

# Mark Scheme (Results)

## Summer 2007

GCSE

### GCSE Engineering & Manufacturing (5318/04)

Engineering Fabrication (5318/04)				
SECTION A				
Question		Expected answers		Mark allocation
5318_04_Q01a		Tick the two boxes below where the products belong to the engineering fabrication sector.		
1	(a)	<ul style="list-style-type: none"> <li>• Hanging basket bracket</li> <li>• Metal shelving system</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_04_Q01b		Tick the two boxes below where the products belong to the engineering fabrication sector.		
1	(b)	<ul style="list-style-type: none"> <li>• BMX bike</li> <li>• Power-kite buggy</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_04_Q02a1			Naming each component.		
2	(a)	1	<ul style="list-style-type: none"> <li>Washer (accept any answer that makes reference to a specific washer) e.g.  Plain washer Flat washer Tap washer</li> <li>Spacer / metal spacer</li> </ul>	1x1	(1)
5318_04_Q02a2			Explaining what each 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>Rotating fastener / used with nut / used with bolt or screw</li> <li>Damage</li> <li>Spreading load</li> <li>Joining component</li> <li>Spacer</li> </ul> <p><i>E.g. Used with rotating fastener (1) to spread load (1)</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 Mechanical, Automotive sector or 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 NUT as given in question</i></p>	2x1	(2)

Question			Expected answers	Mark allocation	
5318_04_Q02a2			Naming each component.		
2	(a)	2	<ul style="list-style-type: none"> <li>• Hex socket screw/bolt</li> <li>• Allen head screw/bolt</li> <li>• socket head cap screw/bolt</li> <li>• machine screw</li> <li>• socket head screw/bolt</li> <li>• cap screw / bolt</li> <li>• cap headed screw / bolt</li> <li>• Allen key screw / bolt</li> <li>• cap head screw / bolt</li> </ul> <p><i>Do not accept just screw or bolt</i></p>	1x1	(1)
5318_04_Q02b2			Explaining what each 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>• fixing two pieces of materials together</li> <li>• screwing into a threaded hole</li> <li>• used with a key/tool</li> <li>• for temporary fixing / joining</li> </ul> <p><i>E.g. used with a key (1) to join two or more components together (1)</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 Mechanical, Automotive sector or 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 NUT as given in question</i></p>	2x1	(2)
(Total 6 marks)					

Question	Expected answers	Mark allocation														
5318_04_Q03	Draw a straight line to link each term listed below to a key area. Each key area can be used more than once.															
3	<p><i>No mark 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> <table border="0"> <thead> <tr> <th>Term</th> <th>Key area</th> </tr> </thead> <tbody> <tr> <td>Computer Integrated Manufacturing (CIM)</td> <td>Information &amp; Communications Technology (ICT)</td> </tr> <tr> <td>Titanium</td> <td>Modern materials</td> </tr> <tr> <td>Process control</td> <td>Control technology</td> </tr> <tr> <td>Carbon fibre</td> <td>Information &amp; Communications Technology (ICT)</td> </tr> <tr> <td>Internet sites</td> <td>Modern materials</td> </tr> <tr> <td>Databases</td> <td>Control technology</td> </tr> </tbody> </table>	Term	Key area	Computer Integrated Manufacturing (CIM)	Information & Communications Technology (ICT)	Titanium	Modern materials	Process control	Control technology	Carbon fibre	Information & Communications Technology (ICT)	Internet sites	Modern materials	Databases	Control technology	<p>6x1</p> <p>(6)</p>
Term	Key area															
Computer Integrated Manufacturing (CIM)	Information & Communications Technology (ICT)															
Titanium	Modern materials															
Process control	Control technology															
Carbon fibre	Information & Communications Technology (ICT)															
Internet sites	Modern materials															
Databases	Control technology															
(Total 6 marks)																

Question			Expected answers	Mark allocation	
5318_04_Q04					
Name one other product from this sector, apart from metal cantilever tool boxes, that utilises in its manufacture control technology and modern materials.					
4	(a)	i	<p>Appropriate product such as e.g.</p> <ul style="list-style-type: none"> <li>• BBQ</li> <li>• Darts</li> <li>• Car</li> <li>• Mountain bike</li> <li>• Motor bike</li> <li>• Scooters</li> <li>• Filing cabinets</li> <li>• Alloy wheels</li> </ul> <p><i>This list is not exhaustive; accept any product that contains engineering fabrication or association with the sector. Accept brand name of specific product.</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>E.g.</p> <ul style="list-style-type: none"> <li>• to cook (1) food (1)</li> <li>• To throw (1) at a dartboard (1)</li> <li>• To transport (1) from one place to another (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 up to one mark.</i>  <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)(i)</i></p> <p><i>Accept a process that is within any of the stages (e.g casting/fabrication / robots assembling parts / spraying) 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 4b(i) is a Manufacturing stage allow follow through up to 2 marks.</i></p> <p><i>No answer to 4b(i), no marks for 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>• Alloys</li> <li>• Copper</li> <li>• Zinc</li> <li>• Brass</li> <li>• nickel silver</li> <li>• Aluminum alloys</li> <li>• Titanium, Duralumin</li> <li>• Iron alloys</li> <li>• steel/stainless steel/carbon steels</li> <li>• Composites/Carbon fibre/Glass reinforced plastics (GRP)</li> <li>• Smart materials - shape memory alloys (SMAs)/thermo-ceramics</li> <li>• Other appropriate modern material - a material currently used for the given application</li> </ul> <p><i>Accept brand name of a specific material</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.</i></p> <p><i>No answer to 4(a)(i) no marks for 4(c)(i)</i></p>	1x1	(1)

Question			Expected answers	Mark allocation	
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) - minituration (1)</li> <li>• lower weight (1) - better strength to weight ratio (1)</li> <li>• better appearance (1) - smoother/brighter finishes (1)</li> <li>• extends the life-time of product (1) - better wear characteristics (1)</li> <li>• improves wear resistance (1) - harder materials/better surface finish (1)</li> <li>• reduces cost (1) - overall product easier/ machine ability (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_04_Q05					
Give one example of where 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 / processing (CNC department, machine shop)</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 (1)</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_04_Q05b					
Give one example of how computer-aided design (CAD) is used 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 a product</li> <li>show new product concepts</li> <li>modify existing products</li> </ul> <p><i>Do not accept 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) - entry of accurate data or 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 quicker and more accurate - 1 mark only</i> <i>If answer in part 5 (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)

<i>Question</i>		<i>Expected answers</i>	<i>Mark allocation</i>	
5318_04_Q05c		Explain one benefit to the distributor of the manufacturer using Computer Aided Manufacturer (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) - computer links to manufacture (1)</li> </ul> <p><i>Benefit must relate to distributor</i> <i>Low response (1) or detailed response (2)</i> <i>Two low responses (1) eg it is cheaper and quicker - 1 mark only</i></p>	1x1 1x1	(2)
<b>(Total 8 marks)</b>				

Question		Expected answers		Mark allocation	
5318_04_Q06					
Name two examples of communication technology					
6	(a)	<p><i>One mark per relevant example x 2</i></p> <ul style="list-style-type: none"> <li>• Mobile phone / infrared / bluetooth</li> <li>• Walkie talkie</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> </ul> <p><i>Do not accept: TV, CAD, radio, computer / laptop / database</i></p>	1x1 1x1	(1) (1)	
Describe the traditional communications method it has replaced					
6	(b)	<p><i>One mark per relevant example x 2</i></p> <ul style="list-style-type: none"> <li>• Mobile phone - Landline, Pager, Public address system</li> <li>• Walkie talkie - face to face</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> </ul> <p><i>Mark allocation 1 per relevant example must relate to technology given in 6(a) plus manufacturer</i> <i>If part (a) not answered no mark awarded.</i></p>	1x1 1x1	(1) (1)	

Question		Expected answers	Mark allocation	
5318_04_Q06		Explain one benefit to the manufacturer of using this replacement		
6	(c)	<p>An explanation that makes reference to:</p> <ul style="list-style-type: none"> <li>• Mobile phone - flexibility / roaming location</li> <li>• Walkie talkie - flexibility / roaming location / cost</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>• Fax - hard copy record</li> </ul> <p>Other benefits may be seen in the light of:</p> <p>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 any other appropriate response.</p> <p><i>Benefits must relate to the manufacturer</i>  <i>If only thereplacement or original technology is given and the benefit is appropriate allow follow through up to 1 mark.</i>  <i>Two low responses - 1 mark only</i></p>	2x1 2x1	(2) (2)
<b>(Total 8 marks)</b>				

Question		Expected answers			Mark allocation
5318_04_Q07		Explain the benefits information and data handling systems 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

Question	Expected answers	Mark allocation
5318_04_Q08	<p>In the boxes below, explain, using notes and sketches:</p> <p>(a) Function of the handle</p>	
8	<p>(a)</p> <p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• Provides a means to carry (1) the toolbox comfortably (1)</li> <li>• Ergonomic tubular cross section (1) for easy grip (1)</li> <li>• Handle initiates the opening and closing (1) of the linkage (1)</li> <li>• Handles run the length of the box to allow a heavy toolbox to be carried (1) using both hands (1)</li> <li>• Or any suitable</li> </ul> <p><i>Answer must contain both notes and sketches. Max two marks if only notes or only sketches used.</i></p> <p>Example</p> <p>PROVIDES A MEANS OF CARRYING HEAVY TOOLBOX (1 MARK)</p> <p>SKETCH (1 MARK)</p> <p>CIRCULAR CROSS-SECTION FOR EASIER GRIP (1 MARK)</p> <p>TOTAL 3 MARKS.</p>	<p>3x1</p> <p>(3)</p>

Question	Expected answers	Mark allocation
5318_04_Q08	In the boxes below, explain, using notes and sketches: (b) Function of the parallel motion linkage	
8	(b) An answer that makes reference to three of the following points: <ul style="list-style-type: none"> <li>• The parallel motion linkage can be used to make things move in the same direction (1) a set distance apart (1)</li> <li>• Cantilever tool boxes open up to reveal multiple shelves and containers (1) which need to be held horizontal (1). This allows more tools to be stored (1) easy access to all tools (1)</li> <li>• Or any suitable</li> </ul> <p><i>Answer must contain both notes and sketches. Max two marks if only notes or only sketches used.</i></p> <p>Examples</p>	3x1 (3)
(Total 6 marks)		

<i>Question</i>			<i>Expected answers</i>	<i>Mark allocation</i>	
5318_04_Q09ai			Write in the table above the two missing stages in manufacturing metal cantilever tool boxes.		
9	(a)	i	<ul style="list-style-type: none"> <li>• Marketing (1)</li> <li>• Materials supply and control / purchasing (1)</li> </ul> <p>Must be in this order</p>	1x1 1x1	(2)
5318_04_Q09aii			State the stage where the hinges are riveted to the main body of the tool box		
9	(a)	ii	<ul style="list-style-type: none"> <li>• Assembly (and finishing) (1)</li> <li>• Stage 6 / stage six (1)</li> <li>• 6 / six (1)</li> </ul>	1x1	(1)

Question			Expected answers	Mark allocation	
5318_04_Q09bi			Describe the following two stages in the manufacture of the metal cantilever tool boxes.  <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>The stage where the specification of the toolbox(es) is used by the planning team to set out all operations and schedule (1) the toolbox(es) through the production department to meet the required delivery deadlines (1). This could include ordering any special materials or tooling (1) for making the toolbox(es)</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_04_09bii			Production		
9	(b)	ii	<p>Appropriate descriptions including three of the following points:</p> <p><u>Production</u></p> <ul style="list-style-type: none"> <li>• Shaping and forming - press tool work, shearing, stamping out, hydraulic forming, notching, bending / folding nets / tubular handle / dressing</li> <li>• Machining - drilling holes</li> <li>• Joining - spot welding of joints</li> <li>• Riveting the main body</li> <li>• <i>Any other appropriate response</i></li> </ul> <p><i>Do not accept riveting of separate components.</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)
(Total 9 marks)					

Question			Expected answers	Mark allocation	
5318_04_Q10ai			Name the specific material commonly used in metal cantilever tool boxes to make the:  Main body		
10	(a)	i	<ul style="list-style-type: none"> <li>• Steel (1)</li> <li>• Heavy gauge sheet steel (1) - any reference to steel (1)</li> <li>• Aluminium / aluminium alloy</li> </ul> <p><i>Do not accept generic term - metal or plastic</i></p>	1x1	(1)
5318_04_Q10aai			Name the specific material commonly used in metal cantilever tool boxes to make the:  rivets on parallel motion linkage		
10	(a)	ii	<ul style="list-style-type: none"> <li>• aluminium (1)</li> <li>• steel (1)</li> <li>• stainless steel (1)</li> <li>• any reference to steel (1)</li> <li>• nickel copper alloy (1)</li> <li>• copper (1)</li> </ul> <p><i>Do not accept generic terms such as - metal, plastic or thermoplastic or Polypropylene (PP)</i></p>	1x1	(1)
5318_04_Q10bi			Name a specific material used for powder coating.		
10	(b)	i	<ul style="list-style-type: none"> <li>• Deconyl Powder</li> <li>• PVC</li> <li>• Polythene</li> <li>• PTFE</li> <li>• Polyesters</li> <li>• Nylon</li> <li>• thermosetting polymer resin</li> <li>• Epoxy</li> <li>• Enamel / vitreous enamel</li> </ul> <p><i>Do not accept paint, thermoplastic or plastic.</i></p>	1x1	(1)

Question			Expected answers	Mark allocation	
5318_04_Q10bii			Explain two reasons for powder coating metal.		
10	(b)	ii	<p>Two explanations that makes reference to:</p> <ul style="list-style-type: none"> <li>• Protective (1)</li> <li>• Decorative (1)</li> <li>• Powder coated surfaces are more resistant to chipping/scratching (1), fading/chemical and wearing than other finishes/forms a protective coating to prevent corrosion (1)</li> <li>• Colours stay bright and vibrant longer. (1)</li> <li>• Texture selections range from smooth surfaces to a wrinkled or matte finish, and rough textures designed for hiding surface imperfections. (1)</li> </ul>	2x1 2x1	(4)
5318_04_Q10c			Explain how the use of modern materials has helped the manufacturer of metal cantilever tool boxes develop new products.		
10	(c)		<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• Low cost manufacturing processes (1) e.g. cnc folding (1) low unit costs (1)</li> <li>• Aesthetically pleasing (1) wide range of colours, textures, surface finishes (1)</li> <li>• Greater product range (1) using standard components (1)</li> <li>• New markets (1) e.g. DIY enthusiasts, hobbies etc</li> <li>• lightweight (1) durable (1) for hard wear characteristics (1) tough (1) strong (1) to provide protection (1) ductile (1)</li> <li>• water-resistant (1) for weather protection (1)</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)
<b>(Total 10 marks)</b>					

Question			Expected answers	Mark allocation	
5318_04_Q11			Describe two quality control procedures used at the production stage of the manufacture of the metal cantilever tool boxes 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>• Co-ordinate Measurement Machine (CMM) (1)</li> <li>• Optical sensors (1)</li> <li>• Inspection (1) and Testing (1)</li> <li>• Control charts (1)</li> <li>• Use control charts (1) to analyse data (1)</li> <li>• Data from probes (co-ordinate measurement machine CMM) (1) / optical sensors (1) is directly inputted into a computer system (1) and reports can be generated (1)</li> <li>• Inspection of components (1) in order to function properly (1) acceptable in accordance with its specification (1) and external standards (BS, EN ISO) (1)</li> </ul> <p><i>Must have relevant monitoring / control technology link</i></p>	2x1 2x1	(4)



Question			Expected answers	Mark allocation	
Explain one benefit of applying each quality control procedure, described in (a) 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 - cheaper product / more profit (1)</li> <li>• Avoids faulty parts being assembled - early detection (1)</li> <li>• Increased sales - consistent product / lower prices (1)</li> <li>• User confidence - consistent product / less returns (1)</li> <li>• Reduced waste - control of manufacturing process (1)</li> <li>• Reliable product (1) - monitoring standards testing / parts (1)</li> <li>• No breaking parts (1) - monitoring component / parts (1)</li> <li>• Any other appropriate response</li> </ul> <p><i>2 x 1 mark for Low response or 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	(2) (2)

Question		Expected answers	Mark allocation	
Explain one benefit of applying each quality control procedure, described 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	(2) (2)
(Total 12 marks)				

Question			Expected answers	Mark allocation	
5318_04_Q12			The utilisation of modern technology in the manufacture of metal cantilever tool boxes has brought changes. Explain these changes in:		
The Types and size of workforce					
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 response</li> </ul>	2x1	(2)
The working environment					
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 response</li> </ul>	2x1	(2)
The global environment					
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 response</li> </ul>	2x1	(2)

<i>Question</i>		<i>Expected answers</i>		<i>Mark allocation</i>
5318_04_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 response</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_04_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 response</li> </ul>	4x1	(4)
5318_04_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	