



Oxford Cambridge and RSA

**Monday 5 June 2017 – 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 forename		Candidate surname	
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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 barcodes.

**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 A list of engineering sectors is given below.

Aerospace	Electrical and Electronics
Automotive	Medical and Pharmaceutical
Chemical and Process	Rail and Marine
Computers, Communication and IT	Structural and Civil

(a) Choose **two** sectors from the list and give **two** examples of products made in each sector.

Sector .....

Product 1 .....

Product 2 .....

[2]

Sector .....

Product 1 .....

Product 2 .....

[2]

(b) Describe **one** modern technology used in the manufacture of engineered products.

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

[2]

2 The list below gives different types of engineering materials.

**Alloys**  
**Composites**  
**Ferrous metals**  
**Non-ferrous metals**  
**Polymers**

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

Material type	Example
Alloy	Brass
Ferrous metal	
Non-ferrous metal	
Polymer	

[3]

**(b)** Describe, using **one** example, what is meant by the term 'composite material'.

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[3]

(c) Explain the importance to the environment of recycling the materials used in engineered products.

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[3]

3 A list of engineering processes is given below.

Boring	Injection moulding
Brazing	Milling
Casting	Sawing
Drilling	Soldering
Extrusion	Turning
Forging	Welding

(a) (i) Give **three** engineering processes from the list that are used in material removal.

1 .....

2 .....

3 .....

[3]

(ii) Give **two** engineering processes from the list that are used in shaping and manipulation.

1 .....

2 .....

[2]

(iii) Give **two** engineering processes from the list that are used in joining and assembly.

1 .....

2 .....

[2]

(b) Describe **one** way that modern technologies have been used to make engineering processes safer for workers.

.....

.....

.....

.....

[2]

4 A number of mechanical components are listed below.

**Bolt**  
**Circlip**  
**Grub screw**  
**Nut**  
**Pop rivet**  
**Self-tapping screw**  
**Split pin**  
**Wing nut**

(a) (i) Give **two** components from the list that could be used for joining thin sheet metal parts.

1 .....

2 .....

[2]

(ii) Choose **one** of the components you have given in part (i) and describe how it would be used to join two pieces of thin sheet metal.

Component .....

Description .....

.....

.....

.....

.....

[3]

(b) Name **one** pneumatic/hydraulic component.

..... [1]

5 Fig. 1 below shows a chart of the energy used at different stages in the life cycle of two engineered products.

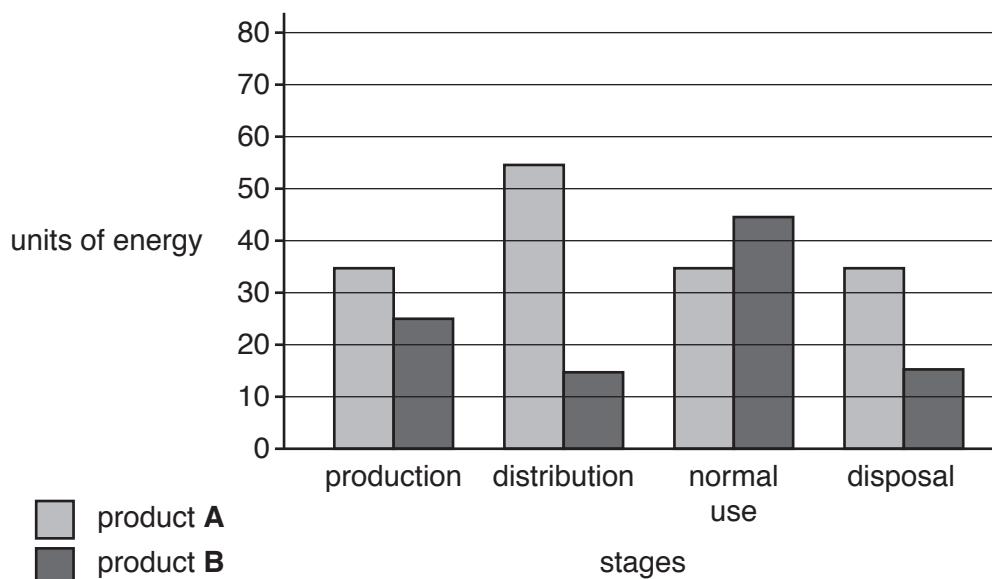


Fig. 1

(a) State which product uses the most energy overall.

..... [1]

(b) Give **two** possible reasons why product B uses much less energy than product A in the distribution stage.

1 .....

.....

[2]

2 .....

.....

[2]

(c) Explain the benefits to the environment of using renewable energy sources.

.....

.....

.....

.....

[3]

6 Fig. 2 shows a link from a simple mechanism. The link is made from 2 mm thick mild steel.

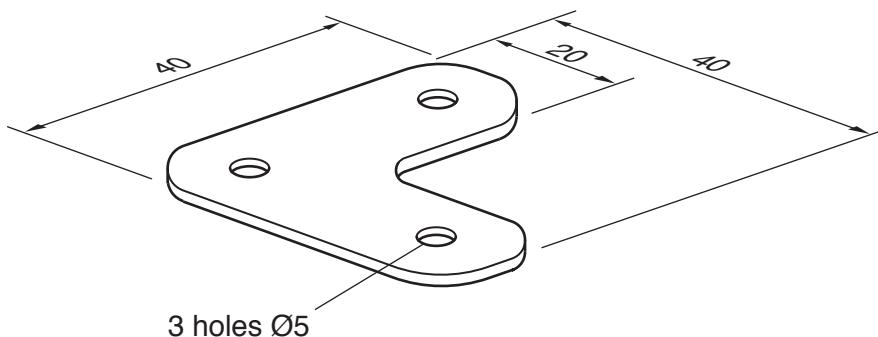


Fig. 2

(a) Give **three** engineering processes that could be used to produce the link in large quantities.

1 .....

2 .....

3 .....

[3]

(b) A surface finish needs to be applied to the link to prevent rusting.

(i) Give **two** surface finishes that would be suitable for the link.

1 .....

2 .....

[2]

(ii) Describe **one** safety precaution that should be taken when carrying out surface finishing processes.

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

[2]

7 Computers are widely used in modern engineering companies.

(a) Describe **two** uses of Computer Aided Design (CAD) software in the design stage of manufacturing new engineered products.

1 .....

.....

2 .....

.....

[4]

(b) Describe **two** benefits to a manufacturer of using computer controlled machines.

1 .....

.....

2 .....

.....

[4]

(c) State what the letters **CIE** stand for.

C ..... I ..... E ..... [1]

**8\*** Discuss the impact on the environment of the manufacture of engineered products.

END OF QUESTION PAPER

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