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Cambridge **NATIONALS LEVEL 1/2**

Cambridge NATIONALS

ENGINEERING MANUFACTURE

Combined feedback on the January 2018 exam paper (including selected exemplar candidate answers and commentary)

Unit R109 – Engineering materials, processes and production

Version 1

ocr.org.uk/engineering

CONTENTS

INTRODUCTION

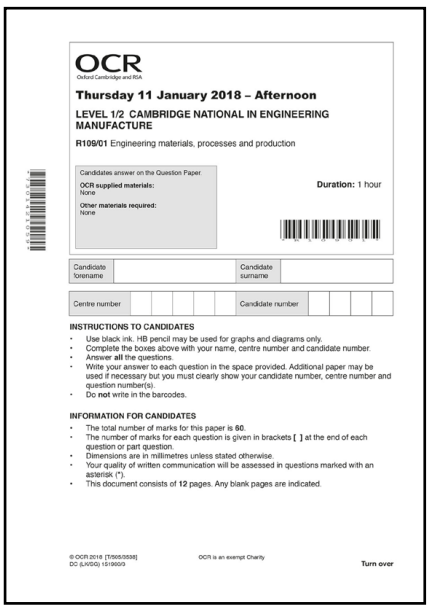
This resource brings together the questions from the January 2018 examined unit (Unit R109), the marking guidance, the examiners comments and the exemplar answers into one place for easy reference.

We have also included exemplar candidate answers with commentary for Questions 4(b), 5(a) and 6(a).

The marking guidance and the examiner's comments are taken from the Report to Centre for this question paper.

The Question Paper, Mark Scheme and the Report to Centre are available from:

https://interchange.ocr.org.uk/Modules/PastPapers/Pages/PastPapers.aspx?menuindex=97&menuid=250



OCR
Oxford Cambridge and RSA

Thursday 11 January 2018 – Afternoon

LEVEL 1/2 CAMBRIDGE NATIONAL IN ENGINEERING MANUFACTURE

R109/01 Engineering materials, processes and production

Candidates answer on the Question Paper.
OCR supplied materials: None
Other materials required: None

Duration: 1 hour

Candidate forename | Candidate surname
Centre number | Candidate number

INSTRUCTIONS TO CANDIDATES
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION FOR CANDIDATES
- The total number of marks for this paper is **60**.
- The number of marks for each question is given in brackets **[ ]** at the end of each question or part question.
- Dimensions are in millimetres unless stated otherwise.
- Your quality of written communication will be assessed in questions marked with an asterisk (*).
- This document consists of **12** pages. Any blank pages are indicated.

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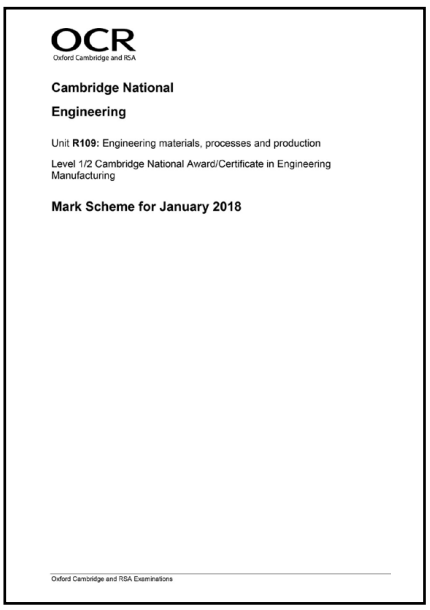
Turn over



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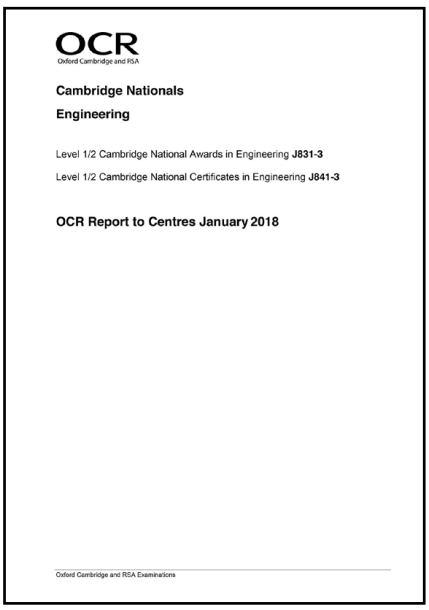
Cambridge National
Engineering

Unit **R109:** Engineering materials, processes and production

Level 1/2 Cambridge National Award/Certificate in Engineering Manufacturing

Mark Scheme for January 2018

Oxford Cambridge and RSA Examinations



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Cambridge Nationals
Engineering

Level 1/2 Cambridge National Awards in Engineering **J831-3**

Level 1/2 Cambridge National Certificates in Engineering **J841-3**

OCR Report to Centres January 2018

Oxford Cambridge and RSA Examinations

GENERAL EXAMINER COMMENTS ON THE PAPER

The majority of candidates attempted all of the questions on the paper but knowledge of some sections of the specification appeared to be quite limited in a number of cases. This was made apparent by a significant increase in the number of questions to which no response was given. In a number of cases it was apparent that candidates had not read questions carefully enough before giving their answers, resulting in a loss of marks.

Responses to questions relating to basic engineering materials and processes were disappointing in the main. In questions that asked for one example of a material or process, some candidates gave more than one, this being known as a 'scatter gun approach'. It should be pointed out that, in cases such as this, only the first example can be accepted as the response and any additional examples cannot be considered.

Responses to questions relating to applications and procedures in manufacturing also indicated an area where some improvement is needed. In questions where candidates are asked to explain processes or procedures, it should be noted that justified responses need to be presented in order to gain the higher marks available. One-word or overly simplistic answers are not suitable responses to this type of question.

Specific examples and details of these points are given later in this report.

Resources which might help address the examiner comments:

From the link below, you'll find 'The OCR guide to examinations' (along with many other skills guides)
http://www.ocr.org.uk/i-want-to/skills-guides/

Question 1

Answer **all** the questions.

1 A list of different types of engineering materials is given below.

Alloys
Composite materials
Ferrous metals
Non-ferrous metals
Smart materials

(a) Choose **three** material types from the list and give **two** examples of each type.

Material type .....
Examples 1 .....
2 .....
Material type .....
Examples 1 .....
2 .....
Material type .....
Examples 1 .....
2 .....
[2]

One mark for each correct **example** given for the stated material type.
No mark for stating the material type.

Examples:
- **Alloys** – Brass; bronze; duralumin; steel; cast iron; solder
- **Composite materials** – Carbon fibre; GRP; concrete; MDF; Plywood
- **Ferrous metals** – Iron; steel (any); HSS; stainless steel; cast iron
- **Non-ferrous metals** – Copper; aluminium; lead; tin; Titanium; zinc
- **Smart materials** – Shape memory alloy (SMA); Thermochromic material; Quantum tunnelling composite (QTC).

3 x (1+1)

(b) (i) Explain why thermoplastics are used for products more often than thermosetting plastics.

.....
.....
.....
.....
.....
.....
[3]

Up to three marks for a reasoned explanation.

Example:
Thermoplastics are more easily moulded (1) and shaped as they can be softened by heat (1) but thermosetting plastics cannot be re-softened after being formed into shape (1).

(3x1)

(ii) Give **one** example of a **product** made using thermosetting plastic.

. [1]

Saucepan handles; electrical fittings; GRP Boat hulls; carbon fibre cycle frames; kettle.

Mark Scheme Guidance

Question 1(a):

Accept other appropriate examples.

Allow repeated use if appropriate e.g. Brass as Alloy *and* Non-ferrous metal; Stainless steel as Ferrous metal *and* Alloy.

Question 1(b)(i):

Accept other valid explanations including reference to ease of recycling, but NOT 'reshaped' etc after manufacture.

Justified response with comparison needed for full marks.

Allow two marks for one point fully justified or two unjustified points.

Question 1(b)(ii):

Accept other appropriate example.

Examiner comments

Question 1(a) – Most candidates scored well on this question, but a considerable number demonstrated rather limited knowledge of the material types and appeared to choose their examples at random. Where marks were lost on the question, this was often as a result of mixing up ferrous metals and non-ferrous metals, and/or giving incorrect examples of smart materials. In some cases, candidates did not give specific examples of materials, but gave brief descriptions of the material types. One example of this is a response stating that 'ferrous metals contain iron' – thereby gaining a mark by default for the reference to iron.

Question 1(b)(i) – This question was not well answered. Marks were awarded for reference to recyclability, but only a limited number of responses mentioned other factors, such as the ease of forming into complex shapes. In many cases, candidates had suggested that thermoplastic products could be 'heated up and reshaped if they came out wrong'.

Question 1(b)(ii) – The most frequently given correct examples of products made using thermosetting plastics were saucepan handles and electrical plug sockets. Where candidates appeared to be uncertain of the difference between the two types of plastics, any item made from plastic was given as an example, such as lego bricks, children's toys and food containers.

Question 2

2 (a) Give **one** example of a ceramic **material** that is used in engineered products.

Tungsten carbide; glass; ceramic bearing material (Zirconium dioxide; Silicon nitride) **[1]**

(b) Ductility, elasticity and resistivity are three properties of engineering materials.

Describe what is meant by:

Ductility .....

.....

.....

.....

Elasticity .....

.....

.....

.....

Up to two marks for each of three valid descriptions.

Examples:

- **Ductility** – The ability of a material to be drawn into lengths (1) without breaking (1)
- **Elasticity** – The ability of a material to return to its original length/shape (1) after being stretched/bent (1)
- **Resistivity** – The ability of a material to resist the passage (1) of electricity or heat (1)

3 x (1+1)

[2]

Resistivity .....

.....

.....

.....

[2]

(c) Name and describe **one** destructive test carried out on engineering materials.

Name .....

.....

.....

.....

.....

One mark for naming and up to two further marks for describing a destructive test.

Examples:

- Tensile testing (1) is carried out by gripping and stretching a test piece (1) and recording the load it breaks at (1)
- Impact testing (1) is done by swinging a heavy block onto a notched test piece (1) and seeing how much energy is absorbed in breaking (1) the test piece

1 + (2x1)

[3]

Mark Scheme Guidance

Question 2(a):

Accept other appropriate examples e.g. porcelain; marble.

Question 2(b):

Allow other suitably descriptive responses.

Justified response needed for second mark.

Question 2(c):

Allow any other valid destructive test e.g. Brinell/Rockwell/Vickers hardness testing.

Examiner comments

Question 2(a) – Most candidates attempted this question, but only a limited number were able to name a ceramic material correctly. Glass and tungsten carbide were the most frequently seen correct responses, but ceramic bearing material was also given in a small number of cases. In many cases, examples seem to have been chosen by guesswork, and metals or plastics were occasionally incorrectly given as examples of ceramic materials.

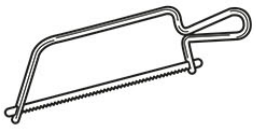
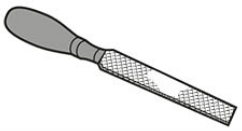
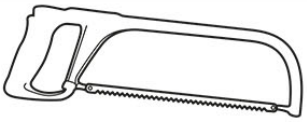
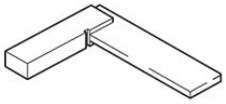
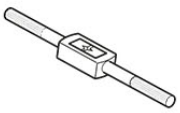
Question 2(b) – Responses to this question were rather varied, with knowledge of the properties of engineering materials being quite limited in many cases, and only the higher achieving candidates scored more than half marks on the question overall. Elasticity was the most frequently well described property, but marks were often lost on ductility, where candidates merely stated that it meant the material could be drawn into thin wire, without mentioning the fact of it not breaking. Most candidates gave inappropriate descriptions of resistivity, suggesting that materials were able to resist most things, such as force and bending, but few candidates mentioned resistance to the flow of electricity or heat.

Question 2(c) – In most cases this question was not well answered, and a significant number of candidates gave no response to it at all. Marks were often lost where candidates had described a non-destructive test such as dye penetrant or ultrasound testing, and also where testing of products was described. A regularly seen example of this was the crash testing of new vehicles. Marks were awarded where an appropriate testing method was suitably described but not correctly named.

Question 3(a)

3 (a) Complete the table below by giving the correct name of each of the tools shown.

One has been done for you. One mark for each correctly named tool.

Tool	Name of tool
	Scriber
	Junior/Mini hacksaw
	Centre punch/dot punch
	(Hand/Flat) File
	Hacksaw
	(Engineer's) Try square
	Tap wrench/holder

[6]

(6x1)

Examiner comments

The whole range of marks from zero to six were awarded across the cohort. Very few candidates identified the tap wrench/holder, and the junior hacksaw and the hacksaw were often too simply named as a 'saw'.

Question 3(b)

(b) Riveting is a joining process that does not involve the use of heat.

(i) Describe how two sheet metal parts would be joined using 3 mm countersunk rivets.

Up to three marks for an appropriate description of a *workable* method.

Example:
Drill and countersink holes for the rivets (1) Put rivet through holes and cut to length (1) Form countersunk head on end of rivet (1)

(3x1)

..... **[3]**

(ii) Name **one** other joining process that does not involve the use of heat.

Self-tapping screws; adhesives/glueing; threaded fasteners/nuts and bolts/ screws .. **[1]**

Examiner comments

Question 3(b)(i) – This question was not well answered generally, with very few candidates scoring more than one mark on it. In many cases a single mark was given for the first stage of drilling the holes for the rivets, but this was then followed by a brief description of 'pop' riveting rather than the use of solid countersunk rivets. Only a limited number of candidates scored two marks or more on the question overall.

Question 3(b)(ii) – Most candidates answered this question correctly, with adhesives and threaded fasteners being used as examples of 'cold' joining processes. Where marks were lost, this was normally as a result of giving heat processes such as welding or soldering, but occasionally candidates repeated the use of rivets or 'pop' rivets.

Questions 4(a) and (b)

4 Engineered products often have surface finishes applied to them after manufacture.

(a) Give **three** surface finishing processes suitable for use on mild steel parts.

1 .....

2 .....

3 .....

One mark for each of three appropriate finishing processes.

Examples:
Painting; plastic/powder coating; galvanising ; blueing/oil blackening; electroplating

(3x1)

[3]

(b) Risk assessments are carried out to ensure safety during engineering processes.

Give **three** stages in carrying out a risk assessment of an engineering process.

1 .....

.....

2 .....

.....

3 .....

.....

One mark for each relevant stage given.

Examples:
1. Potential risk is identified (1)
2. Evaluated to see how serious it might be (1)
3. Measures are put in place to minimise/remove the risk (1)

(3x1)

[3]

Mark Scheme Guidance

Question 4(a):

Not polishing.

Question 4(b):

Response must be process related not product referenced.

Accept other suitably descriptive wording of relevant stages.

Examiner comments

Question 4(a) – Most candidates were able to give at least one surface finishing process suitable for use on mild steel parts and many gained full marks on this question. A surprising number of candidates appeared to have little or no knowledge of surface finishing, however, and gave unrelated processes such as 3D printing, casting and vacuum forming, or no response to the question at all.

Question 4(b) – Although most candidates attempted this question, very few demonstrated any real knowledge of risk assessment procedures, and only the higher achieving candidates scored two or more marks for their responses. In many cases candidates simply related their responses to basic health and safety precautions, and a number of overly simplistic one-word responses were also seen.

Exemplar candidate work

Question 4(b) – Low level answer

(b) Risk assessments are carried out to ensure safety during engineering processes.

Give **three** stages in carrying out a risk assessment of an engineering process.

1 Identification of Hazards

2 Identification of the associated risk

3 assess meant of the risks.

[3]

Commentary

Although the use of the term 'hazards' indicates that this candidate has some awareness of Risk Assessment, this low level answer shows limited knowledge and understanding of the overall procedure.

Reference to either of the other stages, evaluation of the seriousness of the risk or measures taken to reduce it, would improve this response and make it a medium level answer.

Question 4(b) – High level answer

(b) Risk assessments are carried out to ensure safety during engineering processes.

Give **three** stages in carrying out a risk assessment of an engineering process.

1 identify the risk

2 record the risk to not forget

3 thik of away to counteract the risk

[3]

Commentary

This high level answer shows some knowledge and understanding of Risk Assessment, giving the first stage of the process and also the final stage. The second stage given is, however, too vague to be worthy of any credit.

In order to improve this response, and make it a full mark high level answer, the candidate would need to give a clearer description of the second stage, where the risk identified is evaluated to determine its seriousness.

Question 4(c)

(c) Centre lathes are manually operated machines used to produce turned parts.

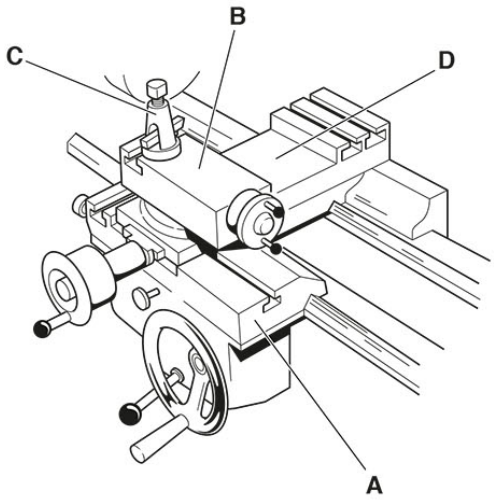


Fig. 1

Fig. 1 shows the parts of a centre lathe that control the cutting tool.

Name the four parts of the centre lathe labelled in Fig. 1.

A .....

B .....

C .....

D .....

One mark for each correctly named part.
A – Saddle/Apron
B – Top/compound slide
C – Tool post/tool holder
D – Cross slide

(4x1)

[4]

Examiner comments

It was disappointing to see that very few candidates were able to name all four of the centre lathe parts labelled in the diagram, and quite a number of candidates did not even attempt the question. The only part correctly named with any regularity was the toolpost/toolholder, although the saddle and the cross slide were also identified in some cases. A number of candidates simply gave the same answer for each of the four parts, in the hope that one of them might be correct.

Question 5(a)

5 (a)* Discuss the factors that should be considered before changing from production using manually controlled machines to production using CNC machines.

Up to six marks for a discussion or detailed explanation of the factors to consider before changing from production using manually controlled machines to production using CNC machines.

[6]

Mark Scheme Guidance

Response might include reference to:

- The cost of new machines.
- Re-training of staff to use new technologies/machines.
- Redundancies in the workforce.
- Potential changes to workshop layout.
- Whether the increased output is justified by sales.
- Long-term cost effective benefits.
- Disposal of old machinery.
- Improved working conditions for staff.
- Increased reliability/consistency of CNC machines.

Level 3 (5–6 marks)

Detailed discussion showing a clear understanding of the factors to consider before changing from production using manually controlled machines to production using CNC machines.

Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate can demonstrate the accurate use of spelling, punctuation and grammar.

Level 2 (3–4 marks)

Adequate discussion showing an understanding of the factors to consider before changing from production using manually controlled machines to production using CNC machines.

There will be some use of specialist terms, although these may not always be used appropriately. The information will be presented for the most part in a structured format. There may be occasional errors in spelling, punctuation and grammar.

Level 1 (1–2 marks)

Basic discussion showing limited understanding of the factors to consider before changing from production using manually controlled machines to production using CNC machines.

There will be little or no use of specialist terms. Answers may be ambiguous or disorganised. Errors of spelling, punctuation and grammar may be intrusive.

0 = a response that is irrelevant and/or not worthy of a mark.

Annotate with 'Seen' at end of response.

Examiner comments

Most candidates attempted this question and some good responses to it were seen. In many cases, however, candidates made the assumption that the CNC machines had already been installed, and proceeded to base their responses on the benefits of using CNC machining in production. A number of candidates presented factors in list or bullet point form rather than as a discussion, thereby limiting the number of marks attainable for the question overall.

The candidate's Quality of Written Communication (QWC) was assessed in this question, and marks were awarded where relevant technical content was somewhat limited.

Exemplar candidate work
Question 5(a) – Low level answer

5 (a)* Discuss the factors that should be considered before changing from production using manually controlled machines to production using CNC machines.

Before using CNC machines you will have to learn how to opperate the Machine & work on your measurment. You will have to lear everything about ~~the~~ CNC Machine before you can be Incontroll of one.

[6]

Commentary

This low level answer is well below the standard required for an extended response discussion question, in which both technical content and Quality of Written Communication (QWC) is assessed.

The candidate has made reference to one simple factor in the response and has not developed it to any degree.

To improve this to a medium level answer, the candidate would need to make mention of at least one other relevant factor and discuss how and why it should be considered before changing from manual to CNC machining.

This would also allow a more accurate assessment of the candidate's quality of written communication to be made.

Exemplar candidate work
Question 5(a) – Medium level answer

5 (a)* Discuss the factors that should be considered before changing from production using manually controlled machines to production using CNC machines.

There are both positives and negatives about having CNC machine. ~~If~~ The positives are that it works every second and doesn't need to rest and with a CNC machines you make a lot of ~~a variet~~ different ~~mate~~ products as it has different tools for different processes and ~~will~~ won't need a professional to use it as it is automatic. The negatives are that it will decrease the amount of people who work ~~in the~~ and also you would have to pay the workers ~~all~~ a lot of money if they are going to be replaced by machines ~~and also~~ furthermore, if the machine breans it would cost a lot to repair ~~the~~. Overall, there are some factors people should take in before getting a CNC whether good nor bad it ~~is no~~ is helpful.

[6]

Commentary

This medium level answer partially addresses the focus of the question but is rather disjointed in its presentation.

Some of the response relates to the benefits of CNC machines in general, rather than factors that would need to be considered before changing from manually controlled machines. Only one really relevant factor has been dealt with and developed in the response, that being related to the effects on the workforce.

In order to improve this response, and make it a higher level answer, the candidate would need to include other relevant factors, so that the focus of the question is more completely addressed. The structure of the whole response should also be arranged so that the points are covered in a more logical order.

Exemplar candidate work
Question 5(a) – High level answer

5 (a)* Discuss the factors that should be considered before changing from production using manually controlled machines to production using CNC machines.

How many workers will I need? Another factor is how much is the machine? How much Space do I need? And if I buy the Machinery will I earn a profit or a loss. Another factor is Who are my Suppliars. Also how much is the cost for the parts. How many worker will I need to train. How much is the CNC Machine. what parts I need to get? where will I export my products.

[6]

Commentary

A number of relevant factors are covered and developed in this response, making it a high level answer in terms of its content. The factors appear to have been written down in the order that the candidate has thought of them, making the response seem rather hurried and disjointed.

The candidate could make this response into a full mark high level answer by taking more time and care over its structuring and presentation, thereby improving the Quality of Written Communication (QWC) element of the overall mark.

Questions 5(b) and (c)

(b) Describe how CNC machining might be used in the development of new engineered products.

.....
.....
.....
.....
.....

Up to three marks for an adequate description.

Examples:
- When the product has been designed using CAD (1) it is sent to a CNC milling machine or router (1) where a prototype is produced (1)
- CNC milling machines (1) can be used to produce prototypes quickly (1) and changes can easily be made on the CAD software (1)

(3x1)

..... **[3]**

(c) Give **one** example of an additive manufacturing process.

..... **[1]**

Examples:
- Selective Laser Sintering (SLS)
- Stereolithography (SLA)
- Direct Metal Laser Sintering (DMLS)
- Fused Deposition Modelling (FDM)
- 3D printing
- electron beam melting.

Mark Scheme Guidance

Question 5(b):

Ref to use of CAD needed for full marks.

Allow up to two marks for one partially detailed point.

Examiner comments

Question 5(b) – This question was generally not well answered, with most candidates not addressing the focus of the question, this being the use of CNC machining in the development of new engineered products. Some candidates were able to pick up a single mark for reference to the manufacture of prototypes, but in most cases responses were based on the use of CNC machining in quantity production. Only the higher achieving candidates scored two marks or more on the question.

Question 5(c) – Most candidates attempted this question and by far the most popular example of an additive manufacturing process was 3D printing, although SLS was also seen in some cases. It was quite apparent, however, that some candidates had no knowledge of additive manufacturing, and more conventional processes were given, such as welding, injection moulding and soldering.

Question 6

6 (a) Describe **three** benefits to a manufacturer of using automation in the production of engineered products.

1 .....

.....

.....

..... [2]

2 .....

.....

.....

..... [2]

3 .....

.....

.....

..... [2]

Up to two marks for each of three justified benefits.

Examples:

- Automatic machines make products more quickly/work 24/7 (1) increasing the overall output (1)
- Once set up, automatic machines make products more cheaply (1) and increase profits (1)
- Automation means that fewer workers are needed (1) which saves the company money (1)
- Improvement in quality and consistency (1) as no human error is involved (1)
- Safer working environment (1) means less accidents/danger to workers (1)

3 x (1+1)

(b) Explain the benefits and drawbacks of the Just-in-Time (JIT) method of manufacture.

.....

.....

.....

.....

.....

.....

..... [4]

Up to four marks for a reasoned explanation.

Example:

JIT means that parts are delivered when they are needed to the place where they will be used (1) This means that the company don't have to store parts (1) and can use the space saved for production (1). One drawback is that if the delivery fails to arrive in time, production has to stop (1).

(4x1)

Mark Scheme Guidance

Question 6(a):

Accept other appropriate benefits.

Benefits must be justified for full marks.

Question 6(b):

Accept other appropriate benefits/drawbacks.

Clear and justified response covering benefits *and* drawbacks required for full marks.

Maximum 3 marks for listed unjustified points.

Examiner comments

Question 6(a) – This question was quite well answered generally, and full marks were scored by a number of the higher achieving candidates. Frequently seen benefits of automation in production included better consistency through lack of human error and increased profits from higher output. Where marks were lost, this was normally as a result of overly simplistic responses with too little detail, and many lower achieving candidates scored one mark only for each benefit given.

Question 6(b) – Details of the JIT method of manufacture were not well understood generally and a significant number of candidates did not attempt to answer this question. The most commonly quoted benefit was the fact that storage space for parts and materials was not required, and the effects of late delivery of parts was also well covered. Where candidates had no real knowledge the method, responses were often made up around the term 'Just-in-Time', with some candidates suggesting that products could be of lower quality due to having been 'rushed'. Only the higher achieving candidates produced appropriate responses that gained two or more marks out of the four available for the question.

Exemplar candidate work
Question 6(a) – Low level answer

6 (a) Describe **three** benefits to a manufacturer of using automation in the production of engineered products.

1 It would be easy for the manufacturer since he would be safe.

[2]

2 The machine will stay on the for a long time.

[2]

3 The manufacturer wouldn't need to wear any safety equipment

[2]

Commentary

Only the first one of the three responses given here actually addresses the focus of the question, making this a low level answer. The response has not been justified, and is simply a statement of, rather than a description of, a benefit.

The candidate could make this a medium level answer by giving three relevant examples of benefits of using automation, or by giving just two relevant benefits, one of which would need to be adequately justified.

It should be noted that, where two marks are available and four lines are given for answering the question, simplistic and unjustified statements are not suitable responses.

Exemplar candidate work
Question 6(a) – Medium level answer

6 (a) Describe **three** benefits to a manufacturer of using automation in the production of engineered products.

1 The automated machines can be very fast at doing there job as they know exactly what they are doing and he don't hesitate.

[2]

2 The automated machines can make all the of the products look exactly identical. They can make every single one to perfection.

[2]

3 Automated machines don't stop working. They can work for hours on end without the machine stopping. 24/7.

[2]

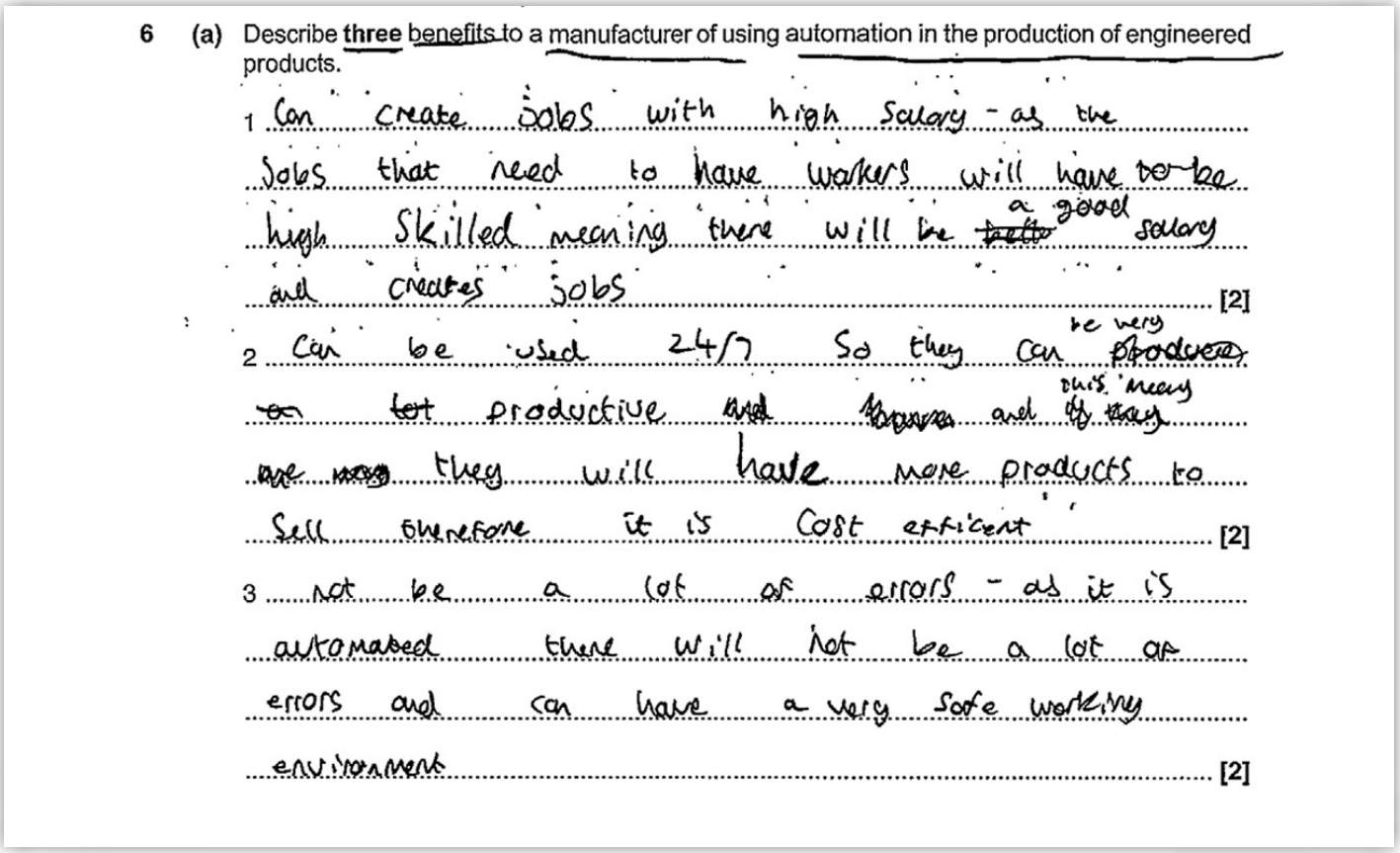
Commentary

This medium level answer does give three benefits of using automation, but the responses are lengthy statements rather than descriptions. Two of the responses contain repetition, and none of the three can be classified as either detailed or justified.

In order to improve this and make it a high level answer, at least one of the benefits should be described in greater detail and fully justified. An example of this would be:

'*Automated machines make products to a consistent quality as there is no possibility of human error affecting the manufacturing*'.

Exemplar candidate work
Question 6(a) – High level answer



6 (a) Describe **three** benefits to a manufacturer of using automation in the production of engineered products.

1 Can create jobs with high salary - as the jobs that need to have workers will have to be high skilled meaning there will be ~~a~~ a good salary and creates jobs [2]

2 can be used 24/7 so they can be very ~~on~~ ~~lot~~ productive and ~~more~~ and by this means ~~are more~~ they will have more products to sell therefore it is cost efficient [2]

3 not be a lot of errors - as it is automated there will not be a lot of errors and can have a very safe working environment [2]

Commentary

This is a high level answer in that it demonstrates generally good knowledge and understanding of the benefits of using automation in production.

Two of the three benefits described relate directly to the manufacturer and are both detailed and justified. Although the first benefit given is really concerned with the workforce rather than the manufacturer, some credit is given for the clear and concise description of the benefit, and the relevance of automation to it.

The candidate could make this into a full mark high level answer by ensuring that all three benefits described relate specifically to the manufacturer, and are all clearly described and justified.

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