



**General Certificate of Education (A-level)  
June 2012**

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

**SYST1**

**(Specification 2555)**

**Unit 1: Materials, Components and Application**

**Final**

***Mark Scheme***

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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 events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

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1 (a)	Plywood or Blockboard or Laminboard – Etc.	(1 mark)	1 mark
1 (b) (i)	An Alloy	(1 mark)	1 mark
1 (b) (ii)	First material	(1 mark)	
	Second material	(1 mark)	2 marks
2	Two resistors in parallel	(1 mark)	
	Third resistor in series with above	(1 mark)	2 marks
3	<b>Naming of method</b> Joint preparation Jointing systems/assembly/disassembly Joint production explained Relevant sketch	(1 mark) (1 mark) (1 mark) (1 mark) (1mark)	4 marks maximum
4 (a)	Input A connected to OR gate Input B connected to OR gate Input C connected to NOT gate Output from OR connected to AND gate Output from NOT connected to AND gate Output from AND shown as Q  Alternative networks can obtain full marks	(1 mark) (1 mark) (1 mark) (1 mark) (1 mark) (1 mark)	6 marks
4 (b)	Correct drawing of a DPDT Correct drawing of battery and Motor Correct connections – clockwise Correct connections – counter clockwise	(1 mark) (1 mark) (1 mark) (1mark)	4 marks
5 (a) (i)	Suitable on/off transducer Correctly connected Partial description (1) Full Description (2) of operation Switches on for 2 seconds (1) (calculations shown) (2) Switches off for 3 seconds (1) (calculations shown) (2)	(1 mark) (1 mark) (2 marks) (2 marks) (2 marks)	8 marks maximum
5 (a) (ii)	Suitable on/off transducer Correctly connected Partial description (1) Full Description (2) of operation Switches on for 2 seconds (1) (calculations shown) (2) Switches off for 3 seconds (1) (calculations shown) (2)	(1 mark) (1 mark) (2 marks) (2 marks) (2 marks)	8 marks maximum
5 (b)	Reference to increased voltage requirements Reference to ac current requirements Suitable solution e.g. Relay Correct modification	(1 mark) (1 mark) (1 mark) (1 mark)	4 marks maximum

6 (a)	<p>Suitable test for the property Allows for isolation of that property within test Fair testing process</p> <p>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 comparison process Explanation how results are used to inform</p>	<p>(1 mark) (1 mark) (1 mark)</p> <p>(1 mark) (1 mark) (1 mark) (1 mark) (1 mark) (1 mark) (1 mark)</p>	<b>10 marks maximum</b>
6 (b)	<p>Suitable process – injection moulding, press moulding etc.</p> <p>Low level of explanation – some basic stages listed</p> <p>Medium level of explanation – most stages covered But lacking detail – Simple sketch labelled</p> <p>High level of explanation – all stages covered Additional information given showing full understanding of the process Sketches with informative annotation</p>	<p>(2 marks)</p> <p>(1-3 marks)</p> <p>(4-5 marks)</p> <p>(6-8 marks)</p>	<b>10 marks maximum</b>
7 (a) (i)	<p>Suitable Sensor Appropriately connected / Suitable Output Capable of producing correct output (1) produces correct output (2)</p>	<p>(1 mark) (1 mark) (2 marks)</p>	<b>4 marks maximum</b>
7 (a) (ii)	<p>Suitable Sensor Appropriately connected / Suitable Output Capable of producing correct output (1) produces correct output (2)</p>	<p>(1 mark) (1 mark) (2 marks)</p>	<b>4 marks maximum</b>
7 (b) (i)	<p>Suitable system for producing linear motion Capable of producing 200mm Input shown (1) and method of activation shown (2) Control system shown (1) and system of limiting to 200mm shown (2)</p>	<p>(1 mark) (1 mark) (2 marks) (2 marks)</p>	<b>6 marks maximum</b>
7 (b) (ii)	<p>Suitable system for producing linear motion Capable of producing 200mm Input shown (1) and method of activation shown (2) Control system shown (1) and system of limiting to 200mm shown (2)</p>	<p>(1 mark) (1 mark) (2 marks) (2 marks)</p>	<b>6 marks maximum</b>

7 (c)	<p><b>The window, window frame:</b>          Window (1 mark)          Windowframe (1 mark)          Method of opening shown (1 mark)</p> <p><b>How the system is positioned and attached:</b>          Suitable positioning of sensor (1 mark)          Suitable fixing of prime mover (1 mark)          Suitable fixing of opening system (1 mark)</p> <p><b>The sensing and control system:</b>          Sensing higher than 25 and producing output (1 mark)          Sensing less than 25 and producing output (1 mark)          Activation of prime mover (1) suitable (2) (2 marks)          Reversal of prime mover - Partial (1) Fully (1) (2 marks)          Interlink of limiting systems – open (1) closed (1) (2 marks)</p> <p>Assembly of the sub-systems – majority (1) all (2) (2 marks)</p> <p>Selection of materials and components (4 marks)          For each pair of suitable components or materials clearly identified (1 mark)</p>		<p><b>20 marks maximum</b></p>
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