

General Certificate of Education
June 2006
Advanced Subsidiary Examination



**DESIGN AND TECHNOLOGY:
SYSTEMS AND CONTROL TECHNOLOGY
Unit 3 Design and Market Influences**

SCT3

Friday 9 June 2006 9.00 am to 10.30 am

For this paper you must have:

- a lined answer book (AB08) which is provided separately
- normal writing and drawing instruments
- two sheets of A3 paper for use with Question 2 (enclosed)

Time allowed: 1 hour 30 minutes

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 SCT3.
- Answer **all** questions.
- Two sheets of A3 paper are provided for use with **Question 2**. No further sheets are to be used.
- Securely attach the two sheets of A3 paper to your answer book at the end of the examination.

Information

- The maximum mark for this paper is 100.
4 of these marks are for the Quality of Written Communication.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in all answers.

Advice

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

Answer **all** questions.

You are advised to spend about 20 minutes on **Question 1** and about 1 hour 10 minutes on **Question 2**.

Theme: Wind power as a source of energy – its characteristics, advantages and disadvantages.

- 1 (a) Explain why greater interest is now being shown in wind power as a means of generating electricity. *(4 marks)*
- (b) Describe the advantages and disadvantages of wind power compared with other methods of producing electricity. *(6 marks)*
- (c) List **four** important factors that need to be considered when selecting a site for wind powered generators. *(4 marks)*
- (d) Describe **two** other commercial uses for wind power, apart from the generation of electricity. *(2 × 3 marks)*

Use the **two** separate A3 sheets provided to answer **Question 2** where appropriate.
Clearly indicate the sections of the question you answer on the sheets.

2 A portable system is required to display wind speed and wind direction to an operator.

- (a) (i) Using an annotated sketch, describe a system that will indicate the *wind's* direction. (4 marks)
- (ii) With the aid of an annotated sketch, describe in detail a system that will use the motion of the wind to produce *rotational* movement of a shaft. (6 marks)
- (iii) Using annotated sketches, describe **two** systems which produce outputs for *each* revolution of a shaft. (2 × 3 marks)
- (iv) Show how an output from Question 2 part (a)(iii) could be used to drive a display that indicates wind speed. (12 marks)
- (b) Develop your ideas from Question 2 part (a) into a design for a system that can be used to display the wind speed. The system should *also* include an LED that illuminates at 10-minute intervals, to inform the operator when to take a reading.

Your design should show:

- how the system ensures the wind speed sensor is always independent of the wind's direction
- how the motion of the wind is converted to an output that can be displayed
- the display system used
- the method of illuminating an LED at 10-minute intervals
- a suitable stand for the system that will be stable on uneven surfaces
- suitable materials and sizes for the various parts of the system.

Part (b) is worth 48 marks.

Marks will be awarded as follows:

- (i) quality of communication (8 marks)
- (ii) development of the system (24 marks)
- (iii) originality and innovation (4 marks)
- (iv) appropriateness of materials and components (8 marks)
- (v) methods of construction. (4 marks)

END OF QUESTIONS

There are no questions printed on this page