OCR
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	

Centre number						Candidate number				

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.

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.....

..... **[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 .....

.....

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.....

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..... **[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.

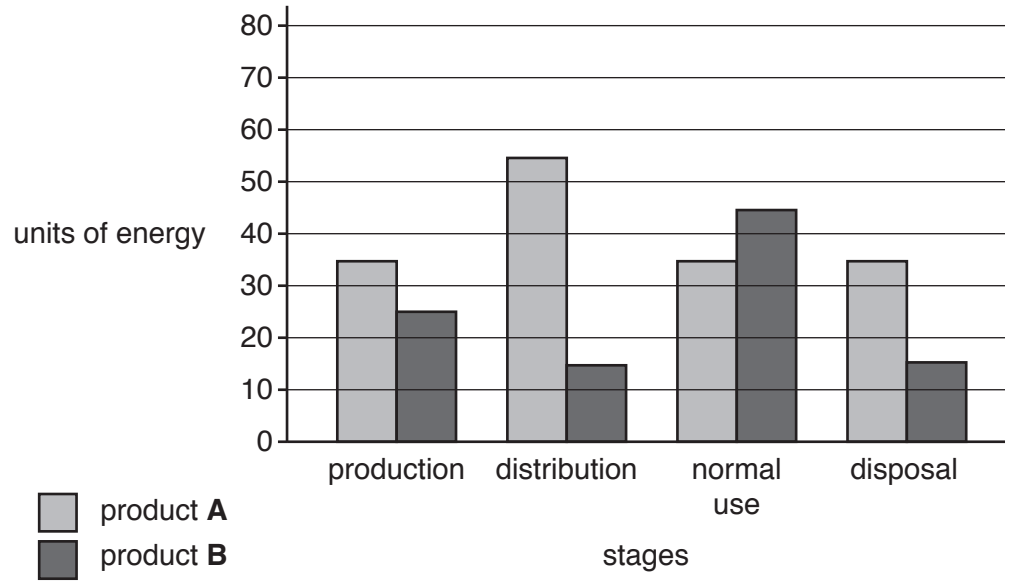

Fig. 1

(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.

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

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

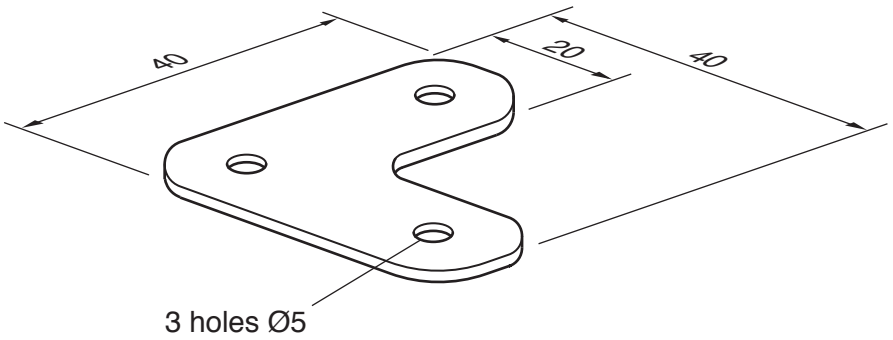

Fig. 2

(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.

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..... **[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 .....

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2 .....

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[4]

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

1 .....

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2 .....

.....

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[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.

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..... **[6]**

END OF QUESTION PAPER

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