

Mark Scheme (Results)

January 2020

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 or 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

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

You can also use our online Ask the Expert service at 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

January 2020

Publications Code 21174E_2001_MS

All the material in this publication is copyright

© Pearson Education Ltd 2020



BTEC Next Generation Mark Scheme Engineering Unit 9

Question Number	Answer	Mark
1a	B – Title block D – Parts list	2

Question Number	Answer	Mark
1b	<p>Award one mark for each correctly identified working instruction up to a maximum of two marks</p> <ul style="list-style-type: none"> • operation sheets/SOP (1) • test schedule (1) • manufacturers' manuals for assembly/test/installation (1) • weld procedure specifications (1) <p>Accept any other reasonable response.</p>	2

Question Number	Answer	Mark
1c	A – Current	1

Question Number	Answer	Mark
1d	<p>Award one mark for each correctly identified document up to a maximum of two marks</p> <ul style="list-style-type: none"> • Gantt chart (1) • critical path analysis/CPA/critical path/network diagram (1) • capacity (1) • milestones (1) • production plans (1) • diary (1) <p>Accept any other reasonable response.</p>	2

Question Number	Answer	Mark
2a	<p>Award one mark for each correctly matched sign, up to a maximum of two marks.</p> <p style="text-align: center;">Warning sign</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>(Source: © art-sonikGetty Images)</p> </div> <div style="text-align: center;"> <p>Warning sign name</p> <div style="border: 1px solid gray; border-radius: 10px; padding: 5px; width: 80%; margin: 5px auto;">Danger of death</div> <div style="border: 1px solid gray; border-radius: 10px; padding: 5px; width: 80%; margin: 5px auto;">Caution</div> <div style="border: 1px solid gray; border-radius: 10px; padding: 5px; width: 80%; margin: 5px auto;">Slippery surface</div> <div style="border: 1px solid gray; border-radius: 10px; padding: 5px; width: 80%; margin: 5px auto;">High voltage</div> <div style="border: 1px solid gray; border-radius: 10px; padding: 5px; width: 80%; margin: 5px auto;">Risk of explosion</div> </div> </div> <div style="margin-top: 20px;">  <p>(Source: © alessandro0770Getty Images)</p> </div>	2

Question Number	Answer	Mark
2b	<p>Award one mark for one of the following</p> <ul style="list-style-type: none"> • emergency stop (1) • emergency exit (1) • fire exit (1) • first aid station (1) • first aid (1) • emergency eye wash (1) • emergency telephone (1) • assembly point (1) <p>Accept any other reasonable response.</p>	1

Question Number	Answer	Mark
2ci	<p>Only acceptable answers</p> <ul style="list-style-type: none"> • Cutting plane (1) • Cross section (1) • Section (1) 	1

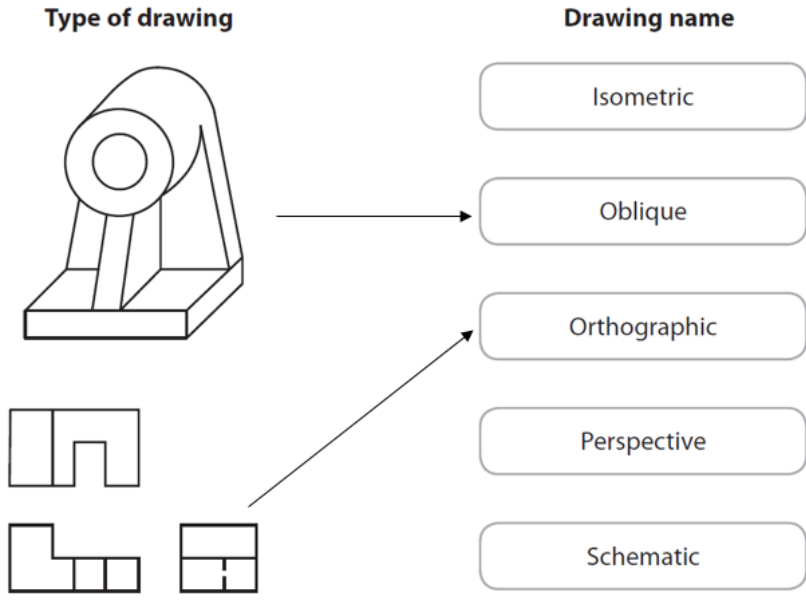
Question Number	Answer	Mark
2cii	<p>Only acceptable answers</p> <ul style="list-style-type: none"> • Centre line (1) • centreline (1) • Centre (1) • CL (1) 	1

Question Number	Answer	Mark
3a	<p>A – Filing cabinet (1) C – ICT system (1)</p>	2

Question Number	Answer	Mark
3b	<p>Award one mark for any of the following up to a maximum of two marks:</p> <ul style="list-style-type: none"> • Allows components to all be drawn to the same size/consistent (1) • Symbols are standardised/internationally recognised (1) • Symbols allow the circuit diagram to be simplified (1) • Saves time/easier to draw/interpret compared to drawings (1) • Saves space on the drawing (1) • Readability/easier to understand (1) <p>Accept any other reasonable response.</p>	2

Question Number	Answer	Mark
3c	<p>Award one mark for any of the following up to a maximum of two marks:</p> <ul style="list-style-type: none"> • Damage could result in parts being made incorrectly (1) • Once damaged the drawing will often become more damaged (1) • Damaged drawings are harder to interpret (1) • Damaged drawings will need to be replaced/redrawn (1) <p>Accept any other reasonable response.</p>	2

Question Number	Answer	Mark
4a	A – To ensure the correct process is used C – To ensure the correct parts are used	2

Question Number	Answer	Mark
4b	<p>Award one mark for each correctly matched drawing type, up to a maximum of two marks.</p> <p>Type of drawing</p>  <p>Drawing name</p> <p>Isometric</p> <p>Oblique</p> <p>Orthographic</p> <p>Perspective</p> <p>Schematic</p>	2

Question Number	Answer	Mark
4ci	B – Plug	1

Question Number	Answer	Mark
4cii	<p>Award one mark for a reason and one additional mark for appropriate expansion, up to a maximum of two marks.</p> <ul style="list-style-type: none"> • The data contains information about the type of welding method or the materials/properties of the welding rods (1) so the correct one can be chosen for the parts being welded/quality of weld produced (1) • Data about required current/power/ angle/position is provided (1) to ensure welds are produced correctly/prevent waste/scrap (1) • The data contains safety information (1) allowing safe working practices to be followed (1) • Physical dimensions of the welding rod are provided (1) allowing the correct size to be selected for the given welds (1) <p>Accept any other reasonable response.</p>	2

Question Number	Answer	Mark
5a	<p>Award one mark for one of the following:</p> <ul style="list-style-type: none"> • Quantities will be shown (1) • Tools and equipment needed will be listed (1) • Materials will be specified (1) • Deadlines will be shown (1) • Timings will be shown (1) • QA/QC data will be shown (1) • List of operations/processes (1) <p>Accept any other reasonable response.</p>	1

Question Number	Answer	Mark
5b	<p>Award one mark for a reason and one additional mark for appropriate expansion, up to a maximum of two marks.</p> <ul style="list-style-type: none"> • Extra width/size will be needed on the sheet metal (1) as bending distorts the metal (1) • Different thicknesses of metal have different allowances/tolerances (1) therefore it reduces the chances of making mistakes (1) • Reduces the need for engineers to carry out calculations each time (1) as these are included in the reference tables/charts (1) • Can reduce wastage (1) as engineers will specify the correct dimensions for the metal (1) <p>Accept any other reasonable response.</p>	2

Question Number	Answer	Mark
5c	<p>Award one mark for an advantage and one additional mark for appropriate expansion, up to a maximum of four marks.</p> <ul style="list-style-type: none"> • Exploded diagrams show all of the individual parts (1) allowing the customer to identify missing parts (1) • Component parts are aligned using projection lines (1) reducing the likelihood of mistakes/highlighting mistakes when they are assembled (1) • Exploded diagrams will show which fixings/tools need to be used (1) meaning the shelving system will be constructed safely/allows job planning/preparation (1) • The diagram will show the order/sequence that parts need to be assembled (1) which should mean the parts fit together logically/securely/easily (1) <p>Accept any other reasonable response</p> <p>Do <u>not</u> accept faster/quicker without further justification</p>	4

Question Number	Answer	Mark
6a	<p>Award one mark for an advantage and one additional mark for appropriate expansion, up to a maximum of two marks.</p> <ul style="list-style-type: none"> • Manufacturers' manuals will show where connections need to be made (1) meaning that the controllers will fit/work correctly (1) • Manufacturers' manuals will show the shape/form/colour of the console (1) which allows the controllers to be designed to be compatible (1) • Manufacturers' manuals will show how parts fit together (1) so SK1 Engineering can accommodate this in their designs (1) • Manufacturers' manuals can include cutaway drawings (1) so SK1 engineering can see where components are inside the console (1) • Manufacturers' manuals will contain technical data (1) which allows controllers to be designed to meet specifications (1) <p>Accept any other appropriate answer</p>	2

Question Number	Answer	Mark
6b	<p>Award one mark for an implication and one additional mark for the appropriate expansion to a maximum of four marks.</p> <ul style="list-style-type: none"> • Faulty products could reach the end user (1) since no documentation exists to monitor production (1) • The controllers may not be consistent quality (1) as engineers do not perform quality checks/meaning that they will not perform as intended (1) • No audit trail will be in place/customer safety risks(1) meaning the manufacturer could face legal issues (1) • More scrap/waste produced (1) as no set quality standard is followed/increased financial cost (1) • Customer dissatisfaction/confidence (1) could result in lack of orders or return/replacement of products (1) • SK1 cannot identify problems/faults (1) therefore product improvements cannot be made (1) <p>Accept any other reasonable response</p>	4
Question Number	Answer	Mark
6c	<p>Award one mark for an advantage and one additional mark for the appropriate expansion, up to a maximum of four marks.</p> <ul style="list-style-type: none"> • Parts will be available to the manufacturer when they expect them (1) as milestones identify key production deadlines (1) • The supplier can manage its stock more efficiently (1) enabling cost savings for both companies (1) • Serious delays can be avoided in manufacturing the controllers (1) as the supplier can inform the manufacturer of any issues with part production (1) • The part suppliers can forecast accurately (1) as milestones allow them to plan their production (1) • Sharing milestones builds trust between suppliers and the manufacturer (1) allowing for secure investment (1) <p>Accept any other reasonable response</p>	4

Question Number	Indicative content	Mark
7	<p data-bbox="443 163 1166 228">General considerations for the use of document control methods</p> <ul data-bbox="491 264 1219 1037" style="list-style-type: none"> • Allows the company to identify the drawing/documents in use when lawn mowers were manufactured • It allows the company to monitor all amendments made to documentation • Ensures that the most recent drawings are used for current activities • Allows mistakes to be traced if they are found in drawings/documents • Provides an audit trail for documentation • Allows dates when changes to manufacturing processes took place to be identified • The company can identify which version of lawn mower was manufactured at a given time • Correct drawings/documents can be identified if customers need repairs or replacement parts • The company can identify who made changes to documents/drawings • It will allow the company to integrate documents in to their system if they come from suppliers • Ensures all documents for a particular model/part of a lawn mower are traceable. • Minimising the risk of drawing/document damage to prevent misinterpretation. <p data-bbox="443 1066 655 1095">Model answer</p> <p data-bbox="443 1128 1230 1644">WR14 Engineering has been manufacturing lawn mowers for a long time and in that time designs will have changed and been improved. This means that drawings will have been updated with changes and new versions produced to match changes in manufacturing. This means that if a customer needs a spare part for a lawn mower made in 1990 then WR14 Engineering will be able to find the correct drawing because it uses a suitable document control method that includes version numbers and details of dates when changes were made and who made them. It might also need to include information such as data sheets from suppliers into its own system. If it has a suitable control method then these can be given references that are linked to drawings and other documents needed to make specific items of the lawn mower.</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 understanding of document control methods.
2 4–6 marks	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. The learner shows a good understanding of document control methods.
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 document control methods.

For more information on Edexcel qualifications, please visit our website
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

