



General Certificate of Education

Design and Technology:
Systems and Control Technology
5556/6556
SCT 3

Mark Scheme

2007 examination - June series

For Publication

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.

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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.

Performance Criteria	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.

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.

- 1 (a) Readily available energy sources, clean affordable heating, requirement for comfort, lack of time to set fires, reduction in cost of equipment, etc. *(2 x 3 marks)*
(reason 1 mark)
(explanation 2 marks)
- (b) Natural gas, propane, coal, coke, oil, electrical
Explanation of energy conversion/transfer
Immersion heaters *(2 x 3 marks)*
(reason 1 mark)
Will accept different types of heating sources, e.g. solar
or combination boilers *(explanation 2 marks)*
- (c) Double glazing, loft insulation, cavity wall insulation,
reduction in drafts, revised building regulations/materials
etc. *(2 x 4 marks)*
Explanation of how energy saving is achieved *(description 2 marks)*
Will accept alternative energy sources used to reduce
heating costs *(how energy is saved 2 marks)*

20 marks

2	(a)		
	(i)	Sensing system	<i>(1 mark)</i>
		Explanation of operation	<i>(2 marks)</i>
		Output dependent on temperature	<i>(1 mark)</i>
			<i>(2 x 4 marks)</i>
	(ii)	Method of sensing/output	<i>(1 mark)</i>
		Method of setting temperature	<i>(2 marks)</i>
		Method of comparison	<i>(3 marks)</i>
	(b)	Quality of communication	<i>(2 marks)</i>
		Water flow control	<i>(1 mark)</i>
		Method of adjustment	<i>(1 mark)</i>
		Full range of adjustment	<i>(2 marks)</i>
	(c)	Timing system capable of lasting 24 hours	<i>(2 marks)</i>
		Method of activation	<i>(2 marks)</i>
		Method of setting	<i>(2 marks)</i>
		Output	<i>(2 marks)</i>
	(d)	Quality of communication	
		• Sketching/Graphics	<i>(4 marks)</i>
		• Labels	<i>(2 marks)</i>
		• Dimensions	<i>(2 marks)</i>
		Development of the system	
		• Transmission/receiver	<i>(4 marks)</i>
		• Case Design	<i>(4 marks)</i>
		• Temperature Selection	<i>(4 marks)</i>
		• Interface/Internal workings of flow control	<i>(4 marks)</i>
		• Suitable fitting for 15mm pipe	<i>(4 marks)</i>
		Originality and innovation	<i>(4 marks)</i>
		Appropriateness of materials and components	
		Simplistic answer giving basic information regarding main materials and methods of manufacture	<i>(1-3 marks)</i>
		Good answer making reference to suitable materials for the main parts and appropriate methods of manufacture	<i>(4-6 marks)</i>
		Excellent answer selecting suitable materials for all important parts and matching these to appropriate manufacturing processes	<i>(7-8 marks)</i>
		Methods of manufacture	
		• Manufacturing process	<i>4 marks</i>
		• Integration of parts into a whole	<i>4 marks</i>

76 marks