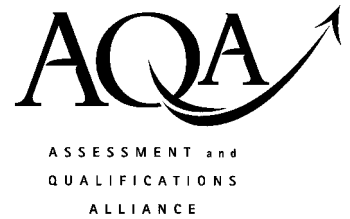


General Certificate of Education  
June 2007  
Advanced Level Examination



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

**SCT6**

Tuesday 19 June 2007 1.30 pm to 4.30 pm

**For this paper you must have:**

- an unlined answer book (7024) which is provided separately
- normal writing and drawing instruments.

Time allowed: 3 hours

**Instructions**

- Use blue or black ink or ball-point pen. Use pencil and coloured pencils 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 marks for questions are shown in brackets.
- The maximum mark for this paper is 100.  
Four of these marks will be awarded for using good English, organising information clearly and using specialist vocabulary where appropriate.
- There are 24 marks for each question.

**Advice**

- Illustrate your answers with sketches and/or diagrams wherever you feel it is appropriate.

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Answer **four** questions.

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

There are 24 marks for each question.

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### SECTION A - MATERIALS AND COMPONENTS

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1 Suggest appropriate *materials* for each of the following products.

Give specific reasons for your choice, making reference to the product's function, manufacturing processes and the scale of production.

- (a) A garden shed
- (b) A bottle for holding carbonated drinks
- (c) The tip of a soldering iron
- (d) A lathe cutting tool

(4 × 6 marks)

- 2 (a) With the aid of sketches, describe in detail a suitable process for the batch production of printed circuit boards (PCBs). (8 marks)
- (b) Explain **two** quality control checks that need to be carried out on a PCB before the components are inserted. (2 × 3 marks)
- (c) Discuss the advantages and limitations of using programmable integrated circuits for the operation of 240 V a.c. electrical devices. (10 marks)

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**SECTION B - DESIGN AND MARKET INFLUENCES**

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- 3 (a) With reference to your own experience of designing and making, explain how computer modelling, computer simulations and Computer Aided Design (CAD) can assist in the development and evaluation of a design. *(16 marks)*
- (b) Discuss the advantages and limitations of CAD/CAM (Computer Aided Manufacture) for small batch production. *(8 marks)*
- 4 (a) Discuss the advantages and disadvantages of rapid technological advances for the:
- manufacturer,
  - repair industry,
  - consumer. *(3 × 4 marks)*
- (b) With reference to a product of your choice, describe its development over the last 10 years and the technological advances that made this development possible. *(12 marks)*

**Turn over for the next question**

**Turn over ▶**

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**SECTION C - PROCESSES AND MANUFACTURE**

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**5** A system is required to maintain automatically the temperature in an office to a value set by the occupants.

(a) Use a flowchart to explain the operation of this system.

Your answer should make reference to the:

- temperature setting system,
- heating system,
- cooling system.

*(12 marks)*

(b) Describe, with the aid of diagrams, how the system in part (a) could be achieved.  
(The heating and cooling units operate from 240 V a.c.)

*(12 marks)*

**6** (a) With the aid of sketches, describe in detail **two** different methods of converting non-finite (renewable) sources of energy into electricity.

Your answer should clearly show the energy conversions that take place. *(2 × 8 marks)*

(b) Discuss the advantages of using non-finite energy sources in place of finite energy sources as a method of generating electricity.

*(8 marks)*

**END OF QUESTIONS**