



## General Certificate of Education

# Design and Technology Systems and Control Technology *Specification*

*SCT3*

## Mark Scheme

*2006 examination – June series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

## 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.*

<b>Performance Criteria</b>	<b>Marks</b>
<p>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.</p>	4
<p>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.</p>	3
<p>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.</p>	2
<p>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.</p>	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.

### **Low mark range**

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.

### **Mid 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.

### **High 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.

## SCT3

### Question 1

- (a) Environmental pollution, greenhouse gases, reduced energy stocks, environmental pressure groups, world agreements to cut pollution, etc.
- |  |          |               |                    |
|--|----------|---------------|--------------------|
|  | Point    | <i>1 mark</i> |                    |
|  | Argument | <i>1 mark</i> | <b>max 4 marks</b> |
- (b) Clean, safe, less pollution, visual pollution, less energy per unit, expensive setup cost, limited sites, not continuous, storage needed, etc.
- |  |       |               |                    |
|--|-------|---------------|--------------------|
|  | Point | <i>1 mark</i> | <b>max 6 marks</b> |
|--|-------|---------------|--------------------|
- (c) Large area  
Winds of appropriate strength  
Near constant wind  
Away from population  
Etc.
- |  |               |  |                    |
|--|---------------|--|--------------------|
|  | <i>1 mark</i> |  |                    |
|  | <i>1 mark</i> |  |                    |
|  | <i>1 mark</i> |  |                    |
|  | <i>1 mark</i> |  | <b>max 4 marks</b> |
- (d) Pumping of water  
Description  
Milling of corn  
Description
- |  |                |  |                |
|--|----------------|--|----------------|
|  | <i>1 mark</i>  |  |                |
|  | <i>2 marks</i> |  |                |
|  | <i>1 mark</i>  |  |                |
|  | <i>2 marks</i> |  | <b>6 marks</b> |
- 20 marks**

### Question 2

- (a) (i) Detection system  
Indication of direction
- |  |                |  |  |
|--|----------------|--|--|
|  | <i>2 marks</i> |  |  |
|  | <i>2 marks</i> |  |  |
- (ii) Suitable system for harnessing wind  
Conversion to rotary motion
- |  |                |  |  |
|--|----------------|--|--|
|  | <i>3 marks</i> |  |  |
|  | <i>3 marks</i> |  |  |
- (iii) Activation by shaft  
Sensing  
Suitable Output
- |  |                   |  |  |
|--|-------------------|--|--|
|  | <i>2 x 1 mark</i> |  |  |
|  | <i>2 x 1 mark</i> |  |  |
|  | <i>2 x 1 mark</i> |  |  |
- (iv) Input system  
A suitable method of counting the output  
Decoding/Driver system  
A reference to a time base  
A suitable calibrated display
- |  |                |  |                 |
|--|----------------|--|-----------------|
|  | <i>2 marks</i> |  |                 |
|  | <i>2 marks</i> |  |                 |
|  | <i>2 marks</i> |  |                 |
|  | <i>4 marks</i> |  |                 |
|  | <i>2 marks</i> |  | <b>28 marks</b> |

(b)	(i)	Quality of communication	<i>8 marks</i>	
	(ii)	Development of the system		
		Wind sensor direction	<i>4 marks</i>	
		Conversion & Display	<i>4 marks</i>	
		10 minute timer	<i>4 marks</i>	
		Stand	<i>6 marks</i>	
		Assembly of sub-systems	<i>6 marks</i>	
	(iii)	Originality and innovation	<i>4 marks</i>	
	(iv)	Appropriateness of materials and components	<i>8 marks</i>	
	(v)	Methods of construction	<i>4 marks</i>	<b>48 marks</b>
				<b>76 marks</b>
				<b>Paper Total 96 Marks</b>