

General Certificate of Education
January 2006
Advanced Subsidiary Examination



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

Tuesday 10 January 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 **two** other questions.
- Use the Insert Sheet provided to help you answer **Question 1**.

Information

- The maximum mark for this paper is 100.
- 40 marks are allocated to Question 1, 28 to each of Questions 2 to 4, and 4 marks overall for Quality of Written Communication.
- The marks for questions are shown in brackets.
- This paper carries 30 per cent of the total marks for AS and 15 per cent for A level.
- You are reminded of the need for good English and clear presentation. Quality of Written Communication will be assessed in all answers.

Advice

- You should 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.

- Catamaran
- CD rack
- Shopping centre bench

- (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 the **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) (i) Name **one** material that has **one** of the following mechanical properties.

- Malleability
- Elasticity
- Hardness

(2 marks)

(ii) Explain what effect the property has on the use of the material you have chosen.

(4 marks)

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

- 2 (a) Define what is meant by the term 'composite material'. *(4 marks)*
- (b) Explain why composites are often better than traditional materials. *(3 marks)*
- (c) For **each** of the following composites describe why **each** is suitable for the products given.

Composite	Products
(i) Kevlar	Body armour/protective clothing
(ii) Carbon Fibre Reinforced Plastic (CFRP)	Racing bikes
(iii) Laminated chipboard	Kitchen work surfaces

(3 × 7 marks)

- 3 (a) Name a use for each of the following materials.
- (i) Medium density fibreboard (MDF) *(1 mark)*
- (ii) High Impact Polystyrene *(1 mark)*
- (iii) Galvanized mild steel *(1 mark)*
- (iv) Styrofoam *(1 mark)*
- (b) For **each** of the materials listed in part (a) explain why it is suitable for the use you have given. *(4 × 6 marks)*

Turn over for the next question

Turn over ▶

4 Study the photographs of a wooden sun sculpture (**Figure 1**) and a metal ornamental cat (**Figures 2 and 3**).

- (a) For **each** of the products, describe the *specific* materials used and its method of manufacture. You should explain why the materials used in each are suitable for the products shown. (2 × 12 marks)



Figure 1 Wooden sun sculpture



Figure 2 Metal ornamental cat



Figure 3 Close up detail of metal ornamental cat

- (b) For **one** of the products pictured above, describe a finish that could be used. (4 marks)

END OF QUESTIONS

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The photographs on this sheet are for use in answering Question 1

Plastic catamaran



Metal shopping centre bench



Wooden CD rack