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.  $(2 \times 2 \text{ marks})$
- (ii) Explain what properties make these materials suitable for the **two** chosen products.
- (iii) Using notes and diagrams, explain how each of these two chosen products is manufactured.
  (2 × 6 marks)
  (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

 $(3 \times 7 marks)$ 

**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.  $(4 \times 6 \text{ marks})$ 

#### Turn over for the next question

- 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.  $(2 \times 12 \text{ marks})$

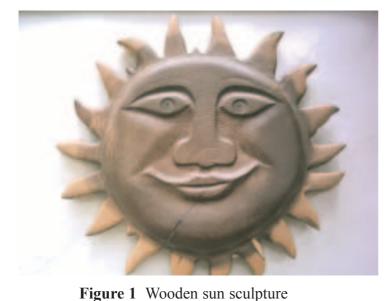




Figure 2 Metal ornamental cat



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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ALLIANCE

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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

#### M/Jan06/Insert to PD1D

# **Insert to PD1D**