

General Certificate of Education
June 2007
Advanced Subsidiary Examination



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

SCT3

Friday 8 June 2007 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 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.

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: Methods of centrally heating domestic properties, their advantages, disadvantages and control systems.

- 1** Central heating provided by the circulation of hot water to radiators is a popular form of domestic heating in the UK.
- (a) Identify and explain **two** key factors why this is the case. *(2 × 3 marks)*
 - (b) Describe in detail **two** different methods that could be used to heat the water for a central heating system. *(2 × 3 marks)*
 - (c) Describe in detail **two** different methods that could be used to improve the energy efficiency of domestic properties. *(2 × 4 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) (i) With the aid of diagrams, describe the operation of **two** sensing systems that will produce an output that depends upon temperature. *(2 × 4 marks)*
- (ii) For one of your sensing systems described in part (a)(i) explain how it could be used to provide an output only when a set temperature is reached. *(6 marks)*
- (b) Using annotated sketches, describe a system that will control the flow of water through a pipe, between no flow and full flow. *(6 marks)*
- (c) With the aid of sketches, describe a system that the user can set to limit the operation of a central heating system to specific times within a 24-hour period. *(8 marks)*
- (d) Develop your ideas from parts (a), (b) and (c) into a design for a central heating control system that can be used to control the temperature of a room by adjusting the flow of hot water through a radiator.

Your design should show:

- how the temperature sensing system can be placed up to 3 metres from the flow control system,
- a case design for the temperature sensing system,
- how the user sets the required temperature for the room,
- how the output from the temperature sensor operates the flow control system,
- the internal arrangement of the parts of the flow control system,
- how the flow control system can be safely connected to a 15 mm diameter copper pipe.

Marks will be awarded for:

quality of communication,	<i>(8 marks)</i>
development of the system,	<i>(20 marks)</i>
originality and innovation,	<i>(4 marks)</i>
appropriateness of materials and components,	<i>(8 marks)</i>
methods of manufacture.	<i>(8 marks)</i>

END OF QUESTIONS

There are no questions printed on this page