WELSH JOINT EDUCATION COMMITTEE
General Certificate of Education
Advanced Subsidiary/Advanced

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351/01

# DESIGN AND TECHNOLOGY AS

# PRODUCT DESIGN DT1

A.M. WEDNESDAY, 10 January 2007

(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.** Anthropometric data is applied to the design of products to ensure suitability and ease of use.

Explain how designers have applied anthropometric data in **four** named products. 4 × [2]

**2.** State how ICT is used effectively in the following areas of design and manufacture:

- research;
- modelling;
- prototyping;
- manufacture. 4 × [2]

**3.** *(a)* State the essential purpose of a Design Specification for both the designer and the manufacturer. [4]

*(b)* For a named product, list **two** primary specification criteria and **two** secondary specification criteria. 2 × [2]

**4.** *Elasticity* and *conductivity* are characteristics of materials exploited by product designers.

*(a)* Name **two** materials which demonstrate *elasticity* and state how **each** is used successfully in the components of named products. 2 × [2]

*(b)* Name **two** materials which demonstrate *conductivity* and state how **each** is used successfully in the components of named products. 2 × [2]

**5.** *(a)* Explain the term *Intellectual Property*. [2]

*(b)* Describe **two** main features of **three** areas of *Intellectual Property*. 3 × [2]

**6.** Product development is influenced by modern materials which include *composites* and *SMART* materials.

*(a)* Name **two** *composite* materials and **two** *SMART* materials. 4 × [1]

*(b)* Describe **two** advantages of using *composite* and/or *SMART* materials instead of traditional materials in named products. 2 × [2]

**7.** Manufacturing systems require specific risk assessments to be carried out.

*(a)* Describe the main functions of a risk assessment. [3]

*(b)* For a specific manufacturing process, list the *five step* risk assessment plan. [5]

**8.** Products may be manufactured with materials which are pre-finished or have a finish applied after manufacture by the consumer.

*(a)* Name a product which is finished by the consumer. State the type of finish and **two** reasons why it is appropriate. [4]

*(b)* Name a product which has a finish that can only be applied by the manufacturer. State the type of finish and **two** reasons why it is appropriate. [4]

**9.** Describe **two** main features of:

*(a)* cell production; [4]

*(b)* assembly line production. [4]

**10.** The ability to join materials in different ways is an important element of both the design and manufacture of products.

*(a)* List **four** permanent methods of joining named materials. [4]

*(b)* For any **two** methods, explain why a permanent joint has been chosen. [4]

## 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.** Statutory quality assurance and environmental issues influence both the design and manufacture of products.

In relation to a specific product or range of products, discuss how the designer has addressed the following:

*(a)* quality assurance; [10]

*(b)* environmental issues. [10]

*Clarity of communication.* [2]

**12.** Materials have both *physical* and *chemical* characteristics.

*(a)* Using examples of specific materials, describe what you understand by **each** characteristic. [10]

*(b)* In the case of a named product, analyse how both the physical and chemical characteristics of the materials used have been utilized in its design. [10]

*Clarity of communication.* [2]

**13.** The expansion of global manufacturing bases, particularly in the Far East, is having a significant influence on the design and manufacture of products.

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