



**GCE A level**

1113/03



S16-1113-03

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

A.M. FRIDAY, 10 June 2016

2 hours 30 minutes

**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. (a) Explain the term market segmentation. [4]  
  
(b) State the reasons why designers should be aware of market segmentation when designing specific products. [4]
  
2. Describe the benefits and limitations of using CAD when developing control systems for products. [8]
  
3. The use of ICT has a significant effect on the design and manufacture of products.  
(a) Explain the benefits of ICT in pre-production prototyping. [4]  
  
(b) Explain the benefits of ICT within stock control. [4]
  
4. Explain how quality standards which are developed by the BSI (British Standards Institute) and ISO (International Organisation for Standardisation) have a positive effect on specific named products. [8]
  
5. Describe in detail **two** methods of prototyping electronic control systems in a school workshop naming specific tools and equipment required. [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. Explain what you understand by qualitative and quantitative testing in relation to the selection of materials when developing products. [8]
7. (a) Describe, using diagrams, the 'systems approach' to problem solving. [4]
- (b) For a named product or process, illustrate how the stages can be presented in the form of a flowchart. [4]
8. Describe a five step risk assessment plan appropriate for a named manufacturing process. [8]
9. Describe the material properties of a named semi-conductor that make it suitable for use in a specific product manufactured during your studies. [8]
10. (a) Explain how concurrent engineering is used within product development. [4]
- (b) Explain how reverse engineering is used in the design and development of products. [4]

**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. “Truly elegant design incorporates top-notch functionality into a simple, uncluttered form.”

*David Lewis 2006*

Discuss how this statement is relevant to the work of a contemporary designer and the impact of the products that he/she has designed. [26]

12. Describe the benefits and effects that programmable microcontrollers have on the success of a particular product in terms of form, function and reliability. [26]

13. Describe the benefits of planned obsolescence within the life cycle of specific products to the consumer and to the manufacturer. [26]

14. Sustainability and energy efficiency can often be driving forces for designers of control systems for products.

Discuss how sustainable and energy efficient control systems have impacted on the success of named products, and the influence this has had on the market. [26]

15. Describe the process of quality control and quality assurance and discuss their importance to the manufacturer, consumer and the environment. [26]

**END OF PAPER**