

General Certificate of Education
Summer 2004
Advanced Level Examination



**DESIGN AND TECHNOLOGY:
SYSTEMS AND CONTROL TECHNOLOGY
Unit 6 Written Paper**

SCT6

Tuesday 22 June 2004 Afternoon Session 1.30 pm to 4.30 pm

In addition to this paper you will require:

- an unlined answer book (7024);
- normal writing and drawing instruments.

Time allowed: 3 hours

Instructions

- Use blue or black ink or ball-point pen. Pencil and coloured pencils should be used only for drawing.
- Write the information required on the front of your answer book. The *Examining Body* for this paper is AQA. The *Paper Reference* is SCT6.
- Answer **four** questions.
- Answer **one** question from each of Sections A, B and C and **one** other question from any section.

Information

- The maximum mark for this paper is 100.
- 24 marks are allocated to each question and 4 marks overall for Quality of Written Communication.
- Mark allocations are shown in brackets.
- This paper carries 20 per cent of the total marks for Advanced Level awards.
- You are reminded of the need for good English and clear presentation. The Quality of your Written Communication will be assessed across all questions.

Advice

- Your answers should be illustrated with sketches and/or diagrams wherever you feel it is appropriate.

Answer **four** questions.

Answer **one** question from each of Sections A, B and C and **one** other question from any section.

Each question carries 24 marks.

SECTION A: MATERIALS AND COMPONENTS

- A1** Suggest appropriate materials for each of the following. Give specific reasons for your choice, making reference to the products function, manufacturing processes and the quantity being produced.
- (a) The case for a desktop computer
 - (b) An external casing for a house alarm
 - (c) The casing for a child's electronic hand held game
 - (d) A preparation knife for use in a kitchen
- (4×6 marks)*
- A2**
- (a) Describe in detail advantages and limitations of using direct current motors and stepper motors for applications where precise angular movement is required. *(12 marks)*
 - (b) With the aid of a diagram, show how accurate linear movement can be achieved using a direct current motor and a feedback system. *(12 marks)*

SECTION B: DESIGN AND MARKET INFLUENCES

B3 The design and manufacture of products or systems give many opportunities for the use of computers.

With reference to a specific product or system, analyse where and why computers may have been used in its development and manufacture. *(24 marks)*

B4 (a) With reference to your own experience of designing and making explain how models and prototypes can assist in the development and evaluation of a design. *(16 marks)*

(b) Explain the advantages jigs bring to the manufacturer when batch or mass producing a product or system. *(8 marks)*

TURN OVER FOR THE NEXT QUESTION

SECTION C: PROCESSES AND MANUFACTURE

C5 You have been asked to design a system that will display the wind speed in kilometres per hour.

- (a) Describe in detail, with the aid of annotated sketches **two** different systems that could be used to measure wind speed. Your answer should make reference to the type of output display used and how this is driven. *(2×10 marks)*
- (b) Describe how these systems could be calibrated. *(4 marks)*

C6 Providing electricity for lighting, refrigeration of vaccines and powering of medical instruments is a problem for remote medical centres.

Describe in detail **three** electricity generating systems that satisfy the needs of remote medical centres without mains electrical supply. Your answers should make reference to the way in which energy could be converted to provide a suitable electrical supply. *(3×8 marks)*

END OF QUESTIONS