Mark Scheme (Results)

Unit 9

January 2019

NQF BTEC Level 1/Level 2 Firsts in Engineering

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

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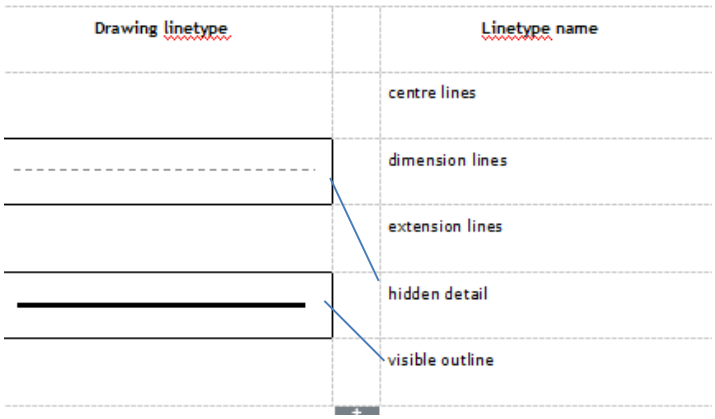
January 2019

Publications Code 21174_1901_MS

BTEC Next Generation Mark Scheme

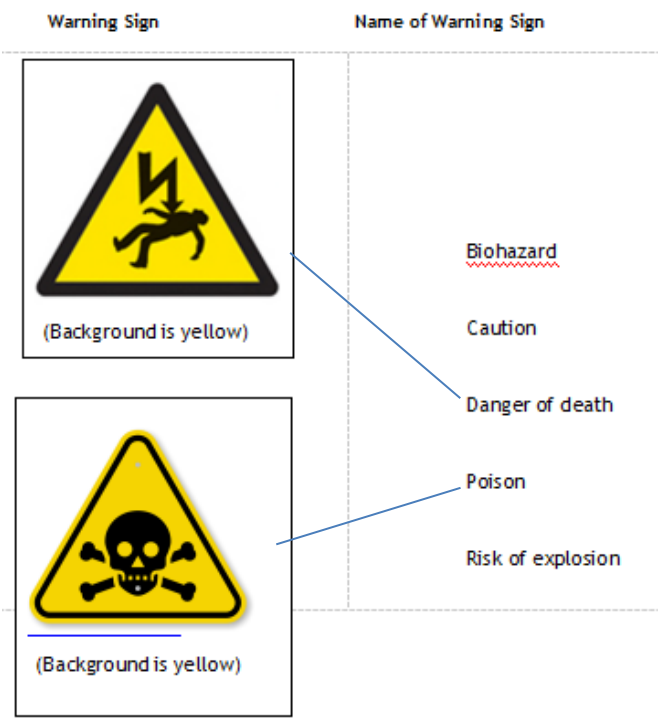
Engineering Unit 9 1901

Question Number	Answer	Mark
1a	Award **one** mark for each of the following up to a maximum of **two** marks: • A - component drawing (1) • D – isometric (1)	2

Question Number	Answer	Mark
1b	Award **one** mark for each correctly matched linetype up to a maximum of **two** marks:  If more than one line drawn from either linetype, award no mark for that linetype.	2

Question Number	Answer	Mark
1c	Award **one** mark for any of the following, up to a maximum of **two** marks. • Clearer than writing full words (1) • Avoids language barriers/universally recognised (1) • Takes less space (1) • Standard abbreviations are common/consistent (1) • To save time when annotating drawings (1) • Readability/easier to understand (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
1d	Only acceptable answer • C - single bevel butt (1)	1

Question Number	Answer	Mark
2a	Award **one** mark for each correctly matched sign to a maximum of **two** marks. 	2

Question Number	Answer	Mark
2bi	Only acceptable answers • Material/material name/type (1) • Metals (1) Consider further acceptable responses at STP	1

Question Number	Answer	Mark
2bii	Award **one** mark for: • To check the material has the correct properties (1) • To check the process to be used is suitable for the material (1) • To check the dimensions are correct (1) • To check the form of supply is correct (1) Accept any other appropriate answer.	1

Question Number	Answer	Mark
2c	Award **one** mark for: • Gantt chart (1) • Gantt (1) Accept phonetic spelling.	1

Question Number	Answer	Mark
3a	Award **one** mark for each of the following up to a maximum of **two** marks: • B - job card (1) • E – test schedule (1)	2

Question Number	Answer	Mark
3b	Award **one** mark for each of the following up to a maximum of **two** marks: • A - position (1) • D - thickness (1)	2

Question Number	Answer	Mark
3c	Award **one** mark for a feature, up to a maximum of **two** marks. • title block (1) • company logo (1) • parts list (1) • Scale (1) • Border (1) • Drawn by (1) • Issue/revision date(s) (1) • company details (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
4a	Only acceptable answer • B - diode (1)	1

Question Number	Answer	Mark
4b	Award **one** mark for an advantage, up to a maximum of **two** marks. • Flow charts are easy to understand/interpret (1) • Shows how to set up/operate the security system visually (1) • Flow charts indicate the stages to be followed (1) • Flow charts aid in fault finding/decision making (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
4c	Award **one** mark for any one of the following: • 56 kΩ • 56000 Ω • 56 k • 56000 • 56,000 • 56 x 10^3	1

Question Number	Answer	Mark
4d	Award **one** mark for a reason and **one** additional mark for appropriate expansion, up to a maximum of **two** marks per response, up to a maximum of **four** marks • To remove guesswork (1) ensuring circuit boards have the correct layout for the components (1) • Layout of circuits can optimised (1) as the specification will indicate the connections required for each pin (1) • To ensure the circuits function correctly (1) as components will only function if they have the correct inputs/outputs (1) • They give a visual representation of the physical component (1) which cannot be seen through a circuit diagram (1) • To allow for diagnostic testing (1) as the diagram indicates the function of each pin (1) Accept any other appropriate answer	4

Question Number	Answer	Mark
5a	Award **one** mark for any of the following, up to a maximum of **two** marks. • sequence of operations (1) • description of operations (1) • health and safety information (1) • materials (1) • components/parts (1) • feeds (1) • speeds (1) • tools (1) • equipment (1) • quality control checks (1) • timings (1) • quantities of items per engine (1) Accept any other appropriate answer	2

Question Number	Answer	Mark
5b	Award **one** mark for an advantage and **one** additional mark for appropriate expansion, up to a maximum of **two** marks per response, up to a maximum of **four** marks. • The fastest/slowest production times can be seen (1) as the critical path shows all available production paths/simultaneous activities (1) • The analysis determines which activities are critical (1) and which have float/can be delayed (1) • An estimated production/delivery time of the car engines can be given (1) as the manufacturer knows exactly which components are critical to the time it takes to manufacture (1) • Delays can be determined (1) as these will be known if an activity of a critical path overruns (1) • Car engines can be made available sooner (1) as using critical path analysis introduces efficiencies by making additional/best use of resources (1) Accept any other appropriate answer	4

Question Number	Answer	Mark
5c	Award **one** mark for an advantage and **one** additional mark for appropriate expansion, up to a maximum of **four** marks. • The test report will assess the material against a specification (1) which allows qualitative data to be analysed (1) • The test report can be used to compare the properties/characteristics of the material (1) allowing for engineers to determine whether the material meets the requirements (1) • Test results can be prioritised (1) so the engineers can consider some results more important than others (1) • Test reports can tell you when the material will fail (1) so you can tell how long the material will last (1) • The material is tested under full working conditions (1) which contributes to the safe/reliable operation of the engine (1) • It provides an audit trail/record (1) which meets quality requirements (1) • It allows comparative data to be collected (1) as the test report can be compared to previous tests/different materials (1) Accept any other appropriate answer. Do **not** accept easy to read/understand.	4

Question Number	Answer	Mark
6a	Award **one** mark for an advantage and **one** additional mark for the appropriate expansion to a maximum of **two** marks. • There is less chance of the washing machine failing to work (1) as the correct wiring and installation information has been provided (1) • There will be fewer complaints from customers/end users (1) as the washing machine will function as expected (1) • To allow for effective manufacture/assembly (1) because the washing machine manufacturer can produce designs that accommodate straight-forward installation of the motor (1) • Manufacturing tooling/resources/planning can be considered (1) to prevent accidents/errors in assembly (1) • It can be used as a fault finding tool (1) which can be used if quality issues arise (1) Accept any other reasonable response.	2

Question Number	Answer	Mark
6b	Award **one** mark for an advantage and **one** additional mark for the appropriate expansion to a maximum of **two** marks. • Milestones allow staged project reviews (1) so the washing machine manufacturer can be informed of any delays (1) • Reviewing milestones allows for production intervention (1) which ensures that motors are available for the washing machine manufacturer when they need them (1) • The ability to share information with the washing machine manufacturer (1) ensuring their production plans can be kept up to date (1) • Milestones can predict when motors will be available (1) meaning the washing machine manufacturer can prepare for varying production/changing demand (1) Accept any other reasonable response.	2

Question Number	Answer	Mark
6c	Award **one** mark for an advantage and **one** additional mark for appropriate expansion, to a maximum of **two** marks. • Identifies the aspects of production where the most faults (80%) in the motors occur (1) allowing the company to focus efforts on improving these aspects (1) • Identifies those stages of production which contribute the most to faulty motors (1) therefore steps can be taken to making improvements at these stages (1) • Allows the company to identify where the biggest issue/s are occurring (1) allowing them to target investment (1) • Allows for a visual comparison of production problems (1) to ensure interventions have been effective (1) • Can identify the root causes of manufacturing problems (1) to achieve reductions in problems with the production process (1) Accept any other reasonable response.	2

Question Number	Indicative content	Mark
7	**Disadvantages of paper engineering drawings** • Easily damaged by rips/spills/water • If folded incorrectly drawings may be difficult to find in the filing cabinets systematically • Drawings become hard to interpret if they are damaged • Incorrect or failure to fold reduces the life span of the drawing • Incorrect folding/creasing will mean the drawing details are not visible without being opened out fully • Drawings will need to be replaced more frequently • Drawings can be costly/time-consuming to produce • Incorrect folding of drawings results in drawings needing to opened out fully to be used • Drawings can need a large space to be opened fully • Large drawings cannot be stored easily unless folded carefully • Version control may be difficult if there are multiple versions of the same drawing being used in the field/site. **Advantages of paper engineering drawings** • All drawings can be folded to result in an A4 size, the resulting drawing opens and closes easier than other types of drawings • Paper copies are fully portable and can be used anywhere • Easier for groups of staff to look at a paper copy of a drawing than alternatives as the whole drawing can be viewed clearly • Does not need any form of IT back up to be able to be used • Does not need technical knowledge to be able to access drawings • Storage costs are relatively low	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. Only one viewpoint considered. Points made will be superficial/generic and not applied/directly linked to the situation in the question. Limited understanding of how paper copies of drawings are produced, used and stored.
2 4-6 marks	Some points identified, or a few key points described. Consideration of more than one viewpoint but there will be more emphasis on one of them. The answer is unbalanced. Most points made will be relevant to the situation in the question, but the link will not always be clear. A good understanding of how paper copies of drawings are produced, used and stored.
3 7-8 marks	Range of points described, or a few key points 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. A developed understanding of how paper copies of drawings are produced, used and stored.

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