

L2 Lead Examiner Report 1906

June 2019

L2 Qualification in Engineering

Unit 9: Interpreting and Using Engineering Information

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

June 2019

Publications Code 21174_1906_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	10	20	30	40

General Comments on Exam

This was the twelfth examination for this unit and the responses seen this year were more accessible than the June series of 2018. 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 and some learners were 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 'statistical process control', 'manufacturers data sheets and 'standard reference charts for limits and fits' 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 using 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 information that would be found on a production plan as either 'health and safety' or 'quality control checks'. 'Quality control checks' was usually the more common correct response.

Targeted Specification Area: Learning Aim A.2

Q1(b)(i) & (ii): The majority of learners struggled with these abbreviations. These are clearly listed in the specification but are not as familiar to learners. Incorrect responses included 'Centrebore' for 1(b)(i) and 'Extension' for 1(b)(ii).

2 mark response:

(b) Abbreviations are used on drawings to represent component features.

(i) State the meaning of the abbreviation CBORE.

(1)

Counter Bore

(ii) State the meaning of the abbreviation EXT.

(1)

External

Targeted Specification Area: Learning Aim A.2

Q1(c): This was a multi choice question that proved accessible to more than half the learners. Most learners were able to identify the correct response as a 'transistor'.

(c)



Figure 1

Identify the electronic component from the symbol shown in **Figure 1**.

(1)

- A** capacitor
- B** diode *x*
- C** lamp *x*
- D** transistor

Targeted Specification Area: Learning Aim A.4

Q1(d): The majority of learners were also able to state one type of dimensional detail that can be found on an engineering drawing. Most popular responses included 'radius, 'diameter', 'width' or 'length. A number of learners gave a combination of the above responses but were only able to access one mark as they came from the same category in the mark scheme 'physical dimensions'. Far too many learners misread the question and gave linetypes as incorrect responses.

1 mark response:

(d) Tolerances are one type of dimensional detail that can be found on engineering drawings.

State **two** other types of dimensional detail that can be found on engineering drawings.

(2)

1 *diameters*

2 *lengths*

Question 2

This question looked at a range of different information that engineers refer to when carrying out manufacturing activities.

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 safe condition signs to the correct safe condition sign name. The correct responses were 'fire exit and 'emergency eye wash'. This is clearly an area that learners understand well.



2 mark response:

2 Engineers refer to a range of information when carrying out manufacturing activities.

(a) Identify the correct name for each of these safe condition signs.

Draw **one** line from each safe condition sign to **one** safe condition sign name.

(2)

Safe Condition Sign	Safe Condition Sign Name
 <p>(Background is green)</p>	<p>assembly point</p> <p>drinking water</p> <p>emergency eye wash</p> <p>fire exit</p> <p>first aid station</p>
 <p>(Background is green)</p>	

Targeted Specification Area: Learning Aim A.4

Q2(b): The majority of learners were also able to identify the correct colour used for mandatory signs as being 'blue'. A number of learners gave incorrect responses such as 'green', 'red' or 'yellow'.

Targeted Specification Area: Learning Aim B.3 & A2

Q2(c)(i) & (ii): Some of the learners were not able to identify the chart used for planning manufacturing activities. Incorrect responses included 'Pareto chart' and 'Gantt chart'. The correct response was 'critical path analysis'. Also the majority of learners failed to give the correct 'latest start time for activity L' as being '15 hours'.

1 mark response for 1(c)(i):

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

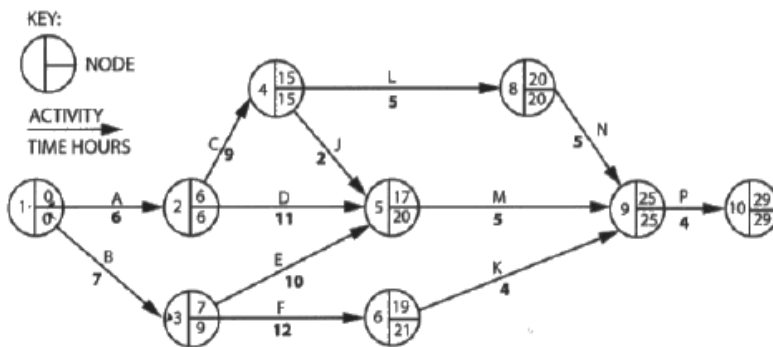


Figure 2

(i) Name the type of chart shown in **Figure 2**.

(1)

Critical path analysis

1 mark response for 1(c)(ii):

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

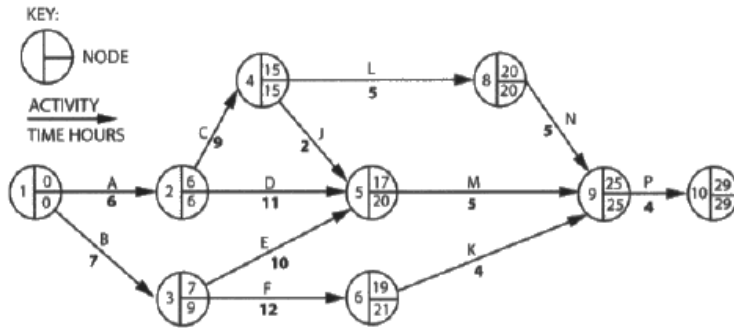


Figure 2

(i) Name the type of chart shown in **Figure 2**.

(1)

Node diagram

(ii) Identify the latest start time, in hours, for activity L.

(1)

15 hours

Question 3

This question was aimed at a range of information associated with engineering drawings.

Targeted Specification Area: Learning Aim B.3

Q3(a): The majority of learners were able to correctly identify at least one of the two locations where engineering drawings can be stored securely as either 'ICT Systems' or 'filing cabinets'. 'ICT systems' was usually the more common correct response.

Targeted Specification Area: Learning Aim A.2

Q3(b): Only a minority of learners were able to correctly identify at least one example of circuit characteristics that can be shown on an engineering drawing. Typical correct responses included 'voltage' and 'current'. Many learners misread the question and simply gave names of different electronic components such as 'battery' or 'resistor' which were both incorrect.

2 mark response:

(b) State **two** examples of circuit characteristics that can be shown on an engineering drawing. (2)

1 voltage

2 current

Targeted Specification Area: Learning Aim A.1

Q3(c): The majority of learners were able to state why engineering drawings are produced to international standards. Typical responses focused on drawings being understood by other engineers and no language barriers to interpreting such drawings.

2 mark response:

(c) State **two** reasons why engineering drawings are produced to international standards.

1 : 1 : 1 : (2)

- 1 Go that engineers globally can understand the drawing (universal language)
- 2 Also it's so that every country can understand, produce and manufacture the drawings, and products accurately.

Question 4

This question was contextualised around an engineering company using mechanical component in the production of self-assembly play equipment.

Targeted Specification Area: Learning Aim B.1

Q4(a): The majority of learners were not able to correctly state two engineering process operation where production documents may be used. A number of learners misread the question and gave types of production documentation such as 'job cards' or 'production plans' as incorrect responses. Typical correct responses focused on 'Product assembly' or 'Product manufacture'.

2 mark response:

4 MK02 Engineering uses mechanical components in the production of self-assembly play equipment.

(a) State **two** engineering process operations where production documentation may be used.

(2)

- 1 Component production
- 2 welding.

Here the second response, 'welding', has been awarded for a process operation that could be found within 'Product assembly'.

Targeted Specification Area: Learning Aim A.2

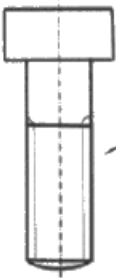
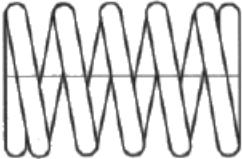
Q4(b): This was a line match question and the majority of learners were able to correctly match at least one mechanical component symbol to the correct mechanical component name. The correct responses were 'bolt' and 'spring'. 'Spring' was usually the more common correct response.

2 mark response:

(b) Identify the correct name for each of these mechanical components.

Draw **one** line from each mechanical component symbol to **one** mechanical component name.

(2)

Mechanical Component Symbol	Mechanical Component Name
	<p>bolt</p> <p>key</p> <p>pin</p> <p>clip</p> <p>spring</p>
	<p>clip</p> <p>spring</p>

Targeted Specification Area: Learning Aim A.1

Q4(c): This was a multi choice question that proved accessible to under half the learners. Those learners who were able to identify the correct response gave 'oblique'.

1 mark **correct** response:

(c) A bracket used in the play equipment is shown in **Figure 3**.

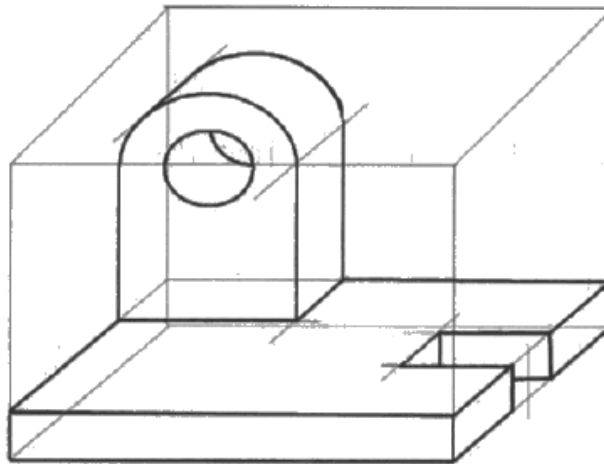


Figure 3

Identify the type of drawing shown in **Figure 3**.

(1)

- A isometric
- B oblique
- C orthographic
- D wiring

1 mark **incorrect** response:

(c) A bracket used in the play equipment is shown in **Figure 3**.

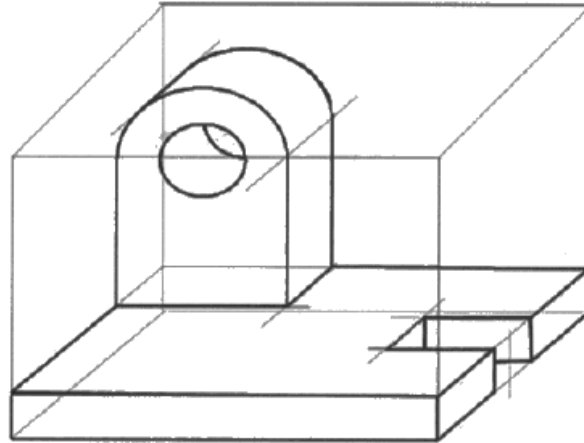


Figure 3

Identify the type of drawing shown in **Figure 3**.

(1)

- A isometric
- B oblique
- C orthographic
- D wiring

Targeted Specification Area: Learning Aim B.2

Q4(d): Learners who had been taught about assembly manuals were able to gain at least one mark here for a response relating to 'customers being able to assemble the equipment correctly'.

1 mark response:

(d) MK02 Engineering provides customers with assembly manuals for the play equipment.

Explain **one** advantage of providing assembly manuals in this situation.

(2)

There will be clear instructions for consumers to follow and there will be no need for specialist training

(Total for Question 4 = 7 marks)

2 mark response:

(d) MK02 Engineering provides customers with assembly manuals for the play equipment.

Explain **one** advantage of providing assembly manuals in this situation.

(2)

Helps the user understand how to assemble the product so that they can do it themselves meaning the company does not need to send an employee out to do it for the customer.

(Total for Question 4 = 7 marks)

Question 5

This question was contextualised around a company that manufactures bicycle racks to be fitted to cars. This context gave learners an opportunity to apply their knowledge and understanding to these questions.

Targeted Specification Area: Learning Aim B.2

Q5(a): Just under half the learners were able to gain the 1 mark for this question. Typically, welding questions prove quite challenge at this level; however, there appears to be an improvement in performance with this topic. Typical correct responses focused on using the correct weld type or welding procedure. Some learners gave responses relating to the characteristics of the bike rack itself as a result of welding such as 'strong joints being created'.

1 mark response:

- (a) State **one** reason why engineers follow a weld procedure specification when welding the frame.

(1)

Engineers follow a weld procedure as it gives instructions and details on how to weld the frame accurately, and what type of weld to use, and the joint to use, and the type.

Targeted Specification Area: Learning Aim B.3

Q5(b): A number of learners were able to score one mark by identifying an advantage of using part numbers when assembling the bicycle racks. This was a part of the specification that had not been tested on many occasions previously and was pleasing to see learners showing some knowledge and understanding of this topic. Typical responses included 'allows parts to be easily identified' or 'allows missing parts to be identified'. Some learners talked about improved efficiencies and reducing the chances of using the incorrect components, which were both correct. Some learners gave linked explanations that were awarded all four marks.

3 mark response:

(b) The documentation used for assembling the bicycle racks contains an identification number for each part.

Explain **two** advantages of using part numbers in this situation.

(4)

- 1 One advantage of using part numbers in the situation is to identify what part numbers assemble with another. This is an efficient way to assemble the product as the parts link with each other using numbers to identify.
- 2 Another reason is that if a part went missing you can reference it and order another part. This allows people to reference and identify the parts using part numbers.

Targeted Specification Area: Learning Aim A.3

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
' they had the correct type of fit or ' the chances of mistakes being made'. Occasionally some learners gave linked responses to achieve further marks. Incorrect responses usually included reference to 'universally recognised' which although correct was not appropriate in this situation.

1 mark response:

(c) Explain **one** advantage of using standard reference charts for limits and fits when producing holes for the adjustable joint.

(2)

SO the manufacturer knows what the correct hole size and shaft size is for the product and which one fits the other.

Question 6

This question was contextualised around a company that assembled electronic advertising displays that are used in shops. 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

Q6(a): This proved to be a challenging question for a number of learners. This was an unfamiliar context with a complex question stem and consequently a number of learners misinterpreted the question and talked about the functions of electronic components rather than why the company uses manufacturer's data sheets for components when assembling electronic circuits. Typical responses included 'prevents components being fitted incorrectly' or 'shows the current/voltage of the components'. Occasionally some learners gave a linked response to achieve a further mark.

1 mark response:

6 BB3 Engineering assembles electronic advertising displays that are used in shops.

(a) Explain **one** reason why BB3 Engineering would use manufacturers' data sheets for components when assembling electronic circuits.

(2)

To make sure each component is suitable and has the circuit function right

2 mark response:

(a) Explain **one** reason why BB3 Engineering would use manufacturers' data sheets for components when assembling electronic circuits.

(2)

As by using data sheets, the exact ~~value~~ properties of the component can be known, reducing risks of damage to the component.

Targeted Specification Area: Learning Aim B.3

Q6(b): Learners who had been taught about reporting procedures were able to gain at least one mark here for a low response relating to 'mistakes could be identified' or 'manuals can be amended'. Some learners were able to give linked responses to gain both marks.

2 mark response:

When installing an advertising display, an engineer notices a discrepancy between the electronic components specified on two different pages of an assembly manual.

(b) Explain **two** advantages of the discrepancy being reported to BB3 Engineering. (4)

1 It allows BB3 Engineering to take action on the discrepancy so that it can be altered in order to fix it for further production and assembly processes.

3 mark response:

When installing an advertising display, an engineer notices a discrepancy between the electronic components specified on two different pages of an assembly manual.

(b) Explain **two** advantages of the discrepancy being reported to BB3 Engineering. (4)

1 Allows the company to assess the problem and find a way to fix it correctly and quickly.

2 It means the company will not send any more of these incorrect assembly manuals out so the same mistake will not repeat itself.

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 'control charts serve as an early warning system allowing operators to detect potential issues' or 'SPC charts can be displayed graphically allowing comparison against standards'. Occasionally some learners gave linked responses to achieve further marks.

2 mark response:

(c) Explain **two** advantages of BB3 Engineering using statistical process control charts during production of the electronic advertising displays.

(4)

1 SPC's are good for evaluating the performance of production ~~as~~ as they do a spot check on every batch to see if they are meeting the correct standards.

Question 7

This question was contextualised around a company that constructs and installs complex electrical equipment in new industrial buildings. The question looks for advantages of using Gantt charts when scheduling the construction and installation of the electrical equipment. Again, this context gave learners an opportunity to apply their knowledge and understanding in this situation.

Targeted Specification Area: Learning Aim B.2

Q7: The majority of learners found this question reasonably accessible. Although an unfamiliar context, 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 advantages of using Gantt charts when scheduling. Typical advantages focused on the identifying critical stages or milestones within production and the ability to determine on-going resources. A number of learners gave descriptions of a Gantt chart which was given some credit. There was clear evidence from the responses that learners had a good understanding of the use of Gantt charts when scheduling and consequently there were responses achieving the higher mark bands. Centres should be commended for their work with this type of question.

Mark band 1 response:

- 7 PE60 Engineering construct and install complex electrical equipment in new industrial buildings.

The electrical equipment requires components to be purchased from many different suppliers.

Discuss the advantages to PE60 Engineering of using Gantt charts when scheduling the construction and installation of the electrical equipment.

~~When using the Gantt charts for~~
Gantt charts give a very clear time schedule to be stuck to. ~~the~~ Each individual component can be ~~time~~ made to be installed within the right amount of time.

Mark band 2 response:

7 PE60 Engineering construct and install complex electrical equipment in new industrial buildings.

The electrical equipment requires components to be purchased from many different suppliers.

Discuss the advantages to PE60 Engineering of using Gantt charts when scheduling the construction and installation of the electrical equipment.

Gantt charts show ~~the~~ the order in which each process should be complete. This allows engineers to know exactly when their job is in the timeline of the project.

The Gantt chart shows the expected start time and duration of each task so that the parts and components needed can ordered and delivered ~~just~~ before the required task is due to start.

This also allows employees plenty of notice for when they are due in to complete the task they are trained for so they can be working elsewhere while other tasks are being completed and they come in on the date in the project timeline that they are needed.

A Gantt shows exactly when the installation must be completed in the ~~project~~ project timeline allowing preparation for the task.

(Total for Question 7 = 8 marks)

TOTAL FOR PAPER = 50 MARKS

Mark band 3 response:

7 PE60 Engineering construct and install complex electrical equipment in new industrial buildings.

The electrical equipment requires components to be purchased from many different suppliers.

Discuss the advantages to PE60 Engineering of using Gantt charts when scheduling the construction and installation of the electrical equipment.

The advantages of PE60 engineering using Gantt charts when scheduling construction and installation of electrical equipment is that they will be able to schedule and use milestone checks in order to find out their progress and time managements. It shows you deadlines and criteria needed to be met. Gantt charts are visual representations of time management and, schedule. This is beneficial to the engineering company as they can identify how much time they would need for each task. e.g. construction, construction and installation of the electrical equipment. It also good for small to complex tasks. In addition the task is complex, Gantt charts will make it easier to identify weaknesses in time management, progress and it will show you milestone checks (how much progress you've done on a task and how much you yet left to do until completion). Gantt charts are also beneficial to the company as it shows when one task stops and when another can start. It accurate and concise information. - And it shows project duration - time start to end. (Total for Question 7 = 8 marks)

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email publication.orders@edexcel.com

Order Code BF037397 Summer 2013

For more information on Edexcel qualifications, please visit
www.edexcel.com/quals

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