

<b>Candidate forename</b>						<b>Candidate surname</b>					
<b>Centre number</b>						<b>Candidate number</b>					

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**  
**GCSE**  
**A622/02**  
**ENGINEERING**  
**Engineering Processes**

**MONDAY 14 MAY 2012: Afternoon**  
**DURATION: 1 hour**  
**plus your additional time allowance**  
**MODIFIED ENLARGED**

**Candidates answer on the Question Paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**None**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes on the first page. 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).

## **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 (\*).

**1 Engineering sectors produce different products.**

**(a) Complete the links below to identify which engineering sector makes the products listed.**

<b>ENGINEERING SECTOR</b>		<b>PRODUCT</b>	
Medical and Pharmaceutical	—	Flood barrier	—
Computers Communications and IT	—	Paint stripper	—
Structural and Civil	—	Inhaler	—
Chemical and Process	—	Webcam	—

**[4]**

**(b) State TWO engineering sectors different to those shown above.**

**Name ONE product made in each sector.**

**Sector 1** \_\_\_\_\_ **[1]**

**Product** \_\_\_\_\_ **[1]**

**Sector 2** \_\_\_\_\_ **[1]**

**Product** \_\_\_\_\_ **[1]**

**2 (a) Tick (✓) TWO items of personal protective equipment (PPE) that should be used when using a soldering iron.**

☐

**overalls/apron**

☐

**hard hat**

☐

**high visibility jacket**

☐

**safety goggles**

**[2]**

**(b) Describe TWO safety precautions, other than PPE, that should be taken when using a soldering iron.**

**1**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**[2]**

**2**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**[2]**

**(c) Give TWO checks that would be carried out during manufacture to ensure that engineered components meet the specified tolerance.**

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

**2** \_\_\_\_\_  
\_\_\_\_\_ **[1]**

**3 The list below shows a number of engineering materials.**

**PHOSPHOR BRONZE  
COPPER  
ABS  
GLASS  
CONCRETE**

**(a) Select a suitable material from the list to complete the following statements correctly.**

**(i) \_\_\_\_\_  
is an alloy [1]**

**(ii) \_\_\_\_\_  
is a polymer [1]**

**(iii) \_\_\_\_\_  
is a non-ferrous metal [1]**

**(iv) \_\_\_\_\_  
is a composite [1]**

**(b) Explain the meaning of the term ‘alloy.’**

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

**(c) Explain the meaning of the term 'composite'.**

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**[2]**

**4 (a) Name ONE stage in the manufacture of an engineered product.**

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

**(b) Describe ONE quality control technique used in engineering.**

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

**(c) Give TWO factors that should be considered when selecting finishing processes for an engineered product.**

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

**2** \_\_\_\_\_  
\_\_\_\_\_ [1]

**(d) Give TWO benefits to a company when health and safety procedures are followed.**

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

**2** \_\_\_\_\_  
\_\_\_\_\_ [1]



- 5 (a) Complete the table below by giving an example of each of the engineering processes listed.

ENGINEERING PROCESS	EXAMPLE OF ENGINEERING PROCESS
Joining	_____ [1]
Assembling	_____ [1]
Heat treatment	_____ [1]
Chemical treatment	_____ [1]

- (b) (i) Describe, using an example, ONE benefit of using 'modern materials' in engineering products.

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

- (ii) Describe, using an example, one benefit of using 'smart materials' in engineered products.

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

**6 Explain the function of any THREE of the engineering components listed below.  
Give ONE example of the use of each component.**

- a. CHAIN DRIVE**
- b. COLD RIVET**
- c. FLOW CONTROL VALVE**
- d. LIGHT EMITTING DIODE (LED)**
- e. POTENTIOMETER**
- f. TRANSISTOR**

**(i) Component 1** \_\_\_\_\_

**Function** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

**Example of use** \_\_\_\_\_

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

**(ii) Component 2** \_\_\_\_\_

**Function** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

**Example of use** \_\_\_\_\_

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

**(iii) Component 3** \_\_\_\_\_

**Function** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

**Example of use** \_\_\_\_\_

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

- 7 The table below shows a comparison of six materials that could be used to make an engineered product.

Material	FACTORS TO BE CONSIDERED				
	Ease of storage	Safe to use	Ease of handling	Value for money	Availability
A	2	8	7	3	5
B	3	4	8	9	7
C	2	4	1	6	3
D	3	9	6	5	6
E	7	2	1	3	6
F	2	5	4	6	3

10 = EXCELLENT and 1 = VERY POOR

- (a) State which material is the best value for money

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

- (b) Give TWO reasons why material C would be least suited for the manufacture of a prototype product.

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

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

**(c) Explain how the information in the table could be used to identify the best material to buy in bulk.**

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**[3]**

**8\* Discuss the impact of the introduction of modern technology on the quality of engineered products.**

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[6]

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