

General Certificate of Education
June 2006
Advanced Level Examination



DESIGN AND TECHNOLOGY: PRODUCT DESIGN PD6D
(3D DESIGN)
Unit 6 Written Paper

Friday 16 June 2006 9.00 am to 12 noon

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: 3 hours

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 PD6D.
- Answer **four** questions.
- Answer **one** question from each of Sections A, B and C and **one** other question from any section.
- Use the Insert Sheet provided to help you answer **Question 1** and **Question 4**.

Information

- The maximum mark for this paper is 100.
4 of these marks are for the Quality of Written Communication.
- There are 24 marks for each question.
- 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 **one** question from **each** of the three sections and **one** other question from any section.

SECTION A

Materials and components

1 The Insert Sheet shows three different types of dining chair (**Figures 1, 2 and 3**).

Name the specific materials used in the manufacture of **each** chair and explain why your named materials are suitable.

You should make reference to the following in your answer:

- the physical and mechanical properties of the named materials with regards to the function and manufacture of each chair,
- the method of manufacture of each chair. (3 × 8 marks)

2 (a) The physical properties of *smart materials* change in response to specific inputs.

- (i) Name a 'smart' material. (2 marks)
- (ii) Name a specific product which has benefited from the use of 'smart' materials. (2 marks)
- (iii) Explain why 'smart' materials are used in the product you have named. (8 marks)

(b) An alloy is formed when two or more different metals are combined.

- (i) Name an alloy, listing the metals that are combined to form this alloy. (3 marks)
- (ii) Name a product where this alloy could be used. (3 marks)
- (iii) What are the specific properties of this alloy that are relevant to the product you have named? (6 marks)

SECTION B**Design and Market Influences**

3 For **each** of the following describe what changes could be made to improve a physically disabled person's lifestyle.

- (i) A domestic product e.g. a kettle or telephone
- (ii) A public building e.g. a school or hospital or library

You should make reference to the following in your answer:

- ergonomics
- anthropometrics
- the use of new technology
- access.

(2 × 12 marks)

4 The photographs on the Insert Sheet show two portable music players (**Figures 4 and 5**).

Compare the two portable music players and describe the differences in the technology that is used.

You should make reference to the following in your answer:

- power supply
- developments in technology
- ease of use
- recording technique.

(2 × 12 marks)

Turn over for the next question

Turn over ▶

SECTION C**Processes and Manufacture**

- 5 Research into sustainable design has shown that the **use** of many products has an effect upon the environment.
- (a) For **either** a domestic washing machine **or** a motor vehicle describe what effect **using** the product will have on the environment. *(12 marks)*
- (b) Describe how the product you have referred to in part (a) above has been, or could be, improved in order to have less effect on the environment. *(12 marks)*

- 6 (a) Explain how computers are used to ensure the efficient manufacturing of products and to eliminate waste.

You should make reference to the following in your answer:

- CIM (computer integrated manufacture)
- FMS (flexible manufacturing systems)
- CAM (computer aided manufacture). *(12 marks)*

- (b) Manufacturers must now design products so that they can be dismantled and recycled at the end of their working life.

Explain how products are affected by the requirement to dismantle and recycle them.

You should make reference to the following in your answer:

- design of the product
- manufacturing processes
- use of materials. *(12 marks)*

END OF QUESTIONS

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The photographs on this page are for use in answering Question 1.

Figure 1 Traditional wooden chair



Figure 2 Modern plastic chair



Figure 3 Contemporary wood/metal chair



The photographs on this page are for use in answering Question 4.

Figure 4 Portable CD player



Figure 5 Mini MP3 player

