



Mark Scheme (Results)

June 2014

NQF BTEC Level 1/Level 2 Firsts in
Engineering

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

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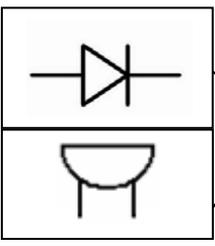
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Question Number	Answer	Mark
1 (a)	D Flammable	1

Question Number	Answer	Mark
1 (b)(i)	C Green and white	1

Question Number	Answer	Mark
1 (b)(ii)	<p>Award 1 mark for each of the following answers, up to a maximum of 2 marks.</p> <ul style="list-style-type: none"> • Eye protection (1) • Ear protection (1) • Protective footwear (1) • Use of guard (1) • Protective gloves (1) • Face protection (1) • Switch off instructions (1) <p>Accept any suitable learner interpretation of the above terms e.g. safety goggles, safety boots.</p>	2

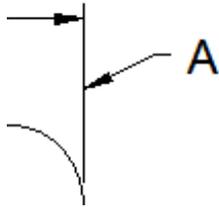
Question Number	Answer	Mark
2 (a)(i)	<p>Award 1 mark for each electronic symbol matched to the correct component name, up to a maximum of 2 marks.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 20px;">  </div> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Buzzer</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Transistor</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Resistor</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Diode</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">Lamp</div> </div> </div> <p>No mark awarded where more than one line is drawn from each electronic symbol.</p> <p>Accept no variation</p>	2

Question Number	Answer	Mark
2 (a)(ii)	<p>Award 1 mark for each of the following responses, up to a maximum of 2 marks.</p> <ul style="list-style-type: none"> • For consistency as they are standardised (1) • For speed as they are simple to draw (1) • Components are easy to identify/understand (1) • Can be used to build a complex set of information (1) • CAD systems contain pre-drawn symbols (1) • Internationally recognised pictorial symbol/universal (1) <p>Accept any other appropriate response.</p> <p>Do not accept responses about positioning components in a circuit or circuit diagram.</p>	2

Question Number	Answer	Mark
2 (b)(i)	<p>62K / 62000Ω / 62000</p> <p>Do not accept '62' on its own.</p> <p>Accept no variation</p>	1

Question Number	Answer	Mark
2 (b)(ii)	<p>Any one of the following answers:</p> <ul style="list-style-type: none"> • Indicates resistor tolerance/tolerance band (1) • Indicates upper/lower value of resistance (1) • Indicates resistor accuracy value (1) <p>Accept any other appropriate response.</p> <p>Do not accept a numerical tolerance value.</p>	1

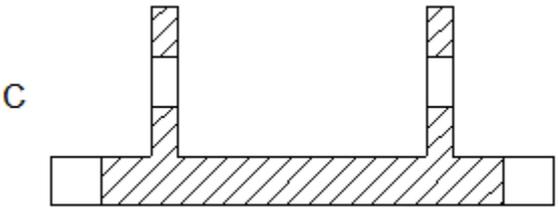
Question Number	Answer	Mark
2 (b)(iii)	<p>A linked response, award 1 mark for identifying each reason and 1 mark for the extension, up to a maximum of 4 marks.</p> <ul style="list-style-type: none"> To reduce the possibility of a calculation error (1) as the correct resistors will ensure the integrity of the circuit (1) To allow the engineer to carry out QC checks on resistors in the circuit (1) when carrying out building or testing activities (1) As the colour wheel can be used with different colour code systems (1) so the engineer does not have to memorise them (1) The colour wheel is a visual system (1) negates necessity to record values (1) <p>Accept any other appropriate response.</p> <p>Do not accept response 'easier' without appropriate justification.</p>	4

Question Number	Answer	Mark
3 (a)	<p>Answer A</p> 	1

Question Number	Answer	Mark
3 (b)	<p>50 mm/50/fifty/5cm</p> <p>Do not accept '5' or 'five' on its own</p>	1

Question Number	Answer	Mark
3 (c)	<p>Radius/Rad</p> <p>Accept any recognisable spelling (phonetic) of the above answer e.g. radios, radius</p>	1

Question Number	Answer	Mark
3 (d)	<p>Award 1 mark for each error identified and 1 mark for each extension, up to a maximum of 4 marks.</p> <ul style="list-style-type: none"> • No dimensional detail for the height of the hole (1) therefore the engineer will not know where to drill it (1) • Incorrect linetype for hidden detail (1) so the engineer may interpret the feature as a slot rather than a hole (1) • Misaligned dimensions (1) means that it has not been drawn to standard conventions/could miss a dimension (1) • The forty mm dimension is stated twice (1) so the drawing is over constrained/can be confusing to read (1) • No dimensions on the top radii (1) therefore the engineer may produce the wrong shape/profile (1) • Total length specified in two different ways (1) which could lead to issues with tolerance build-up (1) <p>Accept any other appropriate response.</p>	4

Question Number	Answer	Mark
3 (e)		1

Question Number	Answer	Mark
3 (f)	<p>A linked response, award 1 mark for identifying the advantage and 1 mark for the extension, up to a maximum of 2 marks.</p> <ul style="list-style-type: none"> • Can enable more accurate manufacturing (1) as you get a more detailed image of what is inside the component (1) • Hatched views can save time (1) as additional views/larger versions do not have to be drawn (1) • All components in an assembly can be shown (1) allowing parts lists to be easily generated (1) • Allows internal features to be dimensioned directly (1) avoiding confusion with adding dimensions to hidden detail lines (1) • Allows complex internal manufactured features to be clearly shown (1) allowing tooling/processes to be designed (1) • Parts can be hatched in different ways (1) as hatching rules allow parts to be distinguished easily/making it easier for assembly operators to build complex assemblies (1) <p>Accept any other appropriate response.</p> <p>Do not accept easier without explanation. Do not accept save time or faster unless associated with bullet point 3 above.</p>	2

Question Number	Answer	Mark
4 (a)		1

Question Number	Answer	Mark
4 (b)	<p>Any one of the following answers:</p> <ul style="list-style-type: none"> • Backing run (1) • Back/backing weld(1) 	1

Question Number	Answer	Mark
4 (c)	<p>A linked response, award 1 mark for identifying the advantage and 1 mark for the extension, up to a maximum of 2 marks.</p> <ul style="list-style-type: none"> • Improved weld quality (1) as weld procedure specifications define standard weld preparation factors such as angle, root face and root gap (1) • Weld consistency improved (1) as all welders able to follow the same weld procedure specifications for each process/material (1) • Improved tracking/accountability (1) as welders are able to use specific guidance for each weld (1) • Reassurance for client (1) as welding parameters recorded (1) • Structures will be produced to a reliable standard (1) as weld procedure specification will outline the welders' skill requirements (1) <p>Accept any other appropriate response.</p> <p>Do not accept answers related to safety.</p>	2

Question Number	Answer	Mark
5 (a)	<p>Any two of the following answers:</p> <ul style="list-style-type: none"> • Wear overalls (1) • Wear safety glasses/goggles (1) • Wear ear defenders/earplugs (1) • Wear safety boots/shoes (1) • Beware of sharp edges (1) • Use of guard when machining (1) • Do not handle swarf with bare hands (1) • Ensure chuck key removed before commencing (1) • Workpiece secure in chuck (1) • Personal safety precautions (remove jewellery, tie hair back, etc.) (1) • Use of coolant (1) <p>Accept any other appropriate response.</p> <p>Do not accept 'hazard' on its own.</p>	2

Question Number	Answer	Mark
5 (b)	<p>A linked response, award 1 mark for identifying the related document and 1 mark for the extension, up to a maximum of 2 marks.</p> <ul style="list-style-type: none"><li>• Capacity charts (1) to advise the engineer how many support bushes can be manufactured/space available for storage (1)<li>• Milestones (1) to allow engineers to determine whether a project is on schedule or not (1)<li>• Gantt charts (1) used to visually display an activity against time allocation (1)<li>• Critical path analysis (1) an algorithm that allows engineers to schedule project activities (1) <p>Accept any other appropriate response.</p>	2

Question Number	Answer	Mark
5 (c)	<p>A linked response, award 1 mark for identifying each reason and 1 mark for each extension, up to a maximum of 4 marks.</p> <ul style="list-style-type: none"> • The production plan would contain information to standardise operations that is not specified on the drawing (1) and this would improve efficiency/prevent waste (1) • The production plan would contain feeds and speeds not specified on the drawing (1) therefore the production plan will prevent tools being worn out prematurely (1) • The production plan would contain tools and equipment information not specified on drawing (1) which would allow the engineer to prepare these prior to manufacture (1) • To schedule quality control checks (1) to ensure that the batch is produced to the correct standard (1) • To enable semi-skilled workers to operate machinery (1) as production engineers will have used information on the drawings when developing the production plans (1) • Timings on the production plan will be shown against each operation (1) to enable the scheduling of the manufacture of the batch of support bushes (1) • To reduce stock inventory (1) as specific materials can be ordered when required (1) <p>Accept other appropriate answers.</p> <p>Do not accept answers that would also apply to the drawing (e.g. to ensure dimensions are accurate).</p> <p>Do not accept quicker/faster/cheaper/mistakes.</p>	4

Question Number	Answer	Mark
6 (a)	<p>Award 1 mark for each of the following responses, up to a maximum of 2 marks.</p> <ul style="list-style-type: none"><li>• To ensure up to date documents are being used/so engineers are not manufacturing using incorrect drawings (1)<li>• So the system is straightforward to understand (1)<li>• So files can be easily organised/less likelihood of being lost/can be stored in multiples/can be accessed faster (1)<li>• Can reduce time spent on tracking (1)<li>• It is simple to issue amendment notices/update or edit drawings (1)<li>• Allows for coordination between departments/premises (1)<li>• To reduce training time/costs (1) <p>Accept any other appropriate response.</p>	2

Question Number	Answer	Mark
6 (b)	<p>A linked response, award 1 mark for identifying the importance and 1 mark for an extension, up to 2 marks for each response, up to a maximum of 4 marks.</p> <ul style="list-style-type: none"> • To provide an audit trail (1) so that the company could pinpoint where/when problems occur (1) • To identify the version of drawing used for the given batch/product (1) to ensure the order met/meets customer requirements (1) • The job card acts as a central point of reference (1) allowing engineers from different departments to follow/track information related to the task/work efficiently (1) • To help the operator establish specific tooling/material requirements to complete the job (1) preventing pre-production errors (1) • To cross-reference back into the scheduling documents (1) to give the company visibility of progress made (1) • Will form part of ISO 9001 quality standard (1) so the company can demonstrate QA compliance (1) <p>Accept any other appropriate response.</p> <p>Do not award marks for identifying characteristics of the job card (e.g. job card contains a drawing number).</p>	4

Question Number	Indicative content	Mark
6 (c)	<p>Possible impact</p> <p>If XYZ were to share its schedule for manufacture information it could improve the delivery times of the mouldings. The mouldings company will be able to check that it has the capacity to make and supply the mouldings as this could be a problem if it has not been factored in when the original contract was gained. There will be a much smoother/efficient operation between both companies with clear lines of communication allowing documentation to be monitored at regular intervals to ensure schedules are being met and quantities are being correctly delivered by deadline dates.</p> <p>Sharing Gantt charts:</p> <ul style="list-style-type: none"> • So the supplier can see XYZ's deadlines for delivery to its customer • So the supplier can see the compound impact it will have if the mouldings are not delivered on time • So the supplier knows when to allocate further resources so the mouldings are delivered to schedule • So the supplier can monitor if it is on track with completion of the order • So the supplier can see how crucial the mouldings are to completion of the body shells • So the supplier can see that the mouldings form an element of the critical path • So that the supplier can work with XYZ for mutual benefit <p>Sharing Capacity charts:</p> <ul style="list-style-type: none"> • So the supplier can work out if it has the technical capacity to produce/store the mouldings otherwise may have to admit incompetence and XYZ could withdraw contract • So the supplier can allocate the correct resources to ensure capacity can be met <p>Sharing CPA information</p> <ul style="list-style-type: none"> • So that the supplier can work out the shortest possible times to produce and deliver the mouldings to meet XYZ's schedules • So that the supplier can look at potential 	8

problems areas to allocate further resources to ensure production/delivery runs smoothly

Sharing milestones:

- So the supplier can visualise XYZ's milestones at different stages of manufacture
- So the supplier has the opportunity to intervene at key points to ensure that mouldings will be delivered when XYZ requires them

Contractual agreements:

- So the supplier knows not to share information with others and recognises the need for security of data
- So the supplier doesn't use the information to control the supply chain to increase prices/for its own benefit

Model answer:

XYZ Engineering will need to share its schedule for manufacture information as this could have a profound impact on the company's reputation and its financial position. If the supplier fails to meet deadlines on a regular basis then XYZ may withdraw the contract for the mouldings. By sharing crucial information in the form of capacity charts then this will immediately provide the supplier with appropriate information so that it can work out the technical capacity to meet delivery times. By sharing Gantt chart information the supplier will be able to monitor the production of its mouldings to ensure that it fits with XYZ schedules. It will give the supplier the opportunity to intervene if deadlines are not being met. The use of milestones is also very important as this provides key information for the supplier at certain points during the schedule. It will also give the supplier the opportunity to check the quality of its parts before sending out inaccurate mouldings. Sharing CPA information would also allow the supplier to manage its resources and focus on key aspects in the schedule to ensure that deadlines will be met. Sharing this information should tighten up the whole process of scheduling which ultimately will reduce costs through improved quality of mouldings and customer reputation as delivery times should improve.

Accept any other valid response.

Level	Descriptor
0 0 marks	No rewardable material.
1 1-3 marks	A few implications of sharing different documentation identified, or one implication of using different documentation described in some detail. The answer is likely to be in the form of a list. Only one viewpoint considered. Implications of sharing different documentation made will be superficial/generic and not applied/directly linked to the situation in the question.
2 4-6 marks	Some implications of sharing different documentation identified, or a few key implications of sharing different documentation described. Consideration of more than one viewpoint but there will be more emphasis on one of them. The answer is unbalanced. Most implications of sharing different documentation made will be relevant to the situation in the question, but the link will not always be clear.
3 7-8 marks	Range of implications of sharing different documentation described, or a few key implications of sharing different documentation explained in depth. All sides of the case are considered and the answer is well balanced, giving weight to all viewpoints. The majority of points made will be relevant and there will be a clear link to the situation in the question.