General Certificate of Education
Advanced Subsidiary/Advanced

351/01

DESIGN AND TECHNOLOGY
AS
PRODUCT DESIGN DT1

A.M. WEDNESDAY, 9 January 2008
(2½ Hours)

ADDITIONAL MATERIALS

In addition to this examination paper, you will need a 12 page answer book.

INSTRUCTIONS TO CANDIDATES

Answer **six** questions from Section A.

Answer **one** question from Section B.

INFORMATION FOR CANDIDATES

When and where appropriate, answers should be amplified and illustrated with sketches and/or diagrams.

Section A answers should be no more than half a page. This section is designed to demonstrate your **breadth** of knowledge in Product Design.

Your **Section B** answer should be substantial and demonstrate your **depth** of knowledge in Product Design.

You are reminded of the necessity for good English and orderly presentation in your answers.

SECTION A

Answer **six** *questions from this section.*

The maximum length of each answer should be no more than about 150 words.
This section is designed to demonstrate your **breadth** *of knowledge in Product Design.*

Each question carries 8 marks.

1. Describe **two** of the following properties:

- tensile strength;
- compressive strength;
- density;
- malleability. 2 × [3]

For **each** of the **two** properties described, name a material which displays this characteristic. 2 × [1]

2. *(a)* Describe what is meant by the term *performance modelling*. [2]

(b) State **two** advantages of performance modelling to

(i) the designer, 1 × [3]

(ii) the consumer. 1 × [3]

3. In order for designers to ensure products are suitable for their intended user, they are assessed against specified criteria within each of the following categories:

- aesthetics;
- function;
- reliability.

(a) Describe a means of assessing a named product in **two** of these categories. 2 × [2]

(b) Describe the criteria in your chosen categories that would be used to assess the performance of the named product. [4]

4. Designers consider both *visible consumer required characteristics (above the line)* and *invisible operational characteristics (below the line)* when assessing products.

(a) Explain what is meant by **each** of the **two** terms. 2 × [2]

(b) Describe the features of a product which displays both above the line and below the line characteristics. 2 × [2]

5. *(a)* Describe **two** of the following categories of Intellectual Property:

- patent;
- design right;
- trade mark. 2 × [3]

(b) For **each** of the chosen categories name **two** products that might have such protection. [2]

6. Describe the characteristics and uses of any **four** of the following:

polyester, acrylic, polypropylene, nylon, Kevlar, high impact polystyrene (HIPS). [8]

7. *(a)* Define the term *detail designing*. [3]

(b) Explain why *detail designing* is important to manufacturers. [5]

8. *(a)* Explain the term production cell as used within a manufacturing system. [2]

(b) Describe **three** features which make a production cell successful. 2 × [3]

9. *(a)* Describe the process of internal *quality control* (QC). [4]

(b) Describe the process of external *quality assurance* (QA). [4]

10. *(a)* Describe **two** benefits of computer generated models to the client. 2 × [2]

(b) Describe **two** benefits of rapid prototyping to the manufacturer. 2 × [2]

SECTION B

Answer **one** *question from this section.*

Your answer should be substantial and show the **depth** *of your knowledge in Product Design.*

Each question carries 22 marks, 2 of which are for clarity of communication.

11. With reference to a specific product, describe how it has changed over a period of time, through

(a) developments in materials, [8]

(b) changes in design, [6]

(c) manufacturing methods. [6]

Clarity of communication. [2]

12. For **two** named products, describe how the designer has addressed environmental issues through

(a) the choice of material, [10]

(b) the form and structure of the product. [10]

Clarity of communication. [2]

13. The nature of manufacturing is continually changing through using bought-in, and standardised part-assembled components.

Discuss this statement in relation to a product or range of products. [22]