (i) Stating the **two** chosen products, name a suitable *specific* material used in their manufacture. (2 × 2 marks)
- (ii) Explain what properties make these materials suitable for these **two** chosen products. (2 × 6 marks)
- (iii) Using notes and diagrams, explain how **each** of these **two** chosen products is manufactured. (2 × 9 marks)

(b) Explain why blow moulding is used to make plastic drinks bottles. (6 marks)

Answer **two** questions from 2, 3 and 4.

2 (a) Define what is meant by the term 'smart material'. (4 marks)

(b) For each of the following smart materials, explain why they are suitable for the application given.

Smart Material	Application
(i) Shape memory alloy	Greenhouse window openers
(ii) Phosphorescent pigments	Emergency exit signs

(2 × 6 marks)

(c) Choosing a product from **one** of the areas listed below, use notes and diagrams to explain how the product you have chosen could be enhanced by the use of thermochromic pigments.

- Kitchen equipment
- Baby feeding products
- Children's toys

(12 marks)

3 For **each** of the following materials, explain why it is suitable for the products given.

Material	Product
(a) Teak	Outdoor furniture
(b) Foam board	Models
(c) Polycarbonate	CD cases
(d) Low density Polyethylene	Carrier bags
(e) Laminated card	Drinks cartons
(f) Silver	Jewellery
(g) Aluminium	Car engine parts

(7 × 4 marks)

Turn over ▶

4 Study the stool shown below.

Stool



- (a) Name a specific metal that could be used to make the **legs** of the stool. *(2 marks)*
- (b) Explain why this metal is suitable to make the **legs** of the stool. *(6 marks)*
- (c) Name a suitable paint finish and describe how it could be applied to the **legs** of the stool. *(6 marks)*
- (d) Use notes and diagrams to show how the metal legs could be attached to the plastic seat part of the stool. *(9 marks)*
- (e) The seat part of the stool is made from an injection-moulded plastic. Explain why the manufacturer has used injection moulding to make this part of the stool. *(5 marks)*

END OF QUESTIONS

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PD1D

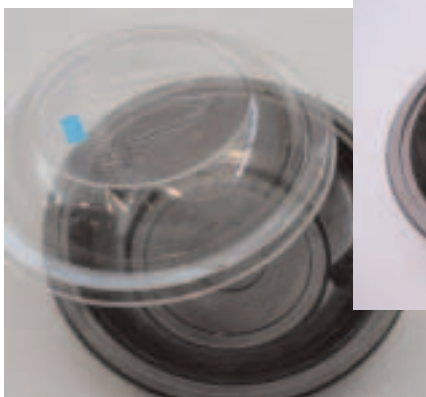
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Refer to these photographs for Question 1

Wooden play house



Metal drinks can



Plastic food packaging

