



GCE AS/A level

1111/03

**DESIGN AND TECHNOLOGY
SYSTEMS AND CONTROL TECHNOLOGY DT1**

P.M. TUESDAY, 22 May 2012

2 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 **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 Systems and Control Technology.

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

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 Systems and Control Technology.*

Each question carries 8 marks.

1. Describe **two** key properties of a named conductive material and **two** key properties of a named dielectric material. 2 × [2]

Identify a specific product where **one** of these materials has been used and explain why the material was chosen. [4]

2. Modelling of control systems during designing is an important stage before manufacture.

Describe **two** methods of modelling a control system during the designing stage and explain why you would use them. 2 × [4]

3. A production plan consists of important stages in the manufacture of a product.

Describe **four** main elements of a production plan for a product of your choice. 4 × [2]

4. Design specifications are used by designers to identify key criteria in the development of new products.

(a) Describe the important features of a design specification. [2]

(b) For a named product, list **three** primary specification criteria and **three** secondary specification criteria. 2 × [3]

5. The design and manufacture of products can involve the use of ICT.

Explain how ICT is used for *research, modelling, prototyping* and *manufacturing*. 4 × [2]

6. Temperature sensors and light sensors are often used as inputs in control systems.

(a) For **one** of these control systems identify the sensing component and describe why it would be selected. [2]

(b) With the aid of a circuit diagram describe the circuit that could connect the sensing component to the process device of the system. [6]

7. Describe the features and benefits of the following Intellectual Property rights to the owner.

(a) Copyright. [4]

(b) Registered Trade Mark. [4]

8. Concurrent engineering is a process used in the manufacture of products.

(a) Explain what you understand by concurrent engineering. [4]

(b) State **two** advantages of concurrent engineering to the designer and manufacturer. 2 × [2]

SECTION B

*Answer **one** question from this section.*

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

Each question carries 30 marks.

9. *Design can be described as a process of change and increasingly has to meet environmental and technological challenges.*

In relation to a product you have used, discuss how the designer has addressed environmental and technological challenges. [30]

10. Developments in both electronic and mechanical components have influenced the design of products with benefits for the designer, manufacturer and consumer.

Discuss these developments and benefits in relation to named products. [30]

11. With reference to a particular system or systems describe the process of quality control and discuss its importance to the manufacturer, consumer and the environment. [30]