



Mark Scheme (Results)

Summer 2018

NQF BTEC Level 1/Level 2 Firsts in  
Engineering

Unit 9: Interpreting and Using  
Engineering Information (21174E)

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**BTEC Next Generation Mark Scheme  
Engineering Unit 9 1806**

Question Number	Answer	Mark
1a	B – Face protection D – Use of guard	2

Question Number	Answer	Mark						
1b	<p>Award <b>one</b> mark for each correctly matched sign up to a maximum of <b>two</b> marks.</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: center;">Hazard Symbol</th> <th style="text-align: center;">Hazard Symbol Name</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: middle;">  </td> <td style="vertical-align: middle;"> <p>Flammable</p> <p>Toxic</p> <p>Corrosive</p> </td> </tr> <tr> <td style="text-align: center; vertical-align: middle;">  </td> <td style="vertical-align: middle;"> <p>Oxidising</p> <p>Explosive</p> </td> </tr> </tbody> </table> <p>If more than one line drawn from either sign, award no mark for that sign.</p>	Hazard Symbol	Hazard Symbol Name		<p>Flammable</p> <p>Toxic</p> <p>Corrosive</p>		<p>Oxidising</p> <p>Explosive</p>	2
Hazard Symbol	Hazard Symbol Name							
	<p>Flammable</p> <p>Toxic</p> <p>Corrosive</p>							
	<p>Oxidising</p> <p>Explosive</p>							

Question Number	Answer	Mark
1c	<p>Award <b>one</b> mark for any of the following, up to a maximum of <b>two</b> marks.</p> <ul style="list-style-type: none"> <li>• outline/visible outline (1)</li> <li>• hidden/hidden detail (1)</li> <li>• centre lines (1)</li> <li>• dimensions lines (1)</li> <li>• extension lines (1)</li> <li>• section line/section cutting plane (1)</li> <li>• construction lines (1)</li> <li>• continuous line (1)</li> </ul>	2

Question Number	Answer	Mark
2a	<p>Only acceptable answers</p> <ul style="list-style-type: none"> <li>• Operation/s sheet (1)</li> <li>• Production plan (1)</li> <li>• Job card (1)</li> <li>• Planning sheet (1)</li> </ul>	1

Question Number	Answer	Mark
2b	<p>A – Test schedule (1) E – Installation manual (1)</p>	2

Question Number	Answer	Mark
2ci	<p>Award <b>one</b> mark for the following:</p> <ul style="list-style-type: none"> <li>• material specifications (1)</li> <li>• material reference sheet (1)</li> <li>• steel manufacturers data sheets (1)</li> </ul> <p>Do not accept 'websites, internet or books', without specific reference.</p> <p>Accept any other appropriate response.</p>	1
2cii	<p>Award <b>one</b> mark for any of the following:</p> <ul style="list-style-type: none"> <li>• tapping drill reference charts (1)</li> <li>• Zeus chart (1)</li> <li>• Machinery's handbook (1)</li> </ul> <p>Do not accept 'websites, internet or books', without specific reference.</p> <p>Accept any other appropriate response.</p>	1

Question Number	Answer	Mark
3a	<p>Only acceptable answers:</p> <ul style="list-style-type: none"> <li>• 36.5 (1)</li> <li>• 36.50 (1)</li> <li>• 36.5 mm (1)</li> </ul> <p>Units do not need to be stated.</p>	1

Question Number	Answer	Mark
3bi	Only acceptable answer  □ Diameter (1)  Accept phonetic spelling.	1
3bii	Only acceptable answers  • Countersink (1) • Countersunk (1)  Accept phonetic spelling.	1

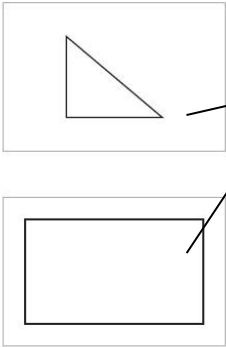
Question Number	Answer	Mark
3c	Award <b>one</b> mark for an advantage and <b>one</b> additional mark for appropriate expansion, up to a maximum of <b>two</b> marks.  <ul style="list-style-type: none"> <li>• No need for further drawings or information (1) because multiple views are provided of the components (1)</li> <li>• Components can be drawn to an exact scale (1) allowing parts to be compared for proportion (1)</li> <li>• All hidden details can be seen (1) unlike using other drawing methods (1)</li> <li>• Standardised layouts/linetypes/symbols are used (1) these can be interpreted internationally/universally (1)</li> <li>• All dimensions of the components are able to be gained from orthographic projections (1) removing the need for guesswork (1)</li> </ul> Accept any other appropriate response.	2

Question Number	Answer	Mark
4a	C – Title block E – Company logo	2

Question Number	Answer	Mark
4b	Award <b>one</b> mark for any of the following, up to a maximum of <b>two</b> marks.  <ul style="list-style-type: none"> <li>• physical dimensions e.g. radius, diameter, length etc (1)</li> <li>• scale (1)</li> <li>• tolerances (1)</li> <li>• fixed reference points (1)</li> <li>• surface texture (1)</li> </ul>	2

Question Number	Answer	Mark
4c i	<p>Award <b>one</b> mark for any of the following.</p> <ul style="list-style-type: none"> <li>• 62K<math>\Omega</math></li> <li>• 62k</li> <li>• 62000</li> <li>• 62000<math>\Omega</math></li> <li>• 62 kilo ohms</li> <li>• 62 kilo <math>\Omega</math></li> <li>• 62000+/-10%</li> <li>• 55800 to 68200</li> </ul>	1
Question Number	Answer	Mark
4c ii	<p>Award <b>one</b> mark for any of the following:</p> <ul style="list-style-type: none"> <li>• Indicates resistor tolerance/tolerance band (1)</li> <li>• Indicates upper/lower values of resistance (1)</li> <li>• Indicates resistor accuracy value (1)</li> <li>• 10% range/difference/tolerance (1)</li> </ul> <p>Accept any other appropriate response.</p>	1
4d	<p>Award <b>one</b> mark for a disadvantage and <b>one</b> additional mark for appropriate expansion, up to a maximum of <b>two</b> marks.</p> <ul style="list-style-type: none"> <li>• It can be time consuming to locate specific drawings (1) because drawings may not be replaced in the correct location (1)</li> <li>• Drawings can become damaged when taking them from the cabinet (1) leading to errors caused by missing information (1)</li> <li>• Filing cabinets are in specific locations (1) meaning retrieval can delay production (1)</li> <li>• Drawings can be amended/misplaced (1) as they could be accessed by anyone (1)</li> <li>• There is no secure back up/copy (1) leading to a risk of paper copies being destroyed in fire/flood (1)</li> <li>• Filing cabinets are often bulky/large (1) this could lead to unnecessary space being taken up (1)</li> </ul> <p>Accept any other appropriate reason.</p>	2

Question Number	Answer	Mark
5ai	<p>Only acceptable answers</p> <ul style="list-style-type: none"> <li>• Welding process (1)</li> <li>• Welding technique (1)</li> <li>• Welding operation (1)</li> <li>• Welding method (1)</li> <li>• Process (1)</li> </ul>	1
5aii	<p>Only acceptable answers</p> <ul style="list-style-type: none"> <li>• Welding position (1)</li> <li>• Position (1)</li> </ul>	1

Question Number	Answer	Mark
5b	<p>Award <b>one</b> mark for each correctly matched symbol to a</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Weld type symbol</p>  </div> <div style="text-align: center;"> <p>Weld type name</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Plug</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Fillet</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Square butt</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Backing run</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Spot</div> </div> </div> </div> <p>maximum of <b>two</b> marks. If more than one line drawn from either symbol, award no mark for that symbol.</p>	2

Question Number	Answer	Mark
5c	<p>Award <b>one</b> mark for an advantage and <b>one</b> additional mark for appropriate expansion, to a maximum of <b>two</b> marks per response, up to a maximum of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• Work force/resource requirements can be determined (1) based on fluctuating capacity (1)</li> <li>• The company can determine the maximum possible output (1) based on the usage of equipment under normal working condition (1)</li> <li>• The company is able to work out how many frameworks can be produced at one time (1) based on the size of the workshop (1)</li> <li>• Sales/customers/purchasing are provided with accurate/up-to-date information (1) as improved forecasting/planning is possible (1)</li> <li>• Work flow can be prioritised (1) to minimise disruption from bottlenecks (1)</li> </ul> <p>Accept any other appropriate response.</p>	4

Question Number	Answer	Mark
5d	<p>Award <b>one</b> mark for a characteristic and <b>one</b> additional mark for appropriate expansion, to a maximum of <b>two</b> marks.</p> <ul style="list-style-type: none"> <li>• Data sheets contain information about the size/profile of filler rods (1) allowing welding parameters to be set accordingly (1)</li> <li>• Data sheets give information about the form of the filler (1) so that the correct welding procedure can be used (1)</li> </ul> <p>Tensile strength of the filler material is given (1) which means that that filler rods can be specified that have the required strength for the product to be welded (1)</p> <ul style="list-style-type: none"> <li>• Suitable welding positions (vertical/horizontal/overhead) for the filler material are specified (1) meaning that only appropriate filler materials will be used for given weld positions (1)</li> <li>• Material properties/specification/type is specified (1) ensuring compatibility with the product to be welded (1)</li> </ul> <p>Accept any other appropriate response.</p>	2



Question Number	Answer	Mark
6a	<p>Award <b>one</b> mark for an advantage and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>two</b> marks.</p> <ul style="list-style-type: none"> <li>• Components will be manufactured to consistent specifications (1) as all machine operators will be using the same feeds and speeds (1)</li> <li>• Quality of finish will be to the required standard (1) as feeds and speeds will have been determined based on the quality requirements of the component (1)</li> <li>• Machining processes can be completed faster/efficiently (1) as operatives do not need to check values using reference charts/calculate feeds and speeds (1)</li> <li>• More accurate production time can be determined (1) allowing the company to plan scheduling/delivery time (1)</li> </ul> <p>Accept any other reasonable response.</p>	2

Question Number	Answer	Mark
6b	<p>Award <b>one</b> mark for a characteristic and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>two</b> marks.</p> <ul style="list-style-type: none"> <li>• Customers will be able to assemble trailers correctly (1) as assembly drawings/instructions are included in the manual (1)</li> <li>• Manuals contain parts lists (1) enabling the customer to check that all components are included (1)</li> <li>• Tool lists are included (1) so the customer uses the correct tools for safe assembly of the trailers (1)</li> <li>• Fixing settings/assembly methods/torque values are provided (1) to allow correct assembly/to prevent over or under tightening of fixings (1)</li> <li>• Manufacturers' manuals show where each fixing is used (1) ensuring that correct fixings are used in the correct orientation/position (1)</li> <li>• The manual can be used to source spare parts (1) if issues arise in use/build of the trailer (1)</li> <li>• Health and safety risks are minimised (1) as trailers assembled incorrectly could be dangerous (1)</li> </ul> <p>Accept any other reasonable response.</p>	2

Question Number	Answer	Mark
6c	<p>Award <b>one</b> mark for an advantage and <b>one</b> additional mark for appropriate expansion, to a maximum of <b>two</b> marks per response, up to a maximum of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• An estimated delivery/production time of the kits of components can be given (1) as the manufacturing company knows exactly which components are critical to the time it takes to manufacture (1)</li> <li>• The customer can be informed of potential delays to delivery of the kits of components (1) as these will be known if an activity on the critical path overruns (1)</li> <li>• The cost of the kits of components can be reduced (1) as using a critical path analysis introduces efficiencies by making best use of resources (1)</li> <li>• The kits of components could be made available sooner (1) if the manufacturer provides additional resources to activities on the critical path (1)</li> <li>• The customer will receive the correct kit of components (1) as the critical path analysis ensures the kit is built in the correct sequence (1)</li> </ul> <p>Accept any other reasonable response</p>	4

Question Number	Indicative content	Mark
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7	<ul style="list-style-type: none"> <li>• To enable traceability</li> <li>• To enable an audit trail</li> <li>• An ability to check pass/reject rates of multimeters</li> <li>• To support improved multimeter production processes/activities</li> <li>• As documentation could form part of the company's ability to achieve BSI 9001 certification</li> <li>• Keeping records will help the company as it can identify where problems in production occur</li> <li>• Monitor/track various processes during multimeter manufacture</li> <li>• Analyses efficiency and effectiveness of manufacturing operations during quantity manufacture</li> <li>• Helps to improve consistency</li> <li>• Reduces likelihood of faulty multimeters that need to be recalled or replaced</li> <li>• Allows operators to flag up and act on quality issues</li> <li>• Allows operators/machines/processes to be compared</li> <li>• To monitor quality performance over time</li> <li>• Allows quality information to be visually displayed</li> <li>• Can identify the root causes of manufacturing problems</li> </ul> <p>Model answer:  BB34 Engineering will be able to use quality control documentation and information at various stages and in various ways when manufacturing large numbers of multimeters. BB34 Engineering will be able to monitor and track various processes during multimeter manufacture and analyse the efficiency and effectiveness of manufacturing operations over time meaning operators can flag up and act on quality issues, thereby reducing the likelihood of faulty multimeters which need to be recalled or replaced. BB34 Engineering will also be able to use charts to visually display quality control information comparing this over prolonged periods of time. This allows operators, machines and processes to be compared over time, which can help to identify the root causes of manufacturing problems. All of the above would allow for full quality audits as part of a wider quality system.</p>	8
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<b>Level</b>	<b>Descriptor</b>	<b>Mark</b>
0	No rewardable material	0 marks
1	A few key points identified, or one point described in some detail. The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/directly linked to the situation in the question. Limited knowledge of the use of quality control documentation and information will be evident.	1-3 marks
2	Some points identified, or a few key points described. Most points made will be relevant to the situation in the question, but the link will not always be clear. A good understanding of the use of quality control documentation and information will be evident.	4-6 marks
3	Range of points described, or a few key points explained in depth. The majority of points made will be relevant and there will be a clear link to the situation in the question. A developed understanding of the use of quality control documentation and information will be evident.	7-8 marks

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Pearson Education Limited. Registered company number  
872828 with its registered office at Edinburgh Gate,  
Harlow, Essex CM20 2JE

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