Version 0.3

**General Certificate of Education
June 2010**

**Design and Technology:
Systems and Control Technology   SYST1**

Unit 1

Final

Mark Scheme

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.

1 (a)	A mixture of two or more metals (or Iron and Carbon)	*(1 mark)*	
	e.g. Brass, Bronze, (Steel) etc	*(1 mark)*	
			2 marks

| 1 (b) | From a tree that sheds its leaves
e.g. Oak, Elm, Ash etc | *(1 mark)*
(1 mark) | |
| | | | **2 marks** |

| 2 (a) | An input that can have any value
Between a set range | *(1 mark)*
(1 mark) | |
| | | | **2 marks** |

| 2 (b) | Displays the output in set increments
OR
Description of a type of display, e.g. 7seg | *(2 marks)*

(1 mark) | |
| | | | **Max 2 marks** |

| 3 | Electrical prime mover
Conversion to rotary movement
Conversion rotary to oscillatory | *(1 mark)*
(1 mark)
(2 marks) | |
| | | | **4 marks** |

| 4 (a) | Resistance of LDR drops
Voltage at junction rises
Voltage greater than 1.6-1.8V
TR1 & TR2 turn on
Relay energises
Motor stops | *(1 mark)*
(1 mark)
(1 mark)
(1 mark)
(1 mark)
(1 mark) | |
| | | | **5 marks maximum** |

| 4 (b) (i) | Limit current or protect transistors | *(1 mark)* | |
| | | | **1 mark** |

| 4 (b) (ii) | To adjust the potential divider
To set the threshold level
To calibrate the system | *(1 mark)*
(1 mark)
(1 mark) | |
| | | | **2 marks maximum** |

| 5 (a) (i) | Clear definition | *(2 marks)* | |
| | | | **2 marks** |

5 (a) (ii)	Suitable test for the property Appropriate size of sample for test rig Appropriate method of applying load Appropriate magnitude of load Identification of data to collect Suitable / accurate method of collecting data Explanation of data analysis	*(2 marks)* *(1 mark)* *(1 mark)* *(1 mark)* *(1 mark)* *(1 mark)* *(2 marks)*	
			8 marks maximum

5 (b) (i)	Clear definition	*(2 marks)*	
			2 marks

5 (b) (ii)	Suitable test for the property Appropriate size of sample for test rig Appropriate method of applying load Appropriate magnitude of load Identification of data to collect Suitable / accurate method of collecting data Explanation of data analysis	*(2 marks)* *(1 mark)* *(1 mark)* *(1 mark)* *(1 mark)* *(1 mark)* *(2 marks)*	
			8 marks maximum

6 (a)	Each relevant stage in a logical order	*(1 mark)*	
			10 marks maximum

6 (b)	Suitable total system Capable of producing correct sequence Capable of producing time delays required Suitable outputs shown Suitable inputs shown No diagram – only description Max 8 marks	*(2 marks)* *(2 marks)* *(2 marks)* *(2 marks)* *(2 marks)*	
			10 marks

7 (a)	Suitable sensor Appropriately placed Appropriately connected Suitable output Quality of sketch and explanation	*(1 mark)* *(1 mark)* *(1 mark)* *(1 mark)* *(2 marks)*	
			6 marks

7 (b)	Suitable prime mover	*(1 mark)*	
	Conversion to linear motion	*(1 mark)*	
	Capable of producing length of travel	*(1 mark)*	
	Capable of slow movement	*(1 mark)*	
	Capable of moving load involved	*(1 mark)*	
	Capable of opening and closing	*(1 mark)*	
	Guidance system for door	*(2 marks)*	
	End of travel detection	*(2 marks)*	
			8 marks maximum

7 (c)	Suitable control system capable of controlling prime mover	*(2 marks)*	
	Connection to person sensor	*(1 mark)*	
	Connection to end of travel sensors	*(2 marks)*	
	Explanation of the control sequence	*(4 marks)*	
	Quality of diagram	*(1 mark)*	
			10 marks

7 (d)	Materials and construction:		
	Suitability of materials	*(2 marks)*	
	Suitability of jointing/interconnections	*(2 marks)*	**4 marks**
	Assembly of sub-systems:		
	Quality of diagrams/communication	*(4 marks)*	
	Interconnections of sub-systems	*(2 marks)*	
	Mounting of systems	*(2 marks)*	
			8 marks

7 (e)	Showing how the movement system is fitted and moves the door:		
	Fixing of frame and prime mover	*(2 marks)*	
	Fixing to door	*(2 marks)*	
			4 marks