



Rewarding Learning

General Certificate of Secondary Education  
2016

Centre Number

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Candidate Number

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# Engineering

Paper 1  
Assessment Unit 3  
*assessing*  
Engineering Technology



GEE31

[GEE31]

TUESDAY 24 MAY, MORNING

### TIME

1 hour.

### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.  
Write your answers in the spaces provided in this question paper.  
Answer **all ten** questions.

### INFORMATION FOR CANDIDATES

The total mark for this paper is 80.  
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question.  
Quality of written communication will be assessed in Question **10**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
<b>Total Marks</b>	

Answer **all** questions

1 (a) All the products below belong to a manufacturing sector.

Circle **two** products shown below that belong to the mechanical fabrication sector.

You **must** only circle **two** products. If you make a mistake you must clearly show which two products you have chosen.



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Examiner Only	
Marks	Remark

(b) All the products below belong to a manufacturing sector.

Circle **two** products shown below that belong to the engineering fabrication sector.

You **must** only circle **two** products. If you make a mistake you must clearly show which two products you have chosen.



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Examiner Only	
Marks	Remark

2 Complete the table below by filling in all the appropriate answers.



Examiner Only	
Marks	Remark

Question	Answer
<p>(a) Name and give a suitable use for the item shown below.</p>  <p>© Thinkstock</p>	<p>Name of item</p> <p>_____</p> <p>Use</p> <p>_____</p> <p>_____</p>
<p>(b) Name and give a suitable use for the item shown below.</p>  <p>© Thinkstock</p>	<p>Name of item</p> <p>_____</p> <p>Use</p> <p>_____</p> <p>_____</p>
<p>(c) Name and give a suitable use for the item shown below.</p>  <p>© Thinkstock</p>	<p>Name of item</p> <p>_____</p> <p>Use</p> <p>_____</p> <p>_____</p>

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[2]

Question	Answer
<p><b>(d)</b> Name and give a use for the item shown below.</p>  <p>© Thinkstock</p>	<p>Name of item</p> <hr/> <p>Use</p> <hr/> <hr/>
<p><b>(e)</b> Name and give a use for the item shown below.</p>  <p>© Thinkstock</p>	<p>Name of item</p> <hr/> <p>Use</p> <hr/> <hr/>

[2]

[2]

Examiner Only	
Marks	Remark

3 A list of engineering processes is shown below.

- Soldering
- Turning
- Welding
- Tapping

Select any **one** of the processes listed above.

(a) Selected process

\_\_\_\_\_

Name **two** tools or items of equipment that may be used in the selected process.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

List **two** specific safety precautions when carrying out the selected process.

1. \_\_\_\_\_  
\_\_\_\_\_ [1]

2. \_\_\_\_\_  
\_\_\_\_\_ [1]

List **two** specific quality control checks that should be carried out in an engineering company for the selected process.

1. \_\_\_\_\_  
\_\_\_\_\_ [1]

2. \_\_\_\_\_  
\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

Select **one** other process from the list of engineering processes shown opposite.

**(b)** Selected process

\_\_\_\_\_

Name **two** tools or items of equipment that may be used in the selected process.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

List **two** specific safety precautions when carrying out the selected process.

1. \_\_\_\_\_

\_\_\_\_\_ [1]

2. \_\_\_\_\_

\_\_\_\_\_ [1]

List **two** specific quality control checks that should be carried out in an engineering company for the selected process.

1. \_\_\_\_\_

\_\_\_\_\_ [1]

2. \_\_\_\_\_

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

- 4 Developments in composite materials have allowed better prosthetic limbs to be designed and built. An example is shown in the picture below.



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- (a) What is meant by a composite material?

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[2]

- (b) Carbon fibre is an example of a composite material which is used in the manufacture of some prosthetic limbs. Name **one** other composite material and give an example of a specific use.

Composite material

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[1]

Use

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[1]

Examiner Only

Marks Remark



(c) Tennis rackets can be made from wood and carbon fibre.

An example of each type is shown in the photographs below.



Wooden tennis racket

© Thinkstock



Carbon fibre tennis racket

© Thinkstock

Identify **two** other items of sports equipment, apart from a bicycle, which are made using carbon fibre.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

(d) The picture below shows a bicycle.



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(i) Name a suitable material for the manufacture of a bicycle frame apart from carbon fibre.

\_\_\_\_\_ [1]

(ii) Outline **one** property of the material that makes it suitable for the bicycle frame.

\_\_\_\_\_  
\_\_\_\_\_ [1]

(iii) Outline **one** disadvantage of using this material when making the bicycle frame.

\_\_\_\_\_  
\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

5 Using robotics throughout the manufacture of engineered products has many benefits such as:

- improved reproducibility;
- increased rate of production;
- improved working environment.

(a) Using suitable examples, explain how robotics technology can achieve each of these benefits.

**Marks will not be awarded for repeated responses.**

(i) Improved reproducibility

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(ii) Increased rate of production

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[2]

(iii) Improved working environment.

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[2]

(b) Outline **one** reason why robotics technology may not be used for some engineering production processes.

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[2]

Examiner Only	
Marks	Remark

6 The picture below shows a pair of scissors.



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(a) Give **two** reasons why a manufacturer would use mild steel for the steel blades.

1. \_\_\_\_\_  
\_\_\_\_\_ [1]

2. \_\_\_\_\_  
\_\_\_\_\_ [1]

(b) State a suitable process that would be used to produce the plastic covering on the handles of the scissors.

\_\_\_\_\_  
\_\_\_\_\_ [1]

(c) The scissor blades are joined by a rivet.

Describe **three** stages in the process of making a riveted joint to hold the scissor blades together.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

Examiner Only	
Marks	Remark

7 Identify a product that you have studied from the engineering sector that has modern technology used in its manufacture.

Product

(a) Use **three** points to describe how the modern technology has been used in its manufacture.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [3]

(b) Using **one** example, outline how modern technology has improved product quality and customer satisfaction.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

(c) Modern technology has brought changes to industry including:

- changes to the workforce
- changes in the working environment

Give **one** example of how modern technology has impacted on the manufacturing industry with reference to the workforce and the working environment.

The workforce

\_\_\_\_\_

\_\_\_\_\_ [1]

The working environment

\_\_\_\_\_

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

8 CAD, CAM and CIM all play an important role in the manufacture of engineered products.

(a) Outline, giving **two** examples, how CAD is used in the design of engineered products.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

(b) (i) What does the abbreviation 'CIM' stand for?

\_\_\_\_\_ [1]

(ii) Outline **three** advantages of using CIM in a large engineering company compared to traditional methods of manufacture.

1. \_\_\_\_\_ [1]  
\_\_\_\_\_

2. \_\_\_\_\_ [1]  
\_\_\_\_\_

3. \_\_\_\_\_ [1]  
\_\_\_\_\_

(iii) Describe the difference between CAM and CIM.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [4]

Examiner Only	
Marks	Remark

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**(Questions continue overleaf)**

9 Electrical, mechanical and pneumatic/hydraulic components are used in the manufacture of many engineered products. A range of components is listed below.

Electrical	Mechanical	Pneumatic/Hydraulic
Resistor	Pulleys	Cylinders
Capacitor	Gear train	Reservoirs
Thermistor	Springs	Shuttle valve
Transistor	Levers	Flow control valves

Choose **one** component from each of the sectors above. For each component state its main function and give an example of where it could be used.

Marks will not be awarded for repeated responses.

The **three** components chosen must be from different sectors.

Electrical component

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Function

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 [1]

Example of where it could be used

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 [1]

Mechanical component

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Function

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 [1]

Example of where it could be used

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 [1]

Examiner Only	
Marks	Remark



Pneumatic/Hydraulic component

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Function

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[1]

Example of where it could be used

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[1]

Examiner Only	
Marks	Remark

10 Engineering fabrication processes use energy. In the space below, explain, by giving up to **three** examples, how the use of modern production processes could lead to increased energy consumption.

**Quality of written communication is assessed in this question.**

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**THIS IS THE END OF THE QUESTION PAPER**

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