



**Wednesday 4 June 2014 – Afternoon**

**GCSE ENGINEERING**

**A624/02** Impact of Modern Technologies on Engineering

Candidates answer on the Question Paper.

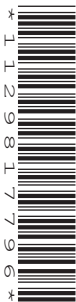
**OCR supplied materials:**

None

**Other materials required:**

None

**Duration: 1 hour**



|                       |  |                      |  |
|-----------------------|--|----------------------|--|
| Candidate<br>forename |  | Candidate<br>surname |  |
|-----------------------|--|----------------------|--|

|               |  |  |  |  |  |                  |  |  |  |  |
|---------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre number |  |  |  |  |  | Candidate number |  |  |  |  |
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- 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 bar codes.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- 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.

1 Engineering sectors produce different products.

(a) Name **three** engineering sectors and, for each one, give **one** example of a product made in the sector.

Sector .....

Product .....

Sector .....

Product .....

Sector .....

Product .....

[6]

(b) Choose **one** of the products you have given in part (a) and describe how modern technology is used in its manufacture.

Product .....

.....

.....

..... [2]

2 The list below shows different types of engineering materials.

**Alloy**  
**Ceramic**  
**Composite**

**Ferrous metal**  
**Non-ferrous metal**  
**Polymer**

(a) Complete the table by giving one example of each type of engineering material. One has been done for you.

| Type of engineering material | Example |
|------------------------------|---------|
| Alloy                        | Bronze  |
| Ceramic                      |         |
| Composite                    |         |
| Ferrous metal                |         |
| Non-ferrous metal            |         |
| Polymer                      |         |

[5]

(b) Place a tick (✓) in one of the boxes below to show the type of engineering material most suitable for injection moulding.

Alloy       Ceramic       Polymer       Composite

[1]

3 Different types of engineering components are listed below.

- Mechanical**
- Electrical/electronic**
- Pneumatic/hydraulic**

(a) Complete the table by giving examples of each type of engineering component. One example has been done for you.

| Type of engineering component | Example 1    | Example 2 |
|-------------------------------|--------------|-----------|
| <b>Mechanical</b>             | <i>Gears</i> |           |
| <b>Electrical/electronic</b>  |              |           |
| <b>Pneumatic/hydraulic</b>    |              |           |

[5]

(b) Explain why manufacturers of engineered products often use 'bought-in' standard components.

.....

.....

.....

.....

.....

.....

.....

..... [3]

4 Fig. 1 shows an aluminium alloy crank on a bicycle.

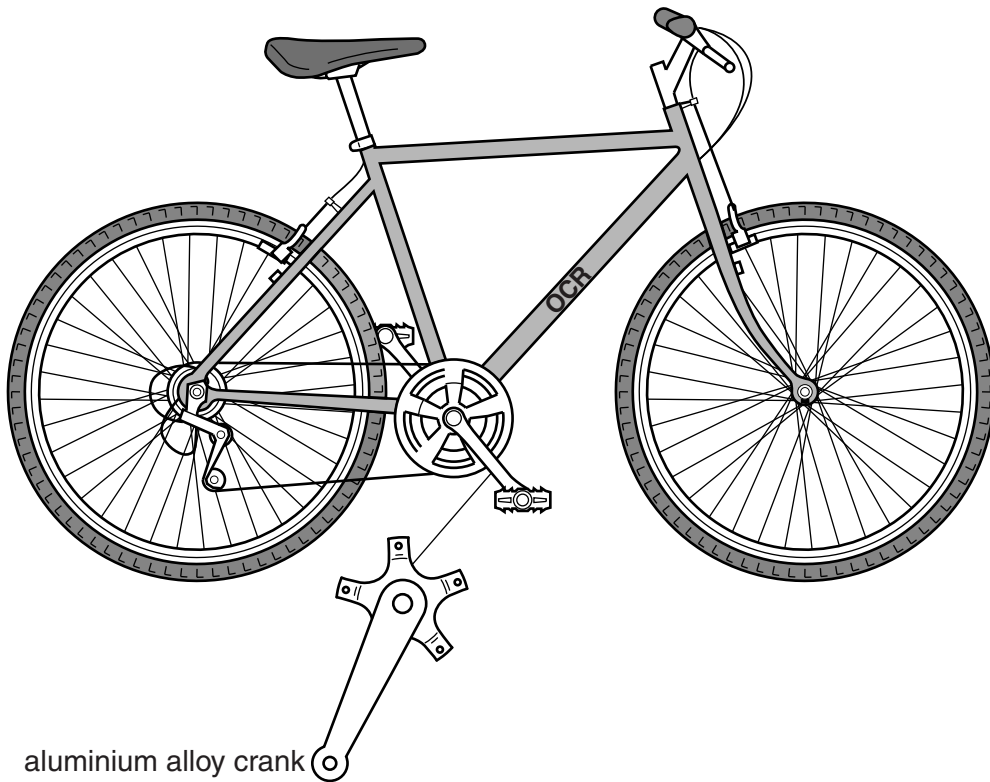


Fig. 1

(a) (i) Give **two** reasons why aluminium alloy is a suitable material for the crank shown in Fig. 1.

1 .....

2 .....

[2]

(ii) Describe **one** engineering process that could be used to make the crank in large quantities.

.....

.....

.....

.....

.....

.....

[3]

(b) Describe **one** safety precaution that should be taken when carrying out a heat and/or chemical treatment process.

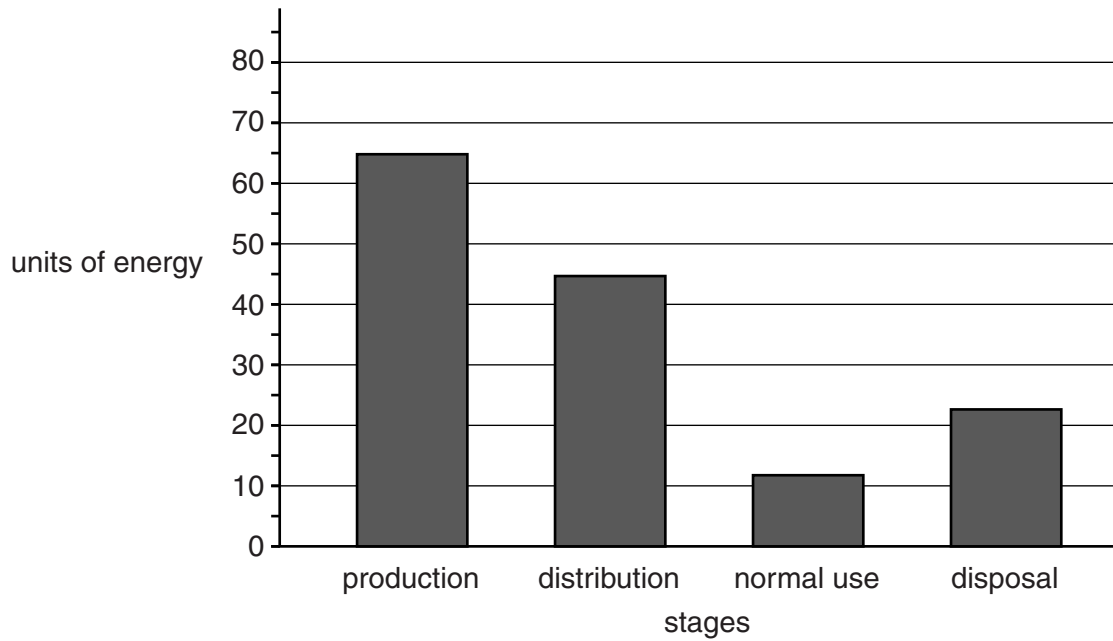
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..... [2]

5 The chart below shows the energy used at stages in the life of an engineered product.



(a) State which stage uses the least energy.

..... [1]

(b) Give **two** possible reasons why production of the product uses so much energy.

1 .....

.....

2 .....

.....

[4]

(c) Describe how energy is used in the disposal of an engineered product.

.....

.....

.....

.....

.....

..... [3]

- 6 (a) Complete the table below by giving examples of each type of engineering process. One example has been done for you.

| Type of engineering process | Example 1 | Example 2 |
|-----------------------------|-----------|-----------|
| Material removal            | Drilling  |           |
| Shaping and manipulation    |           |           |
| Joining and assembly        |           |           |
| Surface finishing           |           |           |

[7]

- (b) Choose **one** of the examples from part (a) and give **two** safety precautions, other than PPE (Personal Protective Equipment), that must be taken.

Example chosen .....

Safety precautions:

1 .....

2 .....

[2]



- 7 (a) (i) One example of modern technology is the use of PLCs in the manufacture of engineered products.

State what the letters PLC stand for.

**P** ..... **L** ..... **C** ..... [1]

- (ii) Describe, giving **one** example, how a PLC might be used in the manufacture of an engineered product.

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

- (b) Describe **two** uses of information, communications and digital technologies in 'material supply and control'.

1 .....  
.....  
.....  
.....

2 .....  
.....  
.....  
.....

[4]



11  
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