



**GCE A level**

1113/03

**DESIGN AND TECHNOLOGY – DT3**  
**Systems and Control Technology**

A.M. TUESDAY, 4 June 2013

2½ hours

**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 **three** questions from Section A.

Answer **three** questions from Section B.

Answer **two** questions from Section C.

**INFORMATION FOR CANDIDATES**

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

**Section A** and **Section B** answers are designed to demonstrate your **breadth** of knowledge in Systems and Control Technology.

Your **Section C** answers should be substantial and demonstrate your **depth** of knowledge in Systems and Control Technology.

Candidates are reminded of the necessity for good English and orderly presentation in their answers.

**SECTION A**

*Answer **three** questions from this section.*

*This section is designed to demonstrate your **breadth** of knowledge in Systems and Control Technology.*

*Each question carries 8 marks.*

1. Outline the factors that determine the price that a product is sold for in the market place. [8]
  
2. (a) Explain the reasons why a product manufacturer must identify any risks associated with the use of a particular named product. [4]  
(b) Identify **four** risks associated with the use of a specific named product.  $1 \times [4]$
  
3. Explain how high 'build quality' of the control system within a product can impact on sales in the market place. [8]
  
4. Describe how you would analyse the control system of an existing product as part of researching the market prior to embarking on a design task. [8]
  
5. Describe, using diagrams where appropriate, how you would create permanent folds in a particular sheet material and how these folds affect the design of the product. [8]

**SECTION B**

*Answer **three** questions from this section.*

*This section is designed to demonstrate your **breadth** of knowledge in Systems and Control Technology.*

*Each question carries 8 marks.*

6. Describe how ‘qualitative’ and ‘quantitative’ testing can be used during the development of control systems for products. [8]
7. Outline the information you would expect a designer to present in the detail designing stage of a prototype product. [8]
8. (a) Identify a **specific** integrated circuit component and describe **two** of its main properties.  $2 \times [2]$   
(b) Describe how **one** of these properties has been utilised by designers to improve the function of a control system within a product. [4]
9. (a) Name a specific SMART material. [1]  
(b) Describe **two** of its main properties.  $2 \times [2]$   
(c) Explain how these properties have been exploited by product designers. [3]
10. (a) Define the term ‘feedback’ as used in many control systems. [2]  
(b) Describe, with illustrations, how feedback is used in a control system of your choice. [6]

**SECTION C**

*Answer **two** questions from this section.*

*Your answers should be substantial and show the **depth** of your knowledge in Systems and Control Technology.*

*Each question carries 26 marks.*

- 11.** Functional development is critical when producing new products.

Identify a specific product or product range and describe in detail how the control system provides the main thrust of innovation. [26]

- 12.** Compare the work of **two** designers you are familiar with, indicating how they have developed their design style and how this style has influenced the development of similar products on the market. [26]

- 13.** “The goal of sustainable design is to make all products 100 per cent cyclic, social, solar and safe.”

*Edwin Datschefski – The Total Beauty of Sustainable Products.*

Suggest ways that product designers can make a significant contribution towards this sustainable target in terms of the **four** aspects of design identified by Edwin Datschefski. [26]

- 14.** “It’s very easy to be different, but very difficult to be better.”

*Jonathan Ive - 2008*

Discuss this statement with particular reference to the development of control systems within a specific product or a range of products in the market today. [26]

- 15.** Evaluate the part that CAD and CAM have played in the development of control systems in high volume product manufacturing. [26]