GCE AS/A level

1111/01

DESIGN AND TECHNOLOGY – DT1
Product Design

A.M. TUESDAY, 14 May 2013

2 hours

Suitable for Modified Language Candidates

ADDITIONAL MATERIALS

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

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Answer **five** 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 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 that assessment will take into account the quality of written communication used in answers that involve extended writing **(Section B)**.

SECTION A

Answer **five** *questions from this section.*

This section is designed to demonstrate your **breadth** *of knowledge in Product Design.*

Each question carries 8 marks.

1. Designers and manufacturers use ICT to produce pre-production prototypes.

(a) Give **two** reasons why using ICT to produce pre-production prototypes is important to the designer. 2 × [2]

(b) Give **two** different reasons why using ICT to produce pre-production prototypes is important to the manufacturer. 2 × [2]

2. *(a)* Explain **two** of the following terms that are used to describe the physical properties of materials. For **each** term, name a material that has that property:

density, electrical resistance, fusibility, thermal conductivity. 2 × [2]

(b) Explain **two** of the following terms that are used to describe the mechanical properties of materials. For **each** term name a material that has that property:

elasticity, toughness, durability, plasticity. 2 × [2]

3. Designers and researchers ensure that products are suitable for their intended users. They do this by assessing against the categories of aesthetics, function and reliability.

Describe a means of assessing a named product in **two** of the above categories. State the criteria you would use for the assessment. 2 × [4]

4. Planned obsolescence is a feature of some everyday products.

For a named product:

(a) describe **two** benefits of planned obsolescence to the consumer; 2 × [2]

(b) describe **two** benefits of planned obsolescence to the designer and manufacturer. 2 × [2]

5. Production cells and workforce organisation are features of Flexible Manufacturing Systems (FMS).

(a) Describe **two** advantages of a production cell to a workforce. 2 × [2]

(b) Describe **two** advantages of a production cell to a manufacturer. 2 × [2]

6. Ergonomics and anthropometric data are essential to the success of products.

Describe **two** examples in **each** of the following where:

(a) ergonomics is used to inform successful design in working environments; 2 × [2]

(b) anthropometric data is used to inform successful design in specific products. 2 × [2]

7. Problem solving strategies are used by product designers to initiate design ideas.

Describe any **two** problem solving strategies from the following:

inversion, morphological analysis, lateral thinking, brainstorming. 2 × [4]

8. Qualitative testing and quantitative testing must be considered when selecting materials and processes for the design and manufacture of products.

Explain what you understand by **both** qualitative testing and quantitative testing in relation to specific products. 2 × [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 30 marks.

9. The key input of the product champion and the entrepreneur are essential to the development of innovative products.

Discuss the role of a product champion and an entrepreneur in ensuring the development and success of a product or range of products. [30]

10. Designers and manufacturers have to consider manufacturing methods, product life and environmental factors when designing and manufacturing products.

Discuss all the elements of the above statement with reference to named products. [30]

11. The design and manufacture of products increasingly involves research and design development being undertaken in one location and manufacturing in another.

Discuss the advantages and disadvantages of this form of product development to the designer, manufacturer and the consumer. [30]

