



Mark Scheme (Results)

June 2019

NQF BTEC Level 1/Level 2 Firsts in  
Engineering

Unit 9: Interpreting and Using  
Engineering Information

(21174E)

## **Edexcel and BTEC Qualifications**

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at [www.edexcel.com](http://www.edexcel.com) or [www.btec.co.uk](http://www.btec.co.uk) for our BTEC qualifications.

Alternatively, you can get in touch with us using the details on our contact us page at [www.edexcel.com/contactus](http://www.edexcel.com/contactus).

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson. Their contact details can be found on this link: [www.edexcel.com/teachingservices](http://www.edexcel.com/teachingservices)

You can also use our online Ask the Expert service at [www.edexcel.com/ask](http://www.edexcel.com/ask). You will need an Edexcel username and password to access this service.

### **Pearson: helping people progress, everywhere**

Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: [www.pearson.com/uk](http://www.pearson.com/uk)

June 2019

Publications Code 21174E\_1906\_MS

All the material in this publication is copyright



© Pearson Education Ltd 2019

Question Number	Answer	Mark
<b>1a</b>	<b>B</b> – health and safety <b>D</b> – quality control checks	<b>2</b>

Question Number	Answer	Mark
<b>1b(i)</b>	Award <b>one</b> mark for each correctly identified abbreviation:  CBORE - counterbore (1)  Allow for phonetic spellings	<b>1</b>
<b>1b(ii)</b>	Award <b>one</b> mark for each correctly identified abbreviation:  EXT - external (1)  Allow for phonetic spellings	<b>1</b>

Question Number	Answer	Mark
<b>1c</b>	D - transistor	<b>1</b>

Question Number	Answer	Mark
<b>1d</b>	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 – length /width / thickness / sizes / measurements (1)</li> <li>• Scale (1)</li> <li>• Fixed reference points/datum (1)</li> <li>• Surface texture / finish (1)</li> </ul>	<b>2</b>

Question Number	Answer	Mark
2a	<p>Award <b>one</b> mark for each correctly matched signs, up to a maximum of <b>two</b> marks.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Safe Condition Sign</p>  <p>(Background is green)</p> </div> <div style="text-align: center;"> <p>Safe Condition</p> <p>assembly point</p> <p>drinking water</p> <p>emergency eye wash</p> <p>fire exit</p> <p>first aid</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <p>(Background is green)</p> </div> </div>	2

Question Number	Answer	Mark
2b	<p>Award <b>one</b> mark for either of the following Only acceptable answers:</p> <ul style="list-style-type: none"> <li>• Blue (1)</li> <li>• White (1)</li> </ul>	1

Question Number	Answer	Mark
2c(i)	<p>Award <b>one</b> mark for any of the following:</p> <ul style="list-style-type: none"> <li>• Critical path analysis (1)</li> <li>• Critical path (1)</li> <li>• CPA (1)</li> <li>• Network diagram (1)</li> <li>• Network analysis (1)</li> </ul> <p>Accept any other appropriate response</p>	1

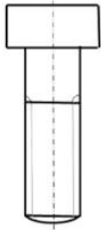
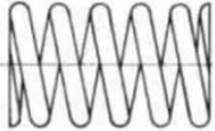
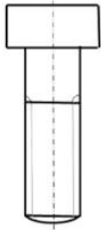
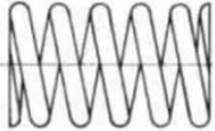
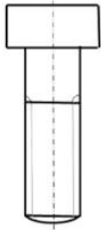
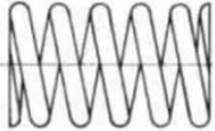
Question Number	Answer	Mark
2c(ii)	Only acceptable answers: <ul style="list-style-type: none"> <li>• 15 hours (1)</li> <li>• 15 (1)</li> <li>• 15 Hrs (1)</li> <li>• Fifteen (1)</li> <li>• Fifteen hours (1)</li> </ul>	1

Question Number	Answer	Mark
3a	<b>C</b> – ICT system (1) <b>D</b> – filing cabinet (1)	2

Question Number	Answer	Mark
3b	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>• Pressure (1)</li> <li>• Flow (1)</li> <li>• Current (1)</li> <li>• Voltage (1)</li> <li>• Speed (1)</li> <li>• Component values (1)</li> <li>• Resistance (1)</li> <li>• Power (1)</li> </ul> Accept any other reasonable response	2

Question Number	Answer	Mark
<b>3c</b>	<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>• Recognised internationally / no language barriers (1)</li> <li>• Able to be quickly understood / interpreted by third parties (1)</li> <li>• Reduces mistakes (1)</li> <li>• Allows compatibility with CAD systems (1)</li> <li>• Line types have specific uses (1)</li> <li>• Symbols are common (1)</li> <li>• Consistency (1)</li> </ul> <p>Accept any other reasonable response</p>	<b>2</b>

Question Number	Answer	Mark
<b>4a</b>	<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>• Product assembly – accept welding, bonding, riveting etc (1)</li> <li>• Product design – accept techniques, such as, CAD (1)</li> <li>• Product manufacture – accept techniques, such as, turning / milling, etc (1)</li> <li>• Maintenance planning / planning (1)</li> <li>• Maintenance procedure (1)</li> <li>• Product installation (1)</li> </ul> <p>Accept any other reasonable response</p>	<b>2</b>

Question Number	Answer	Mark						
4b	<p data-bbox="411 282 1240 344">Award <b>one</b> mark for each correctly matched mechanical symbol, up to a maximum of <b>two</b> marks.</p> <table border="1" data-bbox="411 376 1240 1003"> <thead> <tr> <th data-bbox="411 376 927 416">Mechanical Component Symbol</th> <th data-bbox="930 376 1240 416">Mechanical Component Name</th> </tr> </thead> <tbody> <tr> <td data-bbox="411 421 927 741">  </td> <td data-bbox="930 421 1240 741"> <p data-bbox="1023 517 1066 539"><u>bolt</u></p> <p data-bbox="1023 613 1066 636"><u>key</u></p> <p data-bbox="1023 710 1066 732"><u>pin</u></p> </td> </tr> <tr> <td data-bbox="411 745 927 1003">  </td> <td data-bbox="930 745 1240 1003"> <p data-bbox="1023 806 1066 828"><u>clip</u></p> <p data-bbox="1023 902 1082 925"><u>spring</u></p> </td> </tr> </tbody> </table>	Mechanical Component Symbol	Mechanical Component Name		<p data-bbox="1023 517 1066 539"><u>bolt</u></p> <p data-bbox="1023 613 1066 636"><u>key</u></p> <p data-bbox="1023 710 1066 732"><u>pin</u></p>		<p data-bbox="1023 806 1066 828"><u>clip</u></p> <p data-bbox="1023 902 1082 925"><u>spring</u></p>	2
Mechanical Component Symbol	Mechanical Component Name							
	<p data-bbox="1023 517 1066 539"><u>bolt</u></p> <p data-bbox="1023 613 1066 636"><u>key</u></p> <p data-bbox="1023 710 1066 732"><u>pin</u></p>							
	<p data-bbox="1023 806 1066 828"><u>clip</u></p> <p data-bbox="1023 902 1082 925"><u>spring</u></p>							

Question Number	Answer	Mark
4c	B – oblique	1

Question Number	Answer	Mark
4d	<p>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.</p> <ul style="list-style-type: none"> <li>• Instructs customers how to assemble the play equipment correctly (1) so the product is safe to use (1)</li> <li>• Allows customers to identify the different components (1) so they are attached in the correct places / missing parts can be identified (1)</li> <li>• Allows the customer to disassemble the equipment (1) as all the joints will be indicated (1)</li> <li>• Allows the sequence of assembly to be established (1) ensuring that parts are assembled efficiently / assembled in the correct order (1)</li> <li>• Allows for repair / adjustment (1) as parts may require replacement / maintenance over time (1)</li> <li>• The company does not have to assemble the equipment (1) allowing for reduced transportation / assembly costs (1)</li> </ul> <p>Accept any other reasonable response</p>	<b>2</b>

Question Number	Answer	Mark
5a	<p>Award <b>one</b> mark for any of the following:</p> <ul style="list-style-type: none"> <li>• To ensure the correct material is being used (1)</li> <li>• To make sure the correct welding process to be selected (1)</li> <li>• To make sure the correct type of weld is produced (1)</li> <li>• To make sure the weld is produced to the correct standard (1)</li> <li>• To make sure the correct welding settings are used (1)</li> </ul> <p>Accept any other reasonable response</p>	<b>1</b>



Question Number	Answer	Mark
5b	<p>Award <b>one</b> mark for an advantage and <b>one</b> additional mark for appropriate expansion, up to a maximum of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• Part numbers are specific to the part (1) which reduces the chances of the wrong component being used (1)</li> <li>• Part numbers can be used to identify the type of component (1) for easier grouping / selection / distribution / assembly (1)</li> <li>• Can improve efficiency of manufacturing (1) helping to identify missing parts (1)</li> <li>• Parts with manufacturing defects can easily be identified (1) so parts can be redesigned / reworked / replaced (1).</li> </ul> <p>Accept any other reasonable response</p>	4

Question Number	Answer	Mark
5c	<p>Award <b>one</b> mark for an advantage and <b>one</b> additional mark for appropriate expansion:</p> <ul style="list-style-type: none"> <li>• Ensure the correct class of fit (1) as the technician is able to select the correct size of tool (1)</li> <li>• Engineers do not need to carry out calculations (1) meaning less chance of mistakes (1)</li> <li>• Allows technicians to select either metric or imperial (1) so that it can be assembled in different parts of the world (1)</li> <li>• Clearance / transition / interference fits can be easily specified (1) as a universal coding system specifies the fit (1)</li> </ul> <p>Accept any other reasonable response</p>	2

Question Number	Answer	Mark
6a	<p>Award <b>one</b> mark for reason 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>• Prevents components being fitted incorrectly (1) because the data sheet will indicate polarity (1)</li> <li>• Reduces the risk of incorrect components being used (1) since the data sheet will state the current / voltage limitations of the component (1)</li> <li>• The correct components are able to be identified for the circuit (1) as datasheets contain all nominal values (1)</li> <li>• Check sizes of the electronic components (1) to make sure it fits the circuit board / casing (1)</li> <li>• Check number of pins / connections (1) to make sure circuit board is correct / matches component (1)</li> </ul> <p>Accept any other appropriate answer</p>	2

Question Number	Answer	Mark
6b	<p>Award <b>one</b> mark for an advantage and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• It alerts BB3 Engineering of an error / mistake (1) so assembly manuals can be amended (1)</li> <li>• To ensure safety / consistency (1) because existing installations can be checked for the correct components (1)</li> <li>• Material stocks can be checked (1) to make sure the correct components are being ordered / installed (1)</li> <li>• Document control procedures will be improved (1) as reporting of issues indicates a problem (1)</li> <li>• The installation engineer can confirm the correct component (1) to ensure the current display is correctly installed / assembled (1)</li> </ul> <p>Accept any other reasonable response</p>	4

Question Number	Answer	Mark
6c	<p>Award <b>one</b> mark for a reason and <b>one</b> additional mark for the appropriate expansion to a maximum of <b>two</b> marks, up to a maximum of <b>four</b> marks.</p> <ul style="list-style-type: none"> <li>• Control charts serves as an early warning (1) allowing operators to correct / detect potential issues (1)</li> <li>• Control charts are displayed (1) to emphasise the importance of quality control to the work force (1)</li> <li>• Control charts can be compared over time (1) to show trends / monitor performance (1)</li> <li>• Different control charts can be used (1) depending on the process (1)</li> <li>• Statistical process control information can be displayed graphically (1) allowing comparison against standards (1)</li> <li>• Statistical process control charts can be used as a quality tool (1) being used to review the performance of machines / processes (1)</li> </ul> <p>Accept any other reasonable response</p>	<b>4</b>

Question Number	Indicative content	Mark
7	<ul style="list-style-type: none"> <li>• Allows the construction and installation to be broken down in to tasks / activities</li> <li>• Pinpoints activities with flexibility / float</li> <li>• A series of bars and lines depicting activity flow making it easier to read</li> <li>• Can show earliest start and finish time / latest start and finish time of activities</li> <li>• Critical stages / milestones of the manufacturing process can be identified</li> <li>• Can be used to determine ongoing resource requirements</li> <li>• Allows for JIT to be incorporated so parts are delivered when needed</li> <li>• Can be shared with suppliers</li> </ul> <p><b>Model answer</b> The company can use Gantt charts to monitor the overall progress of the manufacture and installation of the equipment which means any delays can be identified and planned around. Each activity is shown on the chart as bars which are joined together with lines to show which activities depend on each other. This provides a visible representation of a complex process. They can be used to decide on the start or finish time of activities because some will have float so it does not matter when they are done as long as they are finished before the next stage when they are needed. The chart can show the times when specific parts of equipment need to be installed and can be shared with suppliers which means parts will be delivered when they are needed. The chart shows clearly which activities depend on each other, so if something is running late, the plan can be adjusted to accommodate this.</p>	8
Level	Descriptor	
0 0 marks	No rewardable material	
1 1-3 marks	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. The learner shows a limited knowledge of the use of a Gantt charts.	
2 4-6 marks	Some points identified, a few key points described or one point explained in detail. Most points made will be relevant to the situation in the question, but the link will not always be clear. The learner shows a good understanding of the use of Gantt charts.	
3 7-8 marks	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. The learner shows a developed understanding of the use of Gantt charts.	

For more information on Edexcel qualifications, please visit our website  
[www.edexcel.com](http://www.edexcel.com)

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

Ofqual  




Llywodraeth Cynulliad Cymru  
Welsh Assembly Government

