



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

# June 2003

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## GCE

# Design and Technology

# Systems and Control

## Unit SCT6

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## Systems and Control Technology: Unit 6

**Quality of Written Communication**

*The following marks are allocated to the quality of the candidate's written communication. Make a separate assessment of the candidate's overall ability as demonstrated across the paper using the criteria given below.*

<i>Performance Criteria</i>	Marks
The candidate will express complex ideas extremely clearly and fluently. Sentences and paragraphs will follow on from one another smoothly and logically. Arguments will be consistently relevant and well structured. There will be few, if any, errors of grammar, punctuation and spelling.	4
The candidate will express moderately complex ideas clearly and reasonably fluently, through well-lined sentences and paragraphs. Arguments will be generally relevant and well structured. There may be occasional errors of grammar, punctuation and spelling.	3
The candidate will express straightforward ideas clearly, if not always fluently. Sentences and paragraphs may not always be well connected. Arguments may sometimes stray from the point or be weakly presented. There may be some errors of grammar, punctuation and spelling, but not such as to suggest a weakness in these areas.	2
The candidate will express simple ideas clearly, but may be imprecise and awkward in dealing with complex or subtle concepts. Arguments may be of doubtful relevance or obscurely presented. Errors in grammar, punctuation and spelling may be noticeable and intrusive, suggesting weaknesses in these areas.	1

**NB** This mark scheme is intended as a guide to the type of answer expected but is not intended to be exhaustive or prescriptive. If candidates offer other answers which are equally valid **they must be given full credit.**

Many responses at this level are assessed according to the **quality** of the work rather than the number of points included. The following level descriptors are intended to be a guide when assessing the quality of a candidate's response.

The candidate has a basic but possibly confused grasp of the issues.  
Few correct examples are given to illustrate points made. Description may be unclear.

**(low mark range)**

The candidate has some knowledge but there will be less clarity of understanding.  
Some correct examples given to illustrate points made. Description better but unclear or confused in parts.

**(mid mark range)**

The candidate has a thorough understanding of the issues and has provided relevant examples to support the knowledge shown. This candidate's answer shows clear evidence of understanding.

**(high mark range)**

**Section A: Materials and Components****Question 1**

- (a) The aim is for candidates to compare the advantages in both terms of their ability to transmit the load, but also their flexibility and ease of control. More able candidates would also consider such areas as accuracy infinite variation by cam. Simplicity of use, price, noise, repair costs, initial costs, safety, torque, interfacing to computer controlled system, limitations of speed range, size of unit, ease of maintenance etc.
- (each point 2 marks) (3x6 marks)
- (b) Appropriate choice – matched to application with reason. (3x2 marks)

**Total 24 marks****Question 2**

- (a) Ability to draw logic is vital, also relevant application of components/gates in order to achieve desired control.

Only half of the marks available if flow diagram used.

Diagrams must show

Inputs	(1 mark)	
Relative states of inputs	(3 marks)	
Logic network	(3 marks)	
Output	(1 mark)	(8 marks)

- (b) (i) Requires candidates to add further applications to show breadth of understanding.

Diagram must show

Sensing system	(1 mark)	
Conversion to suitable signal	(2 marks)	
Required temperature setting	(1 mark)	
Comparison	(1 mark)	
Output	(1 mark)	(6 marks)

- (ii) Diagram must show
- |                               |           |            |
|-------------------------------|-----------|------------|
| Suitable sensor               | (1 mark)  |            |
| Conversion to suitable signal | (1 mark)  |            |
| Required temperature setting  | (2 marks) |            |
| Comparison                    | (2 marks) |            |
| Output stage                  | (1 mark)  |            |
| Compatibility of components   | (3 marks) | (10 marks) |

**Total 24 marks**

**Section B: Design and Market Influences****Question 3**

- (a) Emphasis on matching the advantages/limitations to the audience, will include cost, unit cost, tooling costs, skilled/limited skilled labour, repair times, of the shelf repair, reduced Quality Assurance costs, multiple suppliers, limited variations in design, lower final cost, lack of choice, ease of repair.
- (each point 2 marks) (24 marks)

**Total 24 marks****Question 4**

- (a) Could include the following sub-systems:  
Sensing person approaching  
Opening door  
Sensing the person has passed through  
Closing door  
(these will require detailed breaking down – with compatibility between sub-systems)
- (each point 2 marks) (12 marks)
- (b) Description of function (2 marks)  
Suitable components (2 marks) (3x4 marks)

**Total 24 marks****Section C: Processes and Manufacture****Question 5**

- (a) Suitable product/system (1 mark)  
Explanation of operation (3 marks)  
Requirement of friction (2 marks) (3x6 marks)
- (b) Detailed explanation (2 marks)  
Relative advantage (1 mark) (2x3 marks)

**Total 24 marks**

**Question 6**

(a)	<b>Harnessing</b>		
	Suitable method	(1 mark)	
	Explanation of principal	(4 marks)	
	Output explained	(1 mark)	
	<b>Storing</b>		
	Suitable method	(1 mark)	
	Matched to output requirements	(1 mark)	
	Reason	(1 mark)	(2x9 marks)
(b)	Limitation/advantage	(1 mark)	
	Reasoned argument	(2 marks)	(2x3 marks)

**Total 24 marks**

TOTAL MARKS FOR PAPER: 100