



GCE A level

1113/03



S15-1113-03

DESIGN AND TECHNOLOGY – DT3
Systems and Control Technology

A.M. MONDAY, 8 June 2015

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. Explain the terms **customer needs** and **customer wants**, when making decisions about the design of products. 2 × [4]

2. Designers often adopt a 'systems' type approach when developing control systems.
Explain, with diagrams, the type of 'systems' approach they may take and evaluate how this contributes to the development of an effective control system. [8]

3. Describe **one** benefit and **one** limitation of using the following sources of energy when manufacturing products: 4 × [2]
 - (a) fossil fuels;
 - (b) nuclear fuels;
 - (c) hydro generation;
 - (d) wind generation.

4. When developing successful control systems for products, designers must consider technology **push** and market **pull** forces.
Using named products, explain how these technology **push** and market **pull** forces have impacted on control system development. [8]

5. Give reasons why an understanding of the product life cycle is so important when deciding on strategies to sell a 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 why the development and refinement of functional values is so important to the designer of control systems. [8]
7. Describe the impact that innovation has on the success of products. [8]
8. (a) Name and sketch the circuit symbols for **two** different input components used in electronic control systems. 2 × [1]
(b) Describe how **both** input components react when used as inputs in control systems of your choice. 2 × [3]
9. Describe the essential features of a:
(a) registered design; [4]
(b) registered trademark. [4]
10. Using named products, evaluate how far the control system is responsible for:
(a) incremental development of products; [4]
(b) radical new 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.** During your studies, selecting appropriate materials and components has been critical when developing effective control systems for products.

Using named materials and/or components, describe how their specific properties and characteristics have made them suitable for use in control systems for products you have made. [26]

- 12.** Describe the design cycle of a designer you are familiar with, indicating how their design style has influenced the development of similar products on the market. [26]

- 13.** “Design is not just what it looks like and feels like, Design is how it works.”

Steve Jobs

Using this statement, evaluate the contribution of the control system to creating an innovative product. [26]

- 14.** Describe a product that you consider to be a ‘design classic’, giving reasons for its classification, and trace the development of the product through time. [26]

- 15.** Evaluate the part that quality assurance and quality control have played in high volume product manufacturing. [26]

END OF PAPER