OCR
Oxford Cambridge and RSA

Tuesday 24 May 2016 – Morning

GCSE ENGINEERING

A622/02 Engineering Processes

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 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 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) Complete the table by stating which engineering sector makes the products given.

Product	Engineering sector
Paint	
Wheelchair	
Microwave oven	
Disc brake	
Mobile phone	

[5]

(b) Choose **one** of the sectors you have given in part **(a)** and give **two** other products made in that sector.

Sector .....

Product 1 .....

Product 2 .....

[2]

2 Fig. 1 shows a clamping plate made in a school workshop from 5 mm thick mild steel.

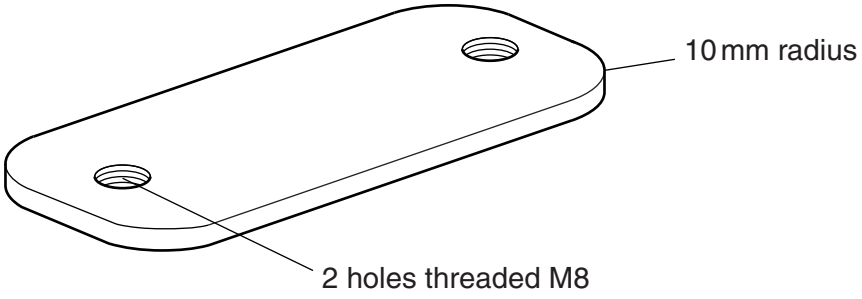

Fig. 1

(a) (i) Complete the list below to give the stages needed to make the clamping plate shown in Fig. 1.

Stage 1 Cut the steel and file it to size

Stage 2 .....

Stage 3 Cut and file the curves on the corners of the plate

Stage 4 .....

Stage 5 Cut the M8 threads in the holes

Stage 6 .....

[3]

(ii) Name **two** tools needed to cut the M8 threads in the holes.

1 .....

2 .....

[2]

(b) The clamping plate shown in Fig. 1 is to be made in large quantities.

Name **two** industrial processes which could be used to cut the shape of the clamping plate.

1 .....

2 .....

[2]

3 The list below shows a number of engineering materials.

ABS	**Glass**
Aluminium	**GRP**
Bronze	**High speed steel**
Cast iron	**Nylon**
Concrete	**Tungsten carbide**

(a) Select a suitable material from the list to complete the following statements:

(i) ..... is a ferrous metal. **[1]**

(ii) ..... is a polymer. **[1]**

(iii) ..... is an alloy. **[1]**

(iv) ..... is a ceramic. **[1]**

(v) ..... is a composite. **[1]**

(b) Explain, using **one** example, what is meant by the term 'non-ferrous alloy'.

.....

.....

.....

.....

.....

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

4 Drilling is a material removal process.

(a) (i) Name **one** item of Personal Protective Equipment (PPE) that should be used when operating a drilling machine.

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

(ii) Give **two** safety precautions, other than PPE, that should be taken when operating a drilling machine.

1 .....

2 .....
[2]

(b) Welding is a joining and assembly process.

(i) Name **three** other joining and assembly processes.

1 .....

2 .....

3 .....
[3]

(ii) Choose **one** of the processes you have given in part **(b)(i)** and name **two** tools or items of equipment used in the process.

Process .....

Tools / items of equipment

1 .....

2 .....
[2]

(c) Many engineering processes are carried out on CNC machines.

State what the letters CNC stand for.

C ..... **N** ..... **C** ..... **[1]**

5 The list below gives some stages in the design of an engineered product.

Client brief
Modifying designs
Prototyping
Research

(a) Describe what takes place in any **two** of these stages.

1 Name of design stage .....

Description .....

.....

.....

..... **[2]**

2 Name of design stage .....

Description .....

.....

.....

..... **[2]**

(b) Explain how information, communications and digital technologies can be used when designing engineered products.

.....

.....

.....

.....

.....

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

6 A list of different types of engineering components is given below.

Mechanical
Electrical/electronic
Pneumatic/hydraulic

(a) Name **one** mechanical component and describe **one** example of its use.

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

Example of use .....

.....

.....

..... **[2]**

(b) Name **one** electrical/electronic component and describe **one** example of its use.

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

Example of use .....

.....

.....

..... **[2]**

(c) Name **one** pneumatic/hydraulic component and describe **one** example of its use.

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

Example of use .....

.....

.....

..... **[2]**

7 'Sampling' is a technique used in quality control.

(a) Explain how sampling is carried out in quality control.

.....

.....

.....

.....

.....

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

(b) Describe **two** possible effects of not carrying out quality control.

1 .....

.....

.....

..... **[2]**

2 .....

.....

.....

..... **[2]**

8* Discuss the possible benefits to the environment of using modern technologies.

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

END OF QUESTION PAPER

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