

# Mark Scheme (Results)

## Summer 2007

GCSE

### GCSE Engineering & Manufacturing (5318/05)

Electrical and Electronics, Process Control, Computers, Telecommunications (5318/05)  
SECTION A

<i>Question</i>		<i>Expected answers</i>	<i>Mark allocation</i>	
5318_05_Q01a		Tick the two boxes below where the products belong to the <u>electrical</u> and <u>electronic</u> sector.		
1	(a)	<ul style="list-style-type: none"> <li>• Electric Toothbrush</li> <li>• DVD Player</li> </ul> <p><i>If three boxes ticked max marks = 1 mark. If 4 boxes or more ticked no marks.</i></p>	2x1	(2)
5318_05_Q01b		Tick the two boxes below where the products belong to the <u>computer</u> sector.		
1	(b)	<ul style="list-style-type: none"> <li>• Microprocessor</li> <li>• Lap Top</li> </ul> <p><i>If three boxes ticked max marks = 1 mark. If 4 boxes or more ticked no marks.</i></p>	2x1	(2)
<b>(Total 4 marks)</b>				

Question			Expected answers	Mark allocation	
5318_05_Q02a1			Naming each piece of component.		
2	(a)	1	<ul style="list-style-type: none"> <li>Resistor (Accept any answer that makes reference to a specific resistor) e.g. Variable Resistor Adjustable resistor</li> <li>potentiometer</li> </ul>	1x1	(1)
5318_05_Q02b1			Explaining what each piece of component is used for.		
2	(b)	1	<p>An answer that makes reference to TWO of the following points:</p> <ul style="list-style-type: none"> <li>To restrict current</li> <li>Allows variation from low to high value</li> <li>Adjust potential difference in a circuit</li> <li>To adjust volume, tone, brightness etc.</li> <li>Any other appropriate answer</li> </ul> <p><i>E.g. to restrict current to allow variation of volume</i></p> <p><i>If the component named in part 2(a) is incorrect, no marks for part 2(a), but if it is a component from the electrical and electronic sector or there is no answer allow follow through, for a correct answer to 2(b), up to 2 mark.</i></p> <p><i>Do not accept explanation of use of LED as given in question</i></p>	2x1	(2)

Question			Expected answers	Mark allocation	
5318_05_Q02a2			Naming each piece of component.		
2	(a)	2	<ul style="list-style-type: none"> <li>• Transistor</li> </ul>	1x1	(1)
5318_05_Q02b2			Explaining what each piece of component is used for.		
2	(b)	2	<p>An answer that makes reference to TWO of the following points:</p> <ul style="list-style-type: none"> <li>• Converts a small input into a large output</li> <li>• For use as an electronic switch</li> <li>• For use as an amplifier</li> <li>• Any other appropriate answer</li> </ul> <p><i>E.g. an amplifier to convert small input to large output</i></p> <p><i>If the component named in part 2(a) is incorrect, no marks for part 2(a), but if it is a component from the electrical and electronic sector or there is no answer allow follow through, for a correct answer to 2(b), up to 2 mark.</i></p> <p><i>Do not accept explanation of use of LED as given in question</i></p>	2x1	(2)
(Total 6 marks)					

Question	Expected answers		Mark allocation	
5318_05_Q03	Draw a straight line to link each term listed below to a key area. <i>Each key area can be used more than once.</i>			
3		<p><i>No marks awarded where 2 or more lines are drawn from a term. Lines do not have to be straight but term and key area must be clearly linked.</i></p> <p><b>Term</b></p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 150px;">Computer Integrated Manufacturing (CIM)</div> <div style="border: 1px solid black; padding: 5px; width: 150px;">Polyvinyl</div> <div style="border: 1px solid black; padding: 5px; width: 150px;">Process control</div> <div style="border: 1px solid black; padding: 5px; width: 150px;">Silicon</div> <div style="border: 1px solid black; padding: 5px; width: 150px;">Internet sites</div> <div style="border: 1px solid black; padding: 5px; width: 150px;">Databases</div> </div> <p><b>Key area</b></p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 150px; text-align: center;">Information &amp; Communications Technology (ICT)</div> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 150px; text-align: center;">Modern materials</div> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 150px; text-align: center;">Control technology</div> </div>	6x1	(6)
<b>(Total 6 marks)</b>				

Question			Expected answers	Mark allocation	
5318_05_Q04					
Name one other product from this sector, apart from digital multimeters, that utilise in its manufacture control technology and modern materials					
4	(a)	i	<p>Appropriate product</p> <ul style="list-style-type: none"> <li>• Digital camera</li> <li>• Mobile phone</li> <li>• DVD player</li> <li>• MP3 player</li> <li>• Computer</li> <li>• Electric Drill</li> </ul> <p><i>This list is not exhaustive; accept any product that contains electrical and electronics, process control, computers, telecommunications sector, or association with the sector. Accept specific product e.g. Hoover</i></p>	1x1	(1)
Explain how the product can be used.					
4	(a)	ii	<p>Appropriate explanation of what the product does, may include reference to features and function</p> <p><i>E.g.</i></p> <p><i>Digital camera - takes images (1) and stores them on disc (1)</i></p> <p><i>Mobile phone - allows communication (1) via cell network (1)</i></p> <p><i>MP3 player - plays music (1) via downloaded files (1)</i></p> <p><i>If product given in 4(a)(i) is not from this sector but is from one of the other engineering manufacturing sectors then allow follow through up to one mark.</i></p> <p><i>No answer to 4(a)(i) no marks for 4(a)(ii)</i></p>	2x1	(2)

Question			Expected answers	Mark allocation	
State one stage in the manufacture of the product you named in 4(a)(i) where control technology is used					
4	(b)	i	<ul style="list-style-type: none"> <li>production planning (1) materials - supply and control (1) processing/production (1) assembly/finishing (1) packaging/dispatch (1)</li> </ul> <p><i>If product given in 4(a)(i) is not from this sector but is from one of the other engineering manufacturing sectors then allow follow through.</i></p> <p><i>No answer to 4(a)(i) no marks for 4(b)(ii)</i></p> <p><i>Accept a process that is within any of the stages (e.g pick and place / robots assembling parts) must be appropriate to the product stated in 4(a)(i)</i></p>	1x1	(1)

Question			Expected answers	Mark allocation	
Explain one advantage to the manufacturer of using control technology at this stage					
4	(b)	ii	<p>One mark for identifying advantage One mark for why</p> <p>Appropriate advantage to the manufacturer e.g.</p> <p><b>production planning, materials - supply and control, processing/production, assembly/finishing, packaging/dispatch</b></p> <p><b>Production planning</b></p> <ul style="list-style-type: none"> <li>• speed (1) - faster than human application (1)</li> </ul> <p><b>materials - supply and control</b></p> <ul style="list-style-type: none"> <li>• cost control (1) - by less waste/faulty parts (1)</li> <li>• waste control (1) - by monitoring processes and quality control of processes (1)</li> </ul> <p><b>processing/production</b></p> <ul style="list-style-type: none"> <li>• energy conservation (1) - by control of energy into process (1)</li> <li>• waste control (1) - by monitoring processes and quality control of processes(1)</li> <li>• competitiveness (1) - faster rates of production (1)</li> <li>• product consistency (1) - by control of processes (1)</li> <li>• cost control (1) - by less waste/faulty parts (1)</li> <li>• efficiency (1) - by less waste/faulty parts (1)</li> <li>• speed (1) - faster than human application (1)</li> </ul> <p><b>assembly/finishing</b></p> <ul style="list-style-type: none"> <li>• energy conservation (1) - by control of energy into process (1)</li> <li>• waste control (1) - by monitoring processes and quality control of processes(1)</li> <li>• product consistency (1) - by control of processes (1)</li> <li>• cost control (1) - by less waste/faulty parts (1)</li> <li>• efficiency (1) - by less waste/faulty parts (1)</li> <li>• speed (1) - faster than human application (1)</li> </ul> <p><b>packaging/dispatch</b></p> <ul style="list-style-type: none"> <li>• packaging consistency (1) - by control of processes (1)</li> <li>• cost control (1) - by less waste/faulty parts (1)</li> <li>• efficiency (1) - by less waste/faulty parts (1)</li> <li>• speed (1) - faster than human application (1)</li> <li>• energy conservation (1) - by control of energy into process (1)</li> <li>• waste control (1) - by monitoring processes and quality control of processes (1)</li> </ul> <p><i>Low response (1) or two low responses (2) or detailed response (2) If the answer in part (i) is a Manufacturing stage allow follow through up to 2 marks. No answer to 4b(i) no marks to 4b(ii)</i></p>	1x1 1x1	(2)



Question			Expected answers	Mark allocation	
State one modern material used in the manufacture of the product you named in 4(a)(i)					
4	(c)	i	<ul style="list-style-type: none"> <li>• polymer / plastic (although plastic is not technically correct accept the term plastic)</li> <li>• composite</li> <li>• metal</li> <li>• solder</li> <li>• copper etc</li> <li>• ceramic</li> <li>• adhesive</li> <li>• Other appropriate modern material - a material currently used for the given application</li> </ul> <p><i>If product given in 4(a)(i) is not from this sector but is from one of the other engineering manufacturing sectors then allow follow through.</i>  <i>No answer to 4(a)(i) no marks for 4(c)(i)</i></p>	1x1	(1)
Describe how this modern material improves the characteristics of the product.					
4	(c)	ii	<p>One mark for identifying improvement  One mark for how</p> <ul style="list-style-type: none"> <li>• Smaller size (1) by minituration (1)</li> <li>• Lighter weight (1) better strength/weight ratio (1)</li> <li>• Greater accuracy (1) due to improved materials</li> <li>• Improved quality (1) due to improved material characteristics (1)</li> <li>• Durability (1) extends lifetime of product (1)</li> <li>• Colour (1) wider range (1)</li> <li>• more functions (1) due to improved electronics(1)</li> <li>• Any other appropriate functional / mechanical aesthetic characteristic that relates to the improvement of the product.</li> </ul> <p><i>If answer in part 4a(i) is inappropriate but the material given in 4c(i) is appropriate allow follow through up to 2 marks. If no answer is given in part 4a(i) but the answer to part 4c(ii) relates to the material stated in part 4c(i) allow follow through up to 1 mark. If no answer or incorrect answer given in part 4c(i) no marks awarded for 4c(ii).</i></p>	1x1 1x1	(2)
(Total 9 marks)					

Question			Expected answers	Mark allocation	
5318_05_Q05a					
Give one example of <u>where</u> computer aided manufacture (CAM) is used by a manufacturer.					
5	(a)	i	<ul style="list-style-type: none"> <li>• materials supply / purchasing (generating orders)</li> <li>• materials control (MRP1, automatic material issuing)</li> <li>• stages in production / processes (CNC department, PCB manufacture, pick and place)</li> <li>• process control (data logging)</li> <li>• storage (automated warehouse)</li> <li>• distribution (automatic order picking)</li> <li>• packaging (automatic labelling)</li> </ul>	1x1	(1)
Explain the benefits to the manufacturer of using Computer-aided manufacture (CAM) relating to the example given in 5(a)(i)					
5	(a)	ii	<p>One mark for identifying the benefit One mark for how</p> <ul style="list-style-type: none"> <li>• reduced ordering times (1) - automatic monitoring (1)</li> <li>• improve quality / accuracy (1) - control of processes (1)</li> <li>• reduced wastage (1) - optimise production methods</li> <li>• improved efficiency (1) - faster / quicker throughput (1)</li> <li>• better process control (1) - in process monitoring (1)</li> <li>• reduced labour (1) - automated processes (1)</li> <li>• lower costs (1) - reduced wastage/faster/continuous production (1)</li> <li>• safer processes (1) - less manual input</li> </ul> <p><i>Do not accept easier without explanation</i></p> <p><i>Low response (1) or two low responses (2) or detailed response (2)</i></p> <p><i>If answer in part 5(ai) is inappropriate allow follow through up to 2 marks. If no answer given in part 5(ai) allow follow through up to 1 mark.</i></p>	1x1 1x1	(2)

Question			Expected answers	Mark allocation	
5318_05_Q05b					
Give one example of <u>how</u> Computer-aided design (CAD) is using by a manufacturer					
5	(b)	i	<ul style="list-style-type: none"> <li>• to create virtual products / drawings / 2 or 3D designs</li> <li>• modelling</li> <li>• show ideas / designing product</li> <li>• show new product concepts</li> <li>• modify existing products</li> </ul> <p><i>Do not accept named software packages without explanation.</i></p> <p><i>E.g. 2D design software / package</i></p>	1x1	(1)
Explain the benefits to the manufacturer of using Computer-aided design (CAD) relating to the example given in 5(b)(i)					
5	(b)	ii	<p>One mark for identifying benefit One mark for how</p> <ul style="list-style-type: none"> <li>• conversion from 2D to 3D (1) - for modelling (1)</li> <li>• quicker development time (1) - through simulation (1)</li> <li>• easier to communicate i.e. ICT (1) - transfer of data (1)</li> <li>• easy to make modifications / edit / change (1) - no paper hard copies (1) / computer data (1)</li> <li>• lower initial development costs (1) - concurrent design processes (1)</li> <li>• easy storage of data/information and retrieval (1) - interaction with databases (1)</li> <li>• accurately drawn (1) - accurate data on sizes (co-ordinates) (1)</li> </ul> <p><i>Do not accept easier without explanation</i></p> <p><i>Low response (1) or detailed response (2)</i> <i>Two low responses (1) eg its quicker and more accurate - 1 mark only</i> <i>If answer in part 5b(i) is inappropriate allow follow through up to 2 marks. If no answer given in part 5b(i) allow follow though up to 1 mark.</i></p>	1x1 1x1	(2)


Question		Expected answers	Mark allocation	
5318_05_Q05c		Explain one benefit to the retailer of the manufacturer using Computer-Aided Manufacture (CAM)		
5	(c)	<p>One mark for identifying benefit One mark for how</p> <ul style="list-style-type: none"> <li>• less returns (1) - more consistent products (1)</li> <li>• lower purchase price (1) - increased sales (1)</li> <li>• shorter order times (1) - greater use if ICT (1)</li> <li>• more sales (1) - better quality (1)</li> <li>• increased sales (1) - more profit (1)</li> <li>• better reputation / customer satisfaction (1) - more reliability (1)</li> <li>• increased profits (1) - less waste product (1)</li> <li>• better control of stock (1) - better links to manufacturer (1)</li> </ul> <p><i>Benefit must relate to retailer. Two low responses (1) eg cheaper and quicker - 1 mark only Low response (1) or detailed response (2)</i></p>	1x1 1x1	(2)
<b>(Total 8 marks)</b>				

Question		Expected answers		Mark allocation
5318_05_Q06				
Name two examples of communications technology				
6	(a)	<p>One mark per relevant example x 2</p> <ul style="list-style-type: none"> <li>• Mobile phone / infrared / bluetooth</li> <li>• Email / messaging</li> <li>• Internet / wireless / Wi-fi</li> <li>• Video conferencing</li> <li>• Electronic point of sale (EPOS)</li> <li>• EDI</li> <li>• ISDN</li> <li>• Texting</li> <li>• Phone</li> <li>• Fax</li> <li>• Walkie talkie</li> </ul> <p><i>Do not accept: TV, CAD, Radio, database, spreadsheet, computer, laptop</i></p>	1x1 1x1	
Describe the traditional communications method it has replaced				
6	(b)	<p>One mark per relevant example x 2</p> <ul style="list-style-type: none"> <li>• Mobile phone - Landline, Pager, Public address system</li> <li>• Email - Fax, Letter, memo, report sheets, telephone</li> <li>• Internet - Books, journals, buyers guides, catalogues, brochures</li> <li>• Video conferencing - Travel to central location</li> <li>• Electronic point of sale (EPOS) - Stock taking, manual ordering, income calculations</li> <li>• EDI - postal documents</li> <li>• ISDN - analogue transmission</li> <li>• Texting - phone / conversation</li> <li>• Phone - telegrams</li> <li>• Fax - letters / memos / post</li> <li>• Walkie talkie - face to face</li> </ul> <p><i>Mark allocation 1 per relevant example must relate to technology given in 6(a) and the manufacturer If part (a) not answered no mark awarded.</i></p>	1x1 1x1	(1) (1)

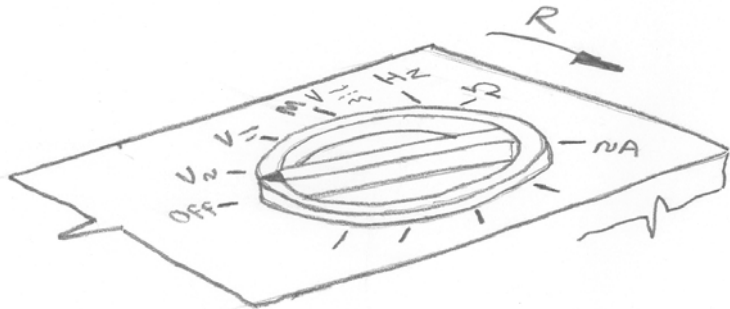
Question		Expected answers	Mark allocation	
Explain one benefit to the manufacturer of using this replacement new technology				
6	(c)	<p>An explanation that makes reference to:</p> <ul style="list-style-type: none"> <li>• Mobile phone - flexibility / roaming location</li> <li>• Email - immediate permanent record</li> <li>• Internet - immediate vast access to information</li> <li>• Video conferencing - no travel expenses / less time wasted in travelling</li> <li>• Electronic point of sale (EPOS) - faster / more accurate</li> <li>• EDI - immediate transfer of information / no hard copies needed / less storage space</li> <li>• ISDN - more data transferred in parallel</li> <li>• Texting - stored record of transaction</li> <li>• Phone - immediate two way conversation</li> <li>• Walkie talkie - roaming location / flexibility / cost</li> <li>• Fax - hard copy record</li> </ul> <p>Other benefits may be seen in the light of:</p> <p><i>Speed, accuracy, JIT, information retrieval, meets consumer demands, quicker, increased sales, reduced stock levels, reduced running costs, reduced lead times, calculation of sales, stock taking quicker/easier, storage space reduced or accept any other appropriate response</i></p> <p><i>Benefits must relate to the manufacturer</i>  <i>If only the replacement or original technology is given and the benefit is appropriate allow follow through up to 1 mark.</i></p> <p><i>2 low responses - 1 mark.</i></p>	2x1 2x1	(2) (2)
(Total 8 marks)				

Question		Expected answers			Mark allocation
5318_05_Q07		Explain the benefits information and data handling system have on:			
Production efficiency					
7	(a)	<p>One mark for benefit One mark for how</p> <ul style="list-style-type: none"> <li>• Accurate information (1) - updated regularly (1)</li> <li>• Detailed information (1) - high storage space (1)</li> <li>• Fast access to data (1) - search / sort query (1)</li> <li>• Improved planning (1) - short lead times(1)</li> <li>• Forecasting (1) - collects volumes of data / modelling (1)</li> <li>• Cost of control (1) - better scheduling (1)</li> <li>• Waste control (1) - process monitoring / control (1)</li> <li>• Reduced stock holding(1) - tracks trends / JIT (1)</li> <li>• Training records (1) - skills monitoring (1)</li> <li>• Wage information (1) - ease of cost monitoring (1)</li> </ul> <p><i>Any other appropriate response. Low response (1) or detailed statement (2)</i></p>	1x1 1x1	(2)	
Marketing					
7	(b)	<p>One mark for benefit One mark for how</p> <ul style="list-style-type: none"> <li>• Accurate sales information (1) - instant feedback (1)</li> <li>• Detailed customer information (1) - tailoring products to target market (1)</li> <li>• Information for marketing strategies/campaigns (1) - tailoring products to target market (1)</li> <li>• Information for advertising campaigns (1) - choosing correct media (1)</li> <li>• Profit information available (1) - models sales demand (1)</li> <li>• Ordering to meet sales faster (1) - meeting demand (1)</li> </ul> <p><i>Any other appropriate response. Low response (1) or detailed statement (2)</i></p>	1x1 1x1	(2)	
					(Total 4 marks)
Total marks for Section A					45marks

SECTION B

<i>Question</i>		<i>Expected answers</i>	<i>Mark allocation</i>	
5318_05_Q08		In the boxes below, explain, using notes and sketches: (a) Function of the liquid crystal display		
8	(a)	An answer that makes reference to three of the following points: <ul style="list-style-type: none"> <li>• Display of numbers</li> <li>• information</li> <li>• crystalline properties</li> <li>• illumination</li> <li>• or any suitable</li> </ul> <p><i>Answer must contain both notes and sketches. Max two marks if only notes or sketches used.</i></p> <p>Example</p> <div style="text-align: center;">  <p style="margin-left: 20px;">Seven Segment Display</p> </div>	3x1	(3)



Question		Expected answers	Mark allocation	
5318_05_Q08		In the boxes below, explain, using notes and sketches: The function of the selector switch.		
8	(b)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• To select appropriate function</li> <li>• To select appropriate scale</li> <li>• Prevent damage</li> <li>• Improve accuracy</li> <li>• Allows instrument to be turned off</li> <li>• Or any suitable</li> </ul> <p><i>Answer must contain both notes and sketches. Max two marks if only notes or sketches used.</i></p> <p>Example</p> 	3x1	(3)
(Total 6 marks)				

Question			Expected answers	Mark allocation	
5318_05_Q09ai			Write in the table above two missing stages in manufacturing digital multimeters		
9	(a)	i	<ul style="list-style-type: none"> <li>• Marketing</li> <li>• Processing/Production / making</li> </ul> <p>Must be in this order</p> <p><i>Do not accept production planning</i></p>	1x1 1x1	(2)
5318_05_Q09aii			State the stage where the electronic components are placed and soldered.		
9	(a)	ii	<ul style="list-style-type: none"> <li>• Assembly and finishing</li> <li>• Stage 6 / stage six</li> <li>• 6 / six</li> </ul>	1x1	(1)

Question			Expected answers	Mark allocation	
5318_05_Q09bi			Describe the following two stages in the manufacture of digital multimeters. <b>Production planning</b>		
9	(b)	i	<p>Appropriate descriptions including three of the following points:</p> <ul style="list-style-type: none"> <li>• Scheduling production (1)</li> <li>• Converting order to production (1)</li> <li>• Materials requirements (1)</li> <li>• Labour requirements (1)</li> <li>• Deadlines (1)</li> <li>• Throughputs (1)</li> <li>• Machinery / equipment requirements (1)</li> <li>• Quality checks (1)</li> <li>• Control points (1)</li> <li>• Health and safety (1)</li> <li>• Any other appropriate response</li> </ul> <p><i>E.g.</i>  <i>The stage where the specification of the circuit board is used by the planning team to set out all operations and schedule (1) the circuit board through the production department to meet the required delivery deadlines (1). This could include ordering any special materials or tooling (1) for making the circuit board.</i></p> <p><i>1 x 1 mark low response, 3 x 1 mark 3 low responses or up to 3 for detailed response</i></p>	3x1	(3)

Question			Expected answers	Mark allocation	
5318_05_Q09bii			Describe the following two stages in the manufacture of digital multimeters		
			<b>Packaging and dispatch</b>		
9	(b)	ii	<p>Appropriate description to include three of the following points:</p> <ul style="list-style-type: none"> <li>• Application of protective packaging (1)</li> <li>• Assembling orders (1)</li> <li>• Application of codes, dates, tech info (1)</li> <li>• Picking orders (1)</li> <li>• Assembly loads (1)</li> <li>• Packing into outer boxes (1)</li> <li>• Making records (1)</li> <li>• Application of labels to boxes (1)</li> <li>• Sending to client (1)</li> <li>• Final visual checks (1)</li> <li>• Collation of multiples of items</li> </ul> <p><i>The stage where the finished circuit boards have any labels added(1) and are prepared for shipment (1) to a client and the use of protective packaging such as foam is added(1)</i></p> <p><i>Any other appropriate response</i>  <i>1 x 1 mark low response, 3 x 1 mark 3 low responses or up to 3 for detailed response</i></p>	3x1	(3)
<b>(Total 9 marks)</b>					

<i>Question</i>			<i>Expected answers</i>	<i>Mark allocation</i>	
5318_05_Q10ai			Name the electronic component commonly found in electronic circuits as used in a digital multimeter to:  Limit current flow		
10	(a)	i	<ul style="list-style-type: none"> <li>• Resistor</li> <li>• Variable resistor</li> <li>• potentiometer</li> </ul>	1x1	(1)
5318_05_Q10aai			Name a specific component commonly used in digital multimeter store electric charge  Store electric charge		
10	(a)	ii	<ul style="list-style-type: none"> <li>• Capacitor</li> </ul>	1x1	(1)
5318_05_Q10bi			Name two materials that are used to make up solder		
10	(b)	i	Any two of the following <ul style="list-style-type: none"> <li>• Lead</li> <li>• Tin</li> <li>• Copper</li> <li>• Silver</li> <li>• Flux</li> </ul>	2x1	(2)

Question			Expected answers	Mark allocation	
5318_05_Q10bii			Explain the function of solder:		
10	(b)	ii	Explanations that makes reference to: <ul style="list-style-type: none"> <li>• Provide electrical connection</li> <li>• Provide a sound mechanical joint</li> <li>• Act as a tinning agent</li> <li>• To allow replacement of faulty component</li> <li>• To act as a semi permanent fastener/connection</li> </ul>	3x1	(3)
5318_05_Q10c			Explain how the use of modern materials has helped the manufacturer of digital multimeter develop new products.		
10	(c)		An explanation that makes reference to three of the following points: <ul style="list-style-type: none"> <li>• Lower cost</li> <li>• Colours</li> <li>• Improved accuracy</li> <li>• Durability</li> <li>• Smaller size</li> <li>• Easier manufacturing</li> <li>• Functionality</li> <li>• More varieties</li> <li>• New markets</li> </ul> <p><i>Up to 3 x 1 mark low responses or up to 3 marks for a detailed response</i></p>	3x1	(3)
(Total 10 marks)					

Question			Expected answers	Mark allocation	
5318_05_Q11			Describe two quality control procedures used at the production stage of the manufacture of the digital multimeters that utilise monitoring control technology.		
11	(a)	i-ii	<p>One mark for identifying QC procedure One mark for how</p> <ul style="list-style-type: none"> <li>• Check faults/damage</li> <li>• Check for correct component sizes (1) - electronic meters (1)</li> <li>• Check for correct casing colour (1) - colour scanners/digital images (1)</li> <li>• Check for correct shape (1) - digital images/gauges (1)</li> <li>• Check accuracy (1) - calibration (1)</li> <li>• Check for packaging misprints (1) - scanners (1)</li> <li>• Check for codes (1) - scanners (1)</li> <li>• Any other appropriate response</li> </ul> <p><i>Must have relevant monitoring / control technology link</i></p>	2x1 2x1	(4)
Explain one benefit of applying each quality control procedure, described in (a) above to the manufacturer.					
11	(b)	i-ii	<p>One mark for identifying benefit to the manufacturer One mark for how</p> <ul style="list-style-type: none"> <li>• Reduced customer complaints (1) - better products(1)</li> <li>• Control of costs (1) - cheaper product / more profit (1)</li> <li>• Avoids faulty parts being assembled (1) - early detection (1)</li> <li>• Increased sales (1) - consistent product / lower prices (1)</li> <li>• User confidence (1) - consistent product / less returns (1)</li> <li>• Reduced waste (1) - control of manufacturing process (1)</li> <li>• Reliable product (1) - monitoring standards testing / parts (1)</li> <li>• Ergonomically safe and comfortable to use (1) - in process measurements (1)</li> <li>• No breaking parts (1) - monitoring component / parts (1)</li> </ul> <p><i>2 x 1 mark for Low response or 2 x 2 marks for detailed responses If no answer or inappropriate answer is given in part 11(a) allow follow through up to 1 mark each benefit.</i></p>	2x1 2x1	(4)

Question		Expected answers	Mark allocation	
Explain one benefit of applying each quality control procedure, describe above in (a) to the consumer:				
11	(c)	<p>One mark for identifying benefit to the consumer One mark for how</p> <ul style="list-style-type: none"> <li>• Safer product to use (1) - confidence in product reliability(1)</li> <li>• Consistent product (1) - ensures standards are met (1)</li> <li>• Longer useable life (1) - don't have to buy as often (1)</li> <li>• Product reliability (1) confidence in the company (1)</li> <li>• Lower prices (1) - less scrap / waste / more efficient (1)</li> <li>• Any other appropriate response</li> </ul> <p><i>2 x1 mark for low responses, 2 x 2 marks for detailed responses</i> <i>If no answer or inappropriate answer is given in part 11(a) allow follow through up to 1 mark each benefit.</i></p>	2x1 2x1	(4)
(Total 12 marks)				



<i>Question</i>			<i>Expected answers</i>	<i>Mark allocation</i>	
5318_05_Q12a			The utilisation of modern technology in the manufacture of digital multimeters has brought changes. Explain these changes in:		
<b>The type and size of workforce</b>					
12	(a)	i	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• Smaller in size (1)</li> <li>• Higher level of skills (1)</li> <li>• Work patterns - shifts (1)</li> <li>• Better educated (1)</li> <li>• Higher level of development skills required (1)</li> <li>• Less employment for unskilled (1)</li> <li>• Updating and training often required (1)</li> <li>• Any other appropriate answer</li> </ul>	2x1	(2)
<b>The working environment</b>					
12	(a)	ii	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• Cleaner (1)</li> <li>• Safety (1)</li> <li>• Quieter (1)</li> <li>• Healthier (1)</li> <li>• Any other appropriate answer</li> </ul>	2x1	(2)
<b>The global environment</b>					
12	(a)	iii	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• Distribution - network increased (extra fuel) (1)</li> <li>• carbon emissions (1)</li> <li>• Operational efficiencies - less fossil fuels (1)</li> <li>• Recyclable materials (1)</li> <li>• Reduced waste - landfill (1)</li> <li>• Increased consumption of raw materials (1)</li> <li>• Any other appropriate answer</li> </ul>	2x1	(2)

<i>Question</i>		<i>Expected answers</i>		<i>Mark allocation</i>	
5318_05_Q12bc					
Describe one disadvantage that modern technology has had on the workforce:					
12	(b)		<p>A description that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• Less staff required (1)</li> <li>• Re-training required (1)</li> <li>• Redundancy threat (1)</li> <li>• Increased travel to work / centralisation (1)</li> <li>• Working pattern / 24/7 operation (1)</li> <li>• Any other appropriate answer</li> </ul>	2x1	(2)
Describe one advantage that modern technology has had on the global environment					
12	(c)		<p>A description that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• Plant more fuel efficient (1)</li> <li>• lower emissions &amp; less consumption (1)</li> <li>• Increased productivity (1)</li> <li>• less fuel used (1)</li> <li>• Reduced wastage (1)</li> <li>• product, packaging etc (1)</li> <li>• less landfill, incineration (1)</li> <li>• Improved manufacturing control (1)</li> <li>• less pollution (1)</li> <li>• Any other appropriate response</li> </ul>	2x1	(2)
<b>(Total 10 marks)</b>					

<i>Question</i>		<i>Expected answers</i>	<i>Mark allocation</i>	
5318_05_Q13a		Describe how CAD is used by the manufacturer to increase market share.		
13	(a)	<p>A description that makes reference to four of the following points:</p> <ul style="list-style-type: none"> <li>• To design new or improved products quickly (1)</li> <li>• better retailer acceptance (1)</li> <li>• improved consumer acceptance (1)</li> <li>• To design new or improved packaging (1)</li> <li>• quicker to market (1)</li> <li>• 2D, 3D modelling to show customers (1)</li> <li>• Any other appropriate answer</li> </ul>	4x1	(4)
5318_05_Q13b		Describe how CAM is used to control manufacturing costs.		
13	(b)	<p>A description that makes reference to four of the following points:</p> <ul style="list-style-type: none"> <li>• Machine settings are ideal (1)</li> <li>• Less energy lost / waste (1)</li> <li>• Only correct number manufactured (1)</li> <li>• Controlled environment uses less fuel / energy / utilities (1)</li> <li>• Correct ordering of materials (1)</li> <li>• Lower staffing requirement (1)</li> <li>• Costs more visible / easier traced (1)</li> <li>• Immediate alerts to out of standard performance (1)</li> <li>• Manufactured just in time (1)</li> <li>• Lower unit cost after initial investment (1)</li> <li>• Continuous operation (1)</li> <li>• Less downtime (1)</li> <li>• Any other appropriate response</li> </ul>	4x1	(4)
(Total 8 marks)				
Total Marks for Section B			55	
Total Marks for the whole Paper for section A and B			100	