L2 Lead Examiner Report 1801

January 2018

NQF BTEC Level 1/Level 2 Firsts in Engineering

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

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January 2018
Publications Code: 21174E_1801_ER

Grade Boundaries

What is a grade boundary?

A grade boundary is where we set the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade, at Distinction, Merit and Pass.

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the external assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries – this means that they decide what the lowest possible mark is for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Awarding grade boundaries is conducted to ensure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in external assessments

Each external assessment we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries for each assessment, because then it would not take accessibility into account.

Grade boundaries for this, and all other papers, are on the website via this link:
http://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

Unit 9: Interpreting and Using Engineering Information

Grade	Unclassified	Level 1 Pass	Level 2		
			Pass	Merit	Distinction
Boundary Mark	0	7	18	29	40

Introduction

This report has been written by the Lead Examiner for BTEC Engineering Unit 9 – Interpreting and Using Engineering Information. It is designed to help you understand how learners performed overall in the exam. For each question, there is a brief analysis of learner responses. You will also find some example learner responses for some questions. We hope this will help you to prepare your learners for future examination series.

Introduction to the Overall Performance of the Unit

This was the ninth examination for this unit and the responses seen this year were comparable with that of the previous May series of 2017. Lower ability learners are still giving inaccurate and/or simplistic responses to questions and therefore gaining limited marks. The more demanding questions provided some learners with an opportunity to apply their knowledge in response to a range of engineering scenarios; however, most learners were not able to give extended answers that focused on the vocational context. Learners would, however, continue to benefit from being taught examination skills and techniques as some continued to misread the questions and consequently they were not answered using an appropriate methodology. It was still evident that some Centre's had not covered the Unit Content in its widest sense as many learners struggled to gain marks for areas related to 'the use of a machinery handbook', 'scheduled maintenance plans' and 'referring to bend allowance charts' when given an engineering context.

Many learners, however, had greater success with a number of the multiple choice questions which was pleasing as many aspects had been seen in previous series.

Question 1

This question was aimed at the identification of a range of drawings and documentation to show information effectively.

Targeted Specification Area: Learning Aim B.2

Q1(a): The majority of learners were able to correctly identify at least one of the types of documentation that would be used to schedule manufacture as either 'Gantt chart' or 'critical path analysis'. Gantt chart was usually the more common correct response.

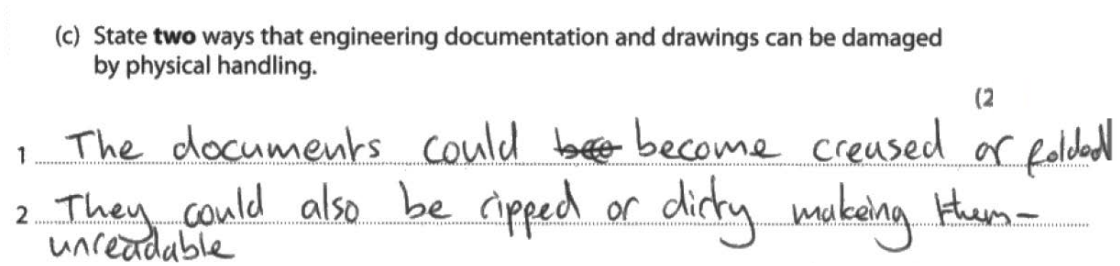
Targeted Specification Area: Learning Aim A.2

Q1(b): This was a line match question and surprisingly, the majority of the learners were unable to select 'Surface texture' as one of the correct answers and therefore very few were able to achieve both marks. The question clearly references information found on an engineering drawing but a number of learners opted for 'Orientation' and therefore incorrect. It was pleasing, however, to see the majority of learners selecting 'Current' for the second correct response.

Targeted Specification Area: Learning Aim B.3

Q1(c): The majority of learners were also able to state both ways that engineering documentation and drawings can be damaged by physical handling. Most popular responses focused on 'rips and tears', 'creasing or folding' or 'spillages of liquids'. It was clear that nearly all the learners were familiar with this type of question.

2 mark response:



(c) State **two** ways that engineering documentation and drawings can be damaged by physical handling.

(2

1 The documents could ~~bee~~ become creased or foldedl

2 They could also be ripped or dirty making them unreadable

Targeted Specification Area: Learning Aim A.2

Question 2

This question looked at how engineering drawings are used by engineers to show the features of components. This question also tested learners knowledge of identifying types of working drawings.

Targeted Specification Area: Learning Aim A.1 / A.2

Q2(a)(i) & (ii): The majority of learners were clearly able to identify the abbreviation as being 'Radius'. Surprisingly, the majority of learners were unable to identify the linetype as being 'Hidden detail'. Many learners left this blank or indicated that it was 'sectioned' or a 'centre line'.

Targeted Specification Area: Learning Aim A.2

Q2(b): The majority of the learners were again unable to perform the simple calculation to determine the overall dimension. Again there were lots of blank responses which was a concern. Where learners had made an attempt, they had failed to divide the large radius by 2 (84/2 = 42) and add this to 50mm giving a total of 92mm. Some learners just gave the correct answer of 92 which was also acceptable to achieve both marks.

2 mark response:

(b) Engineers add dimensions to drawings so components can be made.

Calculate the overall dimension indicated by the letter **C**.

C = 92mm

or

(b) Engineers add dimensions to drawings so components can be made.

Calculate the overall dimension indicated by the letter **C**.

84 ÷ 2 = 42mm

42 + 50 = 92mm

Targeted Specification Area: Learning Aim A.1

Q2(c): Some of the learners were not able to identify both types of working drawings. 'Orthographic projection' was a very popular correct response but a number failed to get the second correct response of 'Installation' which is clearly indicated in the unit specification.

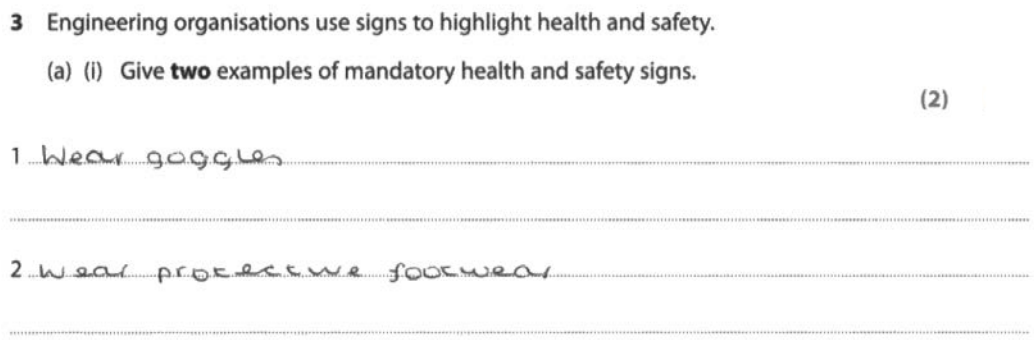
Question 3

This question was aimed at interpreting and using information when manufacturing products.

Targeted Specification Area: Learning Aim A.4

Q3(a)(i): The majority of the learners were able to give two examples of mandatory health and safety signs. The most popular responses were 'eye protection', 'foot protection' and 'protective gloves'. The minorityof learners were giving 'safe conditioning signs' such 'first aid' or 'fire exit' which were both incorrect. Unfortunately, a number of learners looked at the safe conditioning sign below this question and gave responses linked to that.

2 mark response:



3 Engineering organisations use signs to highlight health and safety.

(a) (i) Give **two** examples of mandatory health and safety signs.

(2)

1 Wear goggles

2 Wear protective footwear

Targeted Specification Area: Learning Aim A.4

Q3(a)(ii): this response proved to be accessible to the majority of learners and they were clearly able to identify the safe conditioning sign as being a 'Fire assembly point'.

Targeted Specification Area: Learning Aim A.4

Q3(b): The majority of learners did not score very well here. The term 'metal storage cupboard' caused some confusion as learners responded as if the storage cupboard contained metal. This lead to responses such as 'the metal inside could fall out and hurt you'. Some learners also discussed the metal cupboard having sharp corners and being very heavy if it were to fall over. These responses were incorrect and the learners who did score well here were able to explain the need for displaying warning signs in terms of the hazardous contents that may be locked inside the cupboard.

1 mark response:

(b) Explain **one** reason why a metal storage cupboard in a workshop may need to display warning signs.

(2

It may contain dangerous or hazardous materials such as corrosive or flamable chemicals. e.g solvers like white spirit.

2 mark response:

(b) Explain **one** reason why a metal storage cupboard in a workshop may need to display warning signs.

The Cupboard may Contain things that are harmful to the engineer Such as chemicals or Sharp tools.

Question 4

This question was contextualised around a small engineering company carrying out activities to manufacture storage units from sheet metals.

Targeted Specification Area: Learning Aim A.1

Q4(a): Surprisingly, the majority of learners were unable to correctly identified the drawing type as being 'Isometric'. Many responded with 'oblique' or '3D drawing'.

Targeted Specification Area: Learning Aim B.2

Q4(b): This proved to be a little more accessible to learners with the majority gaining at least one mark here for stating a piece of information found on a production plan. Typical correct responses centred around 'speeds and feeds', 'materials', 'timings', 'tools' and 'equipment'. A number of learners still give incorrect responses such as 'dimensions' or 'measurements' which are clearly not found on a production plan.

2 mark response:

(b) The company produces a production plan for each type of storage unit that they manufacture.

State **two** pieces of information that would be found on a production plan.

(2)

1 materials used

2 tools or processes used

Targeted Specification Area: Learning Aim B.2

Q4(c): Learners who had been taught about weld procedure specifications were able to gain at least one mark here for responses relating to 'checking the correct procedure was being used' or 'ensuring that they are using the correct welding filler'.

1 mark response:

(c) Some of the storage units are welded.

State **two** reasons why technicians refer to weld procedure specifications before welding the storage units.

(2)

1 So They know what type of weld to use

2 to keep it uniformed.

Targeted Specification Area: Learning Aim A.3

Q4(d): Learners who had been taught about the use of a bend allowance chart were able to gain at least one mark here for responses relating to 'to ensure all the bends are the same' or 'the chart shows any extra material requirements'. Some learners were able to give linked responses to gain both marks. Many learners discussed how a bend allowance chart could be used to identify how far a material could be bent before it broke which is incorrect.

1 mark response:

(d) Explain **one** reason why a technician would refer to a bend allowance chart when preparing materials for the storage units.

(2

Because ~~wen~~ material ~~too~~ ~~loses~~ loses length or ~~str~~ size when bent, & so a chart is needed to see how much will be lost.

2 mark response:

(d) Explain **one** reason why a technician would refer to a bend allowance chart when preparing materials for the storage units.

(2)

bend allowance charts indicate specific dimensions needed when bending materials, Saving time and minimising waste.

Question 5

This question was contextualised around a company that produces bench drills which are sold by retailers for the DIY market. This context gave learners an opportunity to apply their knowledge and understanding to these questions.

Targeted Specification Area: Learning Aim B.2

Q5(a): surprisingly, very few learners were able to state two advantages of using operation sheets when making batches of components. Again, many learners went down the dimensioning/measurement route which were both incorrect. Those learners that accessed marks here responded with statement such as 'parts will be made in the same order', 'to make sure they are made to the specification' or 'to avoid mistakes'.

1 mark response:

State **two** advantages of using operation sheets when making batches of components for the bench drills.

(2)

1 Keeps a record

2 allows you to make all the components the same way keeping them uniformed.

2 mark response:

State **two** advantages of using operation sheets when making batches of components for the bench drills.

(2)

1 To make sure the product is consistent.

2 To insure no mistakes one made.

Targeted Specification Area: Learning Aim A.2

Q5(b): This was another line matching question and the majority of learners correctly identified both component names as being 'Split pin' and 'Nut'.

Targeted Specification Area: Learning Aim A.1

Q5(c): Some learners were able to score one mark by identifying a reason why it is important to maintain accurate issue and amendment dates on engineering drawings in the context stated. Typical correct responses included 'allows the components to be traced' and 'might not be compatible with different versions of the drill'. Many learners talked about products being delivered on time or meeting deadline dates which were both incorrect and not relevant in this situation. Some learners gave linked explanations that were awarded both marks.

1 mark response:

Explain **one** reason why it is important that SW3 Engineering maintains accurate issue and amendment dates on their engineering drawings in this situation.

(2

It allows workers to retrieve documents according to date and means they can tell when ~~the~~ the drawing was issued + completed.

2 mark response:

Explain **one** reason why it is important that SW3 Engineering maintains accurate issue and amendment dates on their engineering drawings in this situation.

(2

Drawings may need to be traced back to the last ammended copy in order to make new ammendments. The date and issue number will make it easy to trace back to the file/folder it is stored in

Targeted Specification Area: Learning Aim B.2

Q5(d): The majority of learners were unable to access this question and consequently achieved very little reward. This was surprising as learners have been exposed this type of question in previous series. Typical low responses included 'Pareto charts can be easily read or understood' or 'the chart focuses on the biggest cause of defects'. Occasionally some learners gave linked responses to achieve further marks.

2 mark response:

(d) SW3 Engineering monitors quality when producing the bench drills using Pareto charts.

Explain **two** ways that the use of Pareto charts can benefit SW3 Engineering.

(4

1 The company is able to see where their biggest problems lie through the bars, 80% of the problems, meaning they don't need to waste time finding it in every bench drill

2 The company can also see which 20% - causing that specific problem. This mean that they can correct it with ease as they don't need to waste time finding the cause.

3 mark response:

(d) SW3 Engineering monitors quality when producing the bench drills using Pareto charts.

Explain **two** ways that the use of Pareto charts can benefit SW3 Engineering.

(4

1 Pareto Charts will indicate key problem areas allowing SW3 to pinpoint and adress said faults accordingly. This will save costs and become evident in future Charts.

2 The faults can be identified easily from the breaking point. These faults can highlight improvement areas and prepare SW3 for future faults and prevention methods to save time and cost.

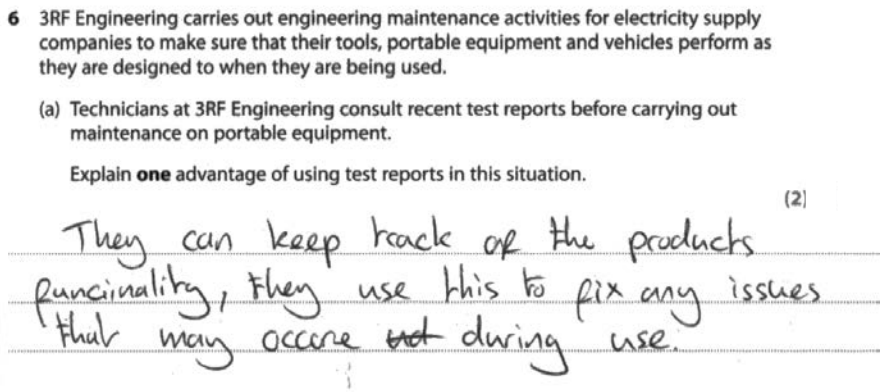
Question 6

This question was contextualised around a company carrying out engineering maintenance activities for electricity supply companies. Again, this context gave learners an opportunity to apply their knowledge and understanding to a range of questions.

Targeted Specification Area: Learning Aim B.1

Q6(a): It was pleasing to see that a number of learners were able to identify an advantage of using test reports in the context provided. The most popular low responses included 'reports can identify faults that have occurred' or 'test will show that equipment is working correctly. Occasionally some learners gave a linked response to achieve a further mark.

1 mark response:



6 3RF Engineering carries out engineering maintenance activities for electricity supply companies to make sure that their tools, portable equipment and vehicles perform as they are designed to when they are being used.

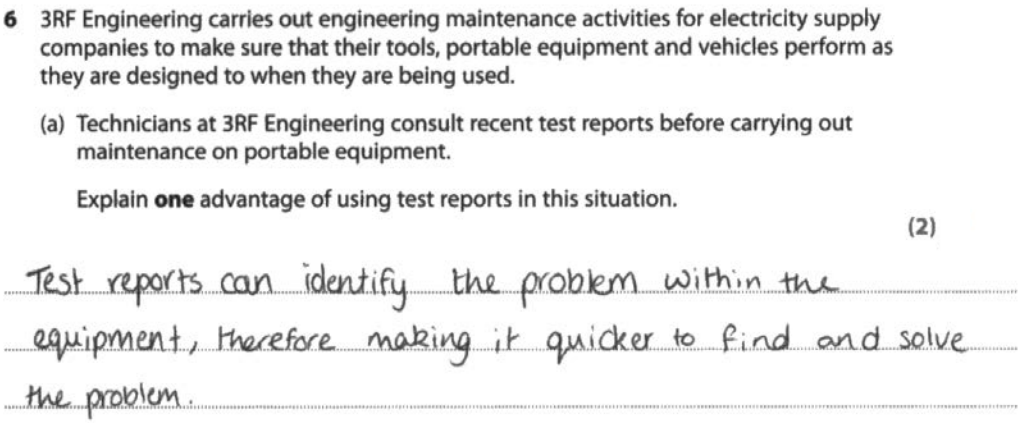
(a) Technicians at 3RF Engineering consult recent test reports before carrying out maintenance on portable equipment.

Explain **one** advantage of using test reports in this situation.

(2)

They can keep track of the products functionality, they use this to fix any issues that may occure ~~not~~ during use.

2 mark response:



6 3RF Engineering carries out engineering maintenance activities for electricity supply companies to make sure that their tools, portable equipment and vehicles perform as they are designed to when they are being used.

(a) Technicians at 3RF Engineering consult recent test reports before carrying out maintenance on portable equipment.

Explain **one** advantage of using test reports in this situation.

(2)

Test reports can identify the problem within the equipment, therefore making it quicker to find and solve the problem.

Targeted Specification Area: Learning Aim B.3

Q6(b): Learners who had been taught about ICT based systems were able to gain at least one mark here for a low response relating to 'instant access to records'. Some learners were able to give linked responses to gain both marks. The majority of learners, however, gave far too generic responses focusing on documents not getting lost which was not the correct response in this situation.

1 mark response:

(b) 3RF Engineering keeps records of all test reports and maintenance activities using an ICT-based system.

Explain **one** advantage to the electricity supply company of 3RF Engineering providing it with access to the records stored on the ICT-based system.

(2)

The records can be sent all over the world quickly making them available for the technicians.

2 mark response:

Explain **one** advantage to the electricity supply company of 3RF Engineering providing it with access to the records stored on the ICT-based system.

(2)

It means the electricity company can instantly access any relevant records, from any connected computer. maximising efficiency for example they would know exactly when some equipment is due a maintenance check.

Targeted Specification Area: Learning Aim B.1

Q6(c): Learners who had been taught about scheduled maintenance plans were able to gain at least one mark here for responses relating to 'budgeting for maintenance more easily' or 'less breakdowns were likely to occur'. Some learners were able to give linked responses to gain further marks.

2 mark linked response:

(c) Explain **two** advantages to the electricity supply company that result from technicians at 3RF Engineering using a scheduled maintenance plan when carrying out maintenance procedures on vehicles.

(4)

1 This can make sure that all components are checked regularly which reduces the chances of a fault happening.

3 mark response:

(c) Explain **two** advantages to the electricity supply company that result from technicians at 3RF Engineering using a scheduled maintenance plan when carrying out maintenance procedures on vehicles.

(4)

1 It means that the supplig company will always know when their vehicles are going to 3RF to be maintained. So they can arrange for an emplye to use another vehicle

2 It also means that they will know how long the vehicle will be out of action until.

Targeted Specification Area: Learning Aim B.3

Question 7

This question was contextualised around a company that employs skilled technicians who design and manufacture one-off components and products and there possible need to refer to the machinery handbook when designing and making replacement components for workshop machinery. Again, this context gave learners an opportunity to apply their knowledge and understanding to a range of questions.

Targeted Specification Area: Learning Aim A.3

Q7: The majority of learners struggled with this question. This was an unfamiliar context and machinery handbooks had clearly not been taught in the majority of centres. Typical incorrect responses were associated with the handbook offering dimensions and images of the replacement components. Specific dimensions would not be found for these replacement components; however, some marks were achieved for information relating to tapping drill sizes, the checking of material properties and health and safety issues. Many learners misinterpreted the question and gave answers that related to this being an assembly drawing or repair manual. For learners to achieve higher marks here, there needed to be a detailed consideration of the positive and negative aspects of why referring to a machinery handbook would be appropriate with a conclusion to show a developed understanding of their use.

Mark band 1 response:

7 3JW Engineering employs skilled technicians who design and manufacture one-off components and products.

Currently, the technicians need to design and make replacement components for workshop equipment.

Discuss whether referring to the machinery handbook would be appropriate in this situation.

The machinery hand book would be refered to when maching for Standard operating procedures and other machining information. The design process would involve working drawings such as orthographic projections and product specifications etc. The machinery hand book wouldnt offer information on materials or specific features on the Components but would however offer technical information such as the purpose of the machinery. Some information such as charts for screw/bolt threads could be found the handbook for a lathe which would need to be reffered to when creating threads.

Mark band 2 response:

7 3JW Engineering employs skilled technicians who design and manufacture one-off components and products.

Currently, the technicians need to design and make replacement components for workshop equipment.

Discuss whether referring to the machinery handbook would be appropriate in this situation.

Machinery hand book is a functional book for engineer, it has lots of useful charts and information inside it, and it can be used in many situation. Like ①. When technician is ready to start some design on drill some hole on the components, he can use tapping drilling reference table in the machinery hand book. ②. When Technicians are ready to do some bending process for one material, to make a components, they can use bend allowance in the machinery hand-book as well. ③. When they are ready to use some materials for the components but they are not really sure about their properties, they can find some detail for some types of material in the machinery hand book as well. ④. When they ready to do some calculation on the drawing, but they are not really sure about it's equation or formula, some times they can find it in the machinery hand book. ⑤. and in the manufacturing or assembly process, they can use machinery hand book to find out the clearance fit, interference fit and transition fit of the male and female part, because the machinery hand book have BS 4500 reference chart inside it.

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