



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme January 2003

GCE

Design and Technology: Systems and Control Technology

Unit SCT1

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Unit 1: Materials and Components

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)

Question 1

- | | | | | |
|-----|------|---|---------------|---------------------------|
| (a) | (i) | Quality of communication | (2 marks) | |
| | | Suitability of method | (3 marks) | |
| | | Suitability of components | (2 marks) | |
| | | Reference to output | (1 mark) | |
| | | | (2 × 8 marks) | (16 marks) |
| | (ii) | Each advantage or disadvantage with sensible reason | (2 marks) | |
| | | | (2 × 4 marks) | (8 marks) |
| (b) | (i) | Suitable method eg. Computer Simulation,
Bread boarding | (1 mark) | |
| | | Explanation of how it is set up | (2 marks) | |
| | | Explanation of how it is used for testing | (2 marks) | (2 × 5 = 10
marks max) |
| | (ii) | Production of master artwork | (2 marks) | |
| | | Transfer to board by photo-resist
or engraving machine | (2 marks) | |
| | | Manufacture of board by etching or engraving | (2 marks) | |
| | | Alternatives are acceptable but they must be suitable for batch
production | | |

Total 40 marks**Question 2**

- | | | | |
|-----|--|---------------|-----------|
| (a) | Reference to input from door being closed | (1 mark) | |
| | Reference to drum being filled | (1 mark) | |
| | Reference to water temperature | (1 mark) | |
| | Comparison of inputs | (1 mark) | |
| | AND Function | (1 mark) | |
| | Logical system | (2 marks) | (7 marks) |
| (b) | Suitable sensor with appropriate connections | (2 marks) | |
| | Reference to mounting or output | (1 mark) | |
| | | (3 × 3 marks) | (9 marks) |
| (c) | Indication of Input states | (3 marks) | |
| | Selection of appropriate gates | (2 marks) | |
| | Correct connections | (3 marks) | (8 marks) |
| (d) | Correct symbol | (2 marks) | |
| | Correct truth table | (2 marks) | (4 marks) |

Total 28 marks

Question 3

- (a) (i) Sensors readily available, feedback signal is fixed between two limits, only requires a single feedback wire, simple circuitry, inaccurate, tends to hunt, cannot be used in an electrically noisy environment.
(Each point 2 marks) (6 marks)
- (ii) Sensors readily available, wide range of sensors, simple circuitry, compatibility with output stage, inaccurate, cannot be used in an electrically noisy environment, infinite range of variation.
(Each point 2 marks) (6 marks)
- (b) Speed of transmission, accuracy, stability, readily available circuitry, compatibility with ICT systems, limited effect by electrical noise, ability to multiplex, need for multiple conductors for parallel signal, need for encode/decode if sent as serial signal if sent as, limited number of states.
(Each point 2 marks) (12 marks)
- (c) Name a sensor (1 mark)
Explanation of operation (3 marks)

Total 28 marks**Question 4**

- (a) Example of jointing system (2 marks)
Explanation of use (2 marks)
Explanation of suitability (2 marks)
(2 × 6 marks) (12 marks)
- (b) (i) Suitability of joining method (2 marks)
Identification of suitable materials (1 mark)
Suitability of method to materials (1 mark)
(2 × 4 marks) (8 marks)
- (ii) Each suitable advantage or disadvantage (1 mark)
(2 × 2 marks) (4 marks)
- (iii) Description of process (2 marks)
Recognition of need for concentricity (2 marks)

Total 28 marks**Total = 100 marks**