



**GCE AS/A level**

351/01

**DESIGN AND TECHNOLOGY  
PRODUCT DESIGN DT1**

A.M. TUESDAY, 20 May 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. Research for product design draws on various sources in order to provide reliable information for the designer.
  - (a) Define the terms *Primary* research and *Secondary* research. 2 × [2]
  - (b) Describe the kind of information gained through *Primary* research and *Secondary* research. [4]
  
2. (a) State the purpose of a *design specification* when designing and manufacturing a product. [2]
  - (b) Describe **three** different ways in which a design specification is used during the design and manufacture of a product. 3 × [2]
  
3. State **four** benefits or reasons why a designer or manufacturing company might *Patent* a product. 4 × [2]
  
4. Materials such as *epoxy resin, polypropylene, cotton, copper, Kevlar* and *ABS (Acrylonitrile Butadiene Styrene)* have properties which make them suitable for specific uses.
 

Select **four** of these materials and for **each**:

  - (a) name a specific use; [4]
  - (b) state the property which makes it suitable for that application. [4]
  
5. (a) Name a product which has undergone *aesthetic* and *functional* improvements as a result of new materials being used for manufacture. [2]
  - (b) Describe **three** *aesthetic* or *functional* changes that have improved the product as a result of new materials being used. 3 × [2]
  
6. Pre-production prototypes are used effectively by both designers and manufacturers.
  - (a) State **two** reasons why pre-production prototyping is important for the designer. 2 × [2]
  - (b) State **two** reasons why pre-production prototyping is important to the manufacturing process. 2 × [2]

7. Describe a five-step risk assessment plan that would be appropriate for a named manufacturing process in a school or college workshop. [8]
8. Manufacturing systems use either *cell production* or *assembly line production* or a combination of both in the organisation of their workforce.
- (a) Describe **two** features of cell production.  $2 \times [2]$
- (b) Describe **two** features of assembly line production.  $2 \times [2]$
9. Designers and manufacturers need to consider the working characteristics of materials in order to ensure that products or components function effectively.
- Describe the working characteristics of any **four** specific materials.  $4 \times [2]$
10. The use of ICT can have a significant effect on the design and manufacture of products.
- (a) Describe **two** aspects where ICT can be used effectively within research and designing.  $2 \times [2]$
- (b) Describe **two** aspects where ICT can be used effectively within the development and manufacturing process.  $2 \times [2]$

**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.** Designers use a range of strategies such as *disassembly*, *brain writing*, *inversion* and *morphological analysis* when developing initial ideas and possible design solutions.

Compare and contrast any **two** of these strategies and describe how they are used by designers to generate ideas. [22]

- 12.** Within a production system samples of the material, component or product may be tested to verify the quality of a batch.

Describe in detail **four** Quality Control procedures that may be used within a production system. 4 × [5]

Clarity of Communication. [2]

- 13.** The critical stages of production, from sourcing materials to the delivery of a product to the consumer, must be effective both for the manufacturer and for the consumer.

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