BTEC

L2 Lead Examiner Report 1901

January 2019

L2 Qualification in Engineering

Pearson

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 website at http://qualifications.pearson.com/en/home.html for our BTEC qualifications.

Alternatively, you can get in touch with us using the details on our contact us page at http://qualifications.pearson.com/en/contact-us.html

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:
http://qualifications.pearson.com/en/support/support-for-you/teachers.html

You can also use our online Ask the Expert service at https://www.edexcelonline.com

You will need an Edexcel Online 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 learners at: www.pearson.com/uk

January 2019
Publications Code 21174_1901_ER
All the material in this publication is copyright
© Pearson Education Ltd 2019

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	12	21	30	40

Introduction to the Overall Performance of the Unit

This was the eleventh examination for this unit and the responses seen this year were comparable with that of the January 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 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 centres had not covered the unit content in its widest sense as many learners struggled to gain marks for areas related to 'milestones', 'pin configuration specifications' and 'test reports' 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.

Individual Questions

Question 1

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

Targeted Specification Area: Learning Aim A.1

Q1 (a): The majority of learners were able to correctly identify at least one of the types of working drawings that would be used to show information effectively as either 'component drawing' or 'isometric'. Component drawing was usually the more common correct response.

Targeted Specification Area: Learning Aim A.2

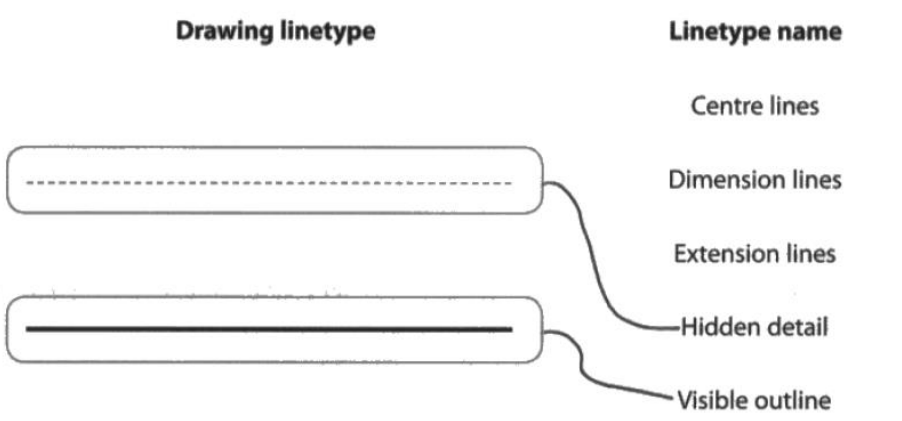
Q1 (b): This was a line match question and the majority of learners were able to correctly match at least one drawing linetype to the correct linetype name. The correct responses were 'hidden detail' and' visible outline'. Visible outline was usually the more common correct response.

2 mark response:

(b) Match the most appropriate linetype name to each of these drawing linetypes.

Draw **one** line from **each** drawing linetype to **one** linetype name.

(2)



Targeted Specification Area: Learning Aim A.2

Q1 (c): The majority of learners were also able to state both reasons why engineers use abbreviations on drawings. Most popular responses focused on 'saving space, 'universally recognised' or 'easier to understand'. It was clear that nearly all the learners were familiar with this type of question.

2 mark response:

(c) State **two** reasons why engineers use abbreviations on drawings.

(2)

1 They are recognised internationally.

2 They take up less space on drawing

Targeted Specification Area: Learning Aim A.2

Q1 (d): This was a multi choice question that proved accessible to most learners which was very pleasing considering welding symbols have been challenging in previous series. Most learners were able to identify the correct response as a 'single bevel butt'.

(d) Figure 1 shows a symbol used by engineers to represent a type of weld.

Figure 1

Identify the type of weld represented by the symbol shown in Figure 1.

(1)

- ☒ **A** backing run
- ☒ **B** double vee groove
- ☒ **C** single bevel butt
- ☒ **D** square butt

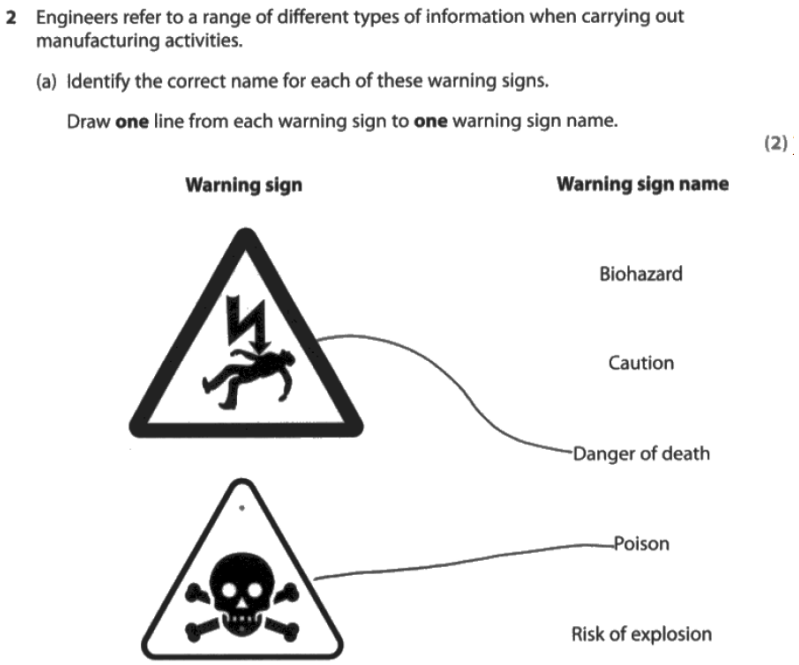
Question 2

This question looked at a range of different information that engineers refer to when carrying out manufacturing activities. This question also tested learner's knowledge of identifying and interpreting other related documentation.

Targeted Specification Area: Learning Aim A.4

Q2 (a): This was a line match question and nearly all of learners were able to correctly match both warning signs to the correct warning sign name. The correct responses were 'Danger of death' and 'Poison'.

2 mark response:



Targeted Specification Area: Learning Aim A.3

Q2 (b)(i): The majority of the learners were able to name the heading in box A of the manufacturers data sheet as being 'Material' or 'Metal'.

(b) Engineers use sources relevant to the task when preparing to produce parts. The diagram shows an extract from a manufacturer's data sheet for the use of welding rods.

Flux-cored and metal cored arc welding				
A	**Size**	**Condition**	**Shielding gas**	**Specification**
Mild steel	1.8 - 2.5 mm	Clean	CO_2	ML-R-5632
Aluminium	0.6 - 6.4 mm	Clean	CO_2	AWS ER5183

(i) Name the heading in box **A**.

(1) Q

Material

Targeted Specification Area: Learning Aim A.3

Q2 (b)(ii): Many of the learners were not able to give a reason why an engineer would refer to material specifications. However, correct responses included 'to check the materials properties' or 'to check the sizes of the material'.

(ii) Give **one** reason why an engineer would refer to material specifications.

(1) Q021

Material specifications show engineers the properties and uses of materials, and help assist in chosing the right material

Targeted Specification Area: Learning Aim B.2

Q2 (c): Some of the learners were not able to identify the chart used for planning manufacturing activities. Incorrect responses included 'bar chart' and 'critical path analysis'. The correct response was 'Gantt chart'.

(c) Figure 2 shows a chart used for planning manufacturing activities.

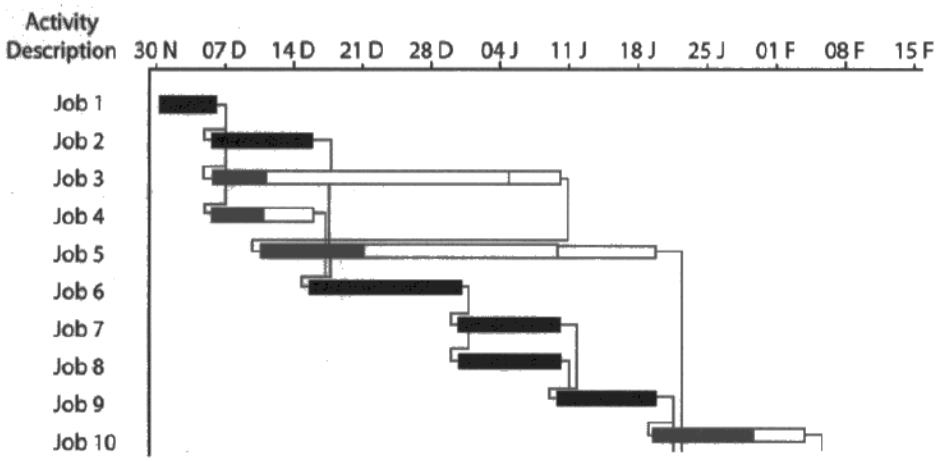


Figure 2

Name the type of chart shown in Figure 2.

GANtt chart

(1) 1 Q0

Question 3

This question was aimed at using related documentation and interpreting engineering drawings.

Targeted Specification Area: Learning Aim B.2

Q3 (a): The majority of learners were able to correctly identify at least one of the types of working instructions as either 'job card' or 'test schedule'. Job card was usually the more common correct response.

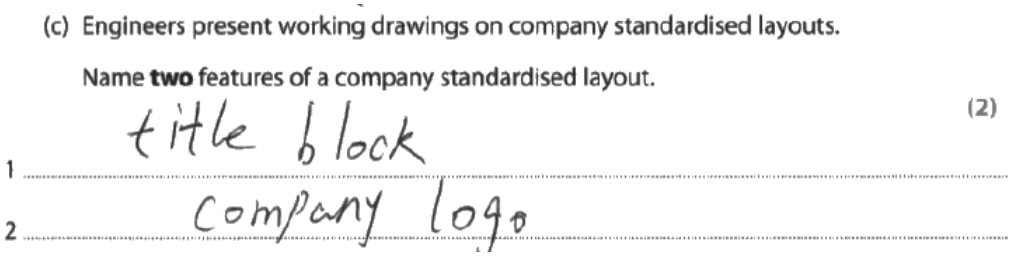
Targeted Specification Area: Learning Aim B.2

Q3 (b): The majority of learners were able to correctly identify at least one piece of information that was contained in weld procedure specifications as either 'position' or 'thickness'. Position was usually the more common correct response.

Targeted Specification Area: Learning Aim A.1

Q3(c): The majority of learners were also able to name two features on a company standard layout. Popular responses included 'company name', 'company logo', title block' and 'scale'. A number of learners thought that 'dimensions' or 'sizes' would be included but his is not the case.

2 mark response:



(c) Engineers present working drawings on company standardised layouts.

Name **two** features of a company standardised layout. (2)

1 title block

2 company logo

Question 4

This question was contextualised around an engineering company manufacturing security systems that included printed circuit boards designed by its engineers.

Targeted Specification Area: Learning Aim A.2

Q4 (a): The majority of learners were able to correctly identify the electronic component as being a 'diode'. Some responded with 'relay' or 'transistor' which were both incorrect.

4 DG08 Engineering manufactures security systems that include printed circuit boards designed by its engineers.

(a) Figure 3 shows a symbol used by engineers to represent an electronic component.

Figure 3

Identify the component shown in Figure 3.

(1)

- ☒ **A** capacitor
- ☒ **B** diode
- ☒ **C** relay
- ☒ **D** transistor

Targeted Specification Area: Learning Aim A.1

Q4 (b): This proved to be a little more accessible to learners with the majority gaining at least one mark here for stating two advantages of providing flow charts for the users of the security systems. Typical correct responses focused on 'easy to interpret', 'can be used for fault finding' and 'shows how to operate the system'.

2 mark response:

(b) DG08 Engineering provides flow charts for the users of the security systems.

State **two** advantages of providing flow charts in this situation.

(2) Q04b

1 Easy to understand

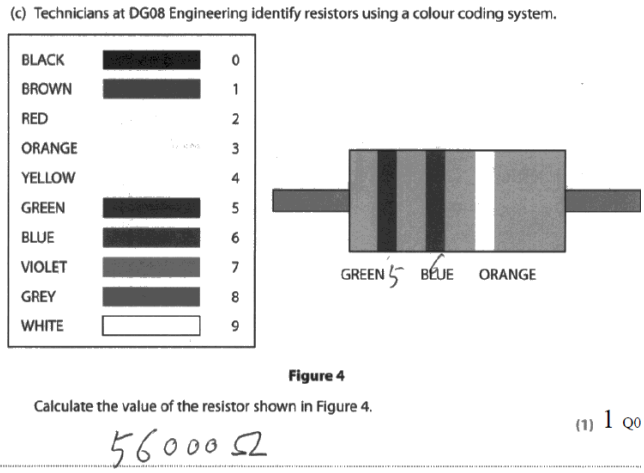
2 Provides solution for problems when it may not work.

Pearson

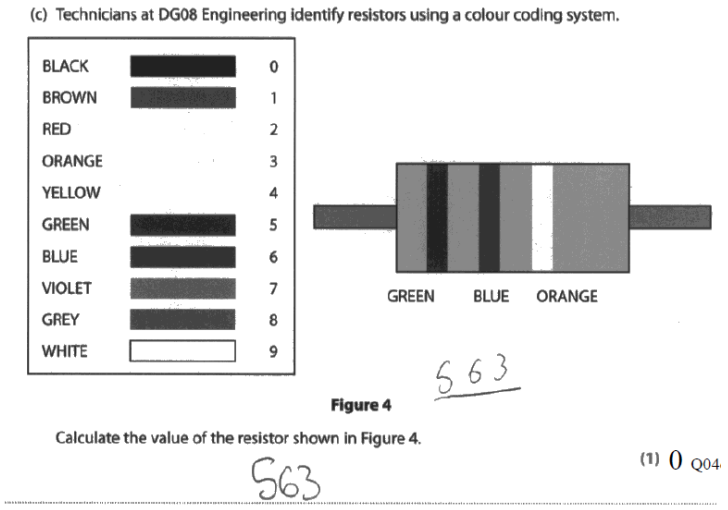
Targeted Specification Area: Learning Aim A.3

Q4 (c): Learners who had been taught about resistor colour codes were able to gain the mark here for responses such as '56000' or '56kΩ'. A similar question has been asked on numerous occasions and centres are still not teaching this skill. There were far too many responses where learners are just giving the numbers of the colours and not interpreting the 3rd band as being the multiplier.

1 mark **correct** response:



1 mark **incorrect** response:



Targeted Specification Area: Learning Aim A.3

Q4 (d): Learners who had been taught about referring to electronic pin configuration specifications were able to gain at least one mark here for responses relating to 'ensuring the circuits function correctly' or 'allows for diagnostic testing'. Some learners were able to give linked responses to gain further marks. Many learners thought that this was related to the resistor question as this was displayed on the same page and consequently answers were incorrect.

1 mark response:

(d) Explain **two** reasons why it is important for DG08 Engineering to refer to electronic component pin configuration specifications when designing and building printed circuit boards.

(4)

1 So that the engineers will understand what they are working with so the do not use the wrong components

2 mark response:

(d) Explain **two** reasons why it is important for DG08 Engineering to refer to electronic component pin configuration specifications when designing and building printed circuit boards.

(4) 2 Q

1 They will show how components need to be connected properly in order for the circuit to work as intended. If this wasn't done then a circuit could be wired up incorrectly and not achieve it's purpose.

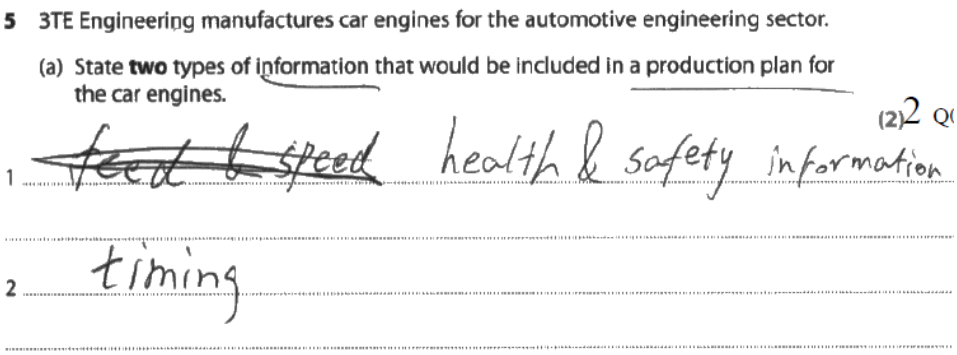
Question 5

This question was contextualised around a company that manufactures car engines for the automotive engineering sector. 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 types of information that would be included in a production plan for car engines. The unfamiliar product in relation to a production plan may have thrown some learners as they are more familiarly with plans that detail more traditional workshop based activities. A number of learners misinterpreted the question and just simply named parts of a car which was incorrect. Those learners that accessed marks here responded with answers such as 'materials', 'feeds and speeds', 'health and safety', 'timings' or 'sequence of operations'.

2 mark response:


5 3TE Engineering manufactures car engines for the automotive engineering sector.

(a) State **two** types of information that would be included in a production plan for the car engines.

(2) 2 Q(

1 ~~feed & speed~~ health & safety information

2 timing

Targeted Specification Area: Learning Aim B.2

Q5 (b): A number of learners were able to score one mark by identifying an advantage of using critical path analysis when planning production for the car engine. Typical correct responses included 'estimating delivery times' and 'fastest/slowest production times'. Some learners talked about organising resources and that activities were able to run simultaneously, which were both correct. Some learners gave linked explanations that were awarded all four marks.

3 mark response:

(b) Explain **two** advantages of using critical path analysis when planning production for the car engines.

(4) 3 Q05b

1 Critical path analysis shows you a minimum and maximum time allowance for undertaking a task. It can be used to check progress and ensure the project is running to the allowed time frame.

2 It provides you with stages of work that are connected. This can be used to plan for resources for a specific time. It will also indicate if an overrun is going to effect any other stages of the production.

4 mark response:

(b) Explain ~~two~~ advantages of using critical path analysis when planning production for the car engines.

(4) 4

1. CRITICAL PATH ANALYSIS WILL SHOW THE MOST CRITICAL PATH LONGEST ~~TIME~~ SO ENGINEER WILL KNOW IF PROJECT IS AT RISK OF BEING DELAYED

2. ENGINEERS WILL KNOW START TIME & FINNISH TIME & HOW LONG THE PROJECT WILL TAKE. THIS WILL ENABLE THEM TO ALLOCATE RESOURCES

- ENGINEER HAVE THE ~~GRACE~~ CHANCE TO FINISH PROJECT EARLY AS THEY CAN DEDICATE ~~STAFF~~ MORE STAFF TO THE PROJECT

Targeted Specification Area: Learning Aim B.1

Q5 (c): The majority of learners were unable to access this question and consequently gained very little reward. This was surprising as learners have been exposed this type of question in previous series. Typical low responses included 'comparing material properties' or 'materials can be tested under full working conditions'. Occasionally some learners gave linked responses to achieve further marks. Incorrect responses usually included reference to 'whether the material was suitable' which was found in the stem of the question.

2 mark response:

(c) The engineers at 3TE want to use a high performance material for a component in the car engines.

Explain **two** advantages of using a test report to determine whether the material is suitable.

(4) 2 Q05c

1 test report would highlight ~~the~~ property about the material, such as idea working temperature, allowing engineer to evaluate whether the material would be fit for purpose to be use in the car engine condition.

2 ~~It~~ test report details the performance of the material ~~the~~ which can be compare with the existing material, help ~~to make~~ 3TE engineer to decide whether or not to use the material

Question 6

This question was contextualised around a company that manufactures motors for use in washing machines. Again, this context gave learners an opportunity to apply their knowledge and understanding to a range of questions.

Targeted Specification Area: Learning Aim B.2

Q6 (a): This proved to be a challenging question for a number of learners. This was again an unfamiliar context with a complex question stem and consequently a number of learners misinterpreted the question and gave advantages for the washing machine user rather than the washing machine manufacturer of being provided with installation manuals for the motor and not the washing machine itself. The most popular low responses included 'motors will be installed in the correct position' or 'less chance of the washing machine not working'. Occasionally some learners gave a linked response to achieve a further mark.

1 mark response:

6 3BZ Engineering manufactures motors for use in washing machines.

(a) Explain **one** advantage for a washing machine manufacturer of being provided with installation manuals by 3BZ Engineering.

(2) 1 Q06a

The manufacturer will be able to understand which parts need easy access, as this will ensure that installation is safe and easy, which would lead to a better public reputation for both businesses.

2 mark response:

6 3BZ Engineering manufactures motors for use in washing machines.

(a) Explain **one** advantage for a washing machine manufacturer of being provided with installation manuals by 3BZ Engineering.

(2) 2 Q06a

As the parts is being produced by a sub contractor, an installation manual will provide the correct information regarding how the motor should be installed which will prevent errors during installation. as a installation procedure can be followed

Targeted Specification Area: Learning Aim B.2

Q6 (b): Learners who had been taught about Milestones were able to gain at least one mark here for a low response relating to 'predicting when motors will be available'. Some learners were able to give linked responses to gain both marks. The majority of learners, however, gave far too generic responses focusing on the definition of a milestone and was not the correct response in this situation.

1 mark response:

(b) Explain **one** advantage for a washing machine manufacturer when 3BZ Engineering uses milestones as part of its scheduling.

(2)

An advantage of this is that the washing machine manufacturer will be aware of when the needed product has been ~~Manufactured~~ Manufactured

2 mark response:

(b) Explain **one** advantage for a washing machine manufacturer when 3BZ Engineering uses milestones as part of its scheduling.

(2) 2 Q06b

Using milestones allows the schedule to be planned out, and a predicted end date to be made. This can benefit the manufacturers as they know when new motors are coming in and can plan production around this information.

Targeted Specification Area: Learning Aim B.2

Q6 (c): The majority of learners were unable to access this question and consequently gained very little reward. This was surprising as learners have been exposed to this type of question in previous series. Typical low responses included 'Pareto charts identify the parts of production where the most faults occur (80%)' or 'the chart focuses on the biggest cause of defects'. Occasionally some learners gave linked responses to achieve further marks.

1 mark response:

(c) 3BZ Engineering uses data from Pareto charts to analyse motor faults caused during their production.

Explain **one** advantage of using Pareto charts in this situation.

(2)

It gives them a clear view of where the mistake are made and what the mistake is making it a quicker fix.

2 mark response:

(c) 3BZ Engineering uses data from Pareto charts to analyse motor faults caused during their production.

Explain **one** advantage of using Pareto charts in this situation.

(2)

Because you can work out that eighty-percent of problems caused from the production comes from ~~20~~ twenty-percent of the motor. Therefore outlining where you need to improve on or finance your money.

Pearson

Question 7

This question was contextualised around a company that manufactures portable electrical products and produces its own working drawings. Again, this context gave learners an opportunity to apply their knowledge and understanding in the relation to the implications of using and storing paper copies of working drawings.

Targeted Specification Area: Learning Aim B.3

Q 7: The majority of learners found this question reasonably accessible. This was a familiar context and this topic had been covered in previous series. It was pleasing to see learners planning the layout for this question and structuring their work clearly. Learners were able to state both disadvantages and advantages of using and storing working drawings. Typical advantages focused on the ability of engineers to have the actual drawing spread out in front of them or low storage costs. The majority opted for disadvantages and responded with answers focusing on drawings getting easily damaged or lost, folded incorrectly and creases causing problems with drawing interpretation. There was clear evidence from the responses that learners had a good understanding of the using and storage of working drawings and consequently there were responses achieving the highest mark band. Centres should be commended for their work with this type of question.

Mark band 1 response:

7 8F5 Engineering manufactures portable electrical products and produces its own working drawings. 3 Q07

Discuss the implications of using and storing paper copies of the working drawings for 8F5 Engineering.

8F5 Engineering would have to take care of and look after their copies of paper working drawings. This ~~mea~~ means they have to be stored away out of sunlight in a cool and dry space. This has to be done because they can be damaged and potentially destroyed. The drawings must also be used in a clear space and not be interacted with oil as this can damage and stain the paper.

Mark band 2 response:

7 8F5 Engineering manufactures portable electrical products and produces its own working drawings.

Discuss the implications of using and storing paper copies of the working drawings for 8F5 Engineering.

When storing paper copies the working drawings could get damaged which could make the drawings unclear when it comes to the manufacturing process. The paper copies could have been photo copied with a flaw or component symbol not being shown accurately. Another implication of using and storing paper copies is it could get creased or ~~folded~~ folded the wrong way. Which could ~~make~~ make the working drawings difficult to understand, and when you constantly fold something it could cover up key information that it is needed.

(Total for Question 7 = 8 marks)

Pearson

Mark band 3 response:

7 8F5 Engineering manufactures portable electrical products and produces its own working drawings. 8 Q07

Discuss the implications of using and storing paper copies of the working drawings for 8F5 Engineering.

Storing and using paper copies of the working drawing has its benefits and drawbacks. This traditional method of ~~storing~~ allows the engineers to compare two engineering drawing side by side which cannot be done using ICT. There is no harm of your work being hacked like in ICT. It gives you the entire view and feeling of the drawing, however incase of a fire the papers can be burnt resulting in loss of drawings. The drawings can also be damaged by graffiti and not folding the papers properly. This method of storing working drawing requires a lot of space unlike using ICT method all your drawing are saved on your computer therefore does not require physical storage. The drawing are difficult to send from one place to another and is time consuming, however even ICT ~~be~~ has its drawbacks like incase of a system failure your work can be lost, there are chances that you drawings can be hacked and sometimes your file is not saved and can result in loss of it. Therefore we can conclude by saying ~~both~~ using and storing paper copies have more disadvantages the ICT method.

(Total for Question 7 = 8 marks) 8

Pearson

For more information on Pearson qualifications, please visit
http://qualifications.pearson.com/en/home.html

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