| Candidate forename | | Candidate surname | |
|---|---|---|---|

| Centre number | | | | | | Candidate number | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

# OXFORD CAMBRIDGE AND RSA EXAMINATIONS
## GENERAL CERTIFICATE OF SECONDARY EDUCATION

# A622

# ENGINEERING

## Engineering Processes

**MONDAY 16 MAY 2011: Afternoon**
**DURATION: 1 hour**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**Candidates answer on the question paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**None**

**READ INSTRUCTIONS OVERLEAF**

DC (CW) 11MEP06250 47097/1

## 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. Pencil may be used for graphs and diagrams only.**
- **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).**
- **Answer ALL the questions.**

## 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 is 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.**

| ENGINEERING SECTOR | PRODUCT |
|---|---|
| Medical and Pharmaceutical | Football stadium |
| Computers Communications and IT | Non-drip paint |
| Structural and Civil | Blister packs |
| Chemical and Process | Portable data storage |

**[4]**

**(b) State TWO engineering sectors different to those shown above.**
**Name ONE product made in each sector.**

**1 Sector** _____ **[1]**

**Product** _____ **[1]**

**2 Sector** _____ **[1]**

**Product** _____ **[1]**

**2 (a) Tick (✓) TWO items of personal protective equipment (PPE) that you should use when operating a grinding machine.**

- ☐ darkened glass face mask
- ☐ hard hat
- ☐ overalls
- ☐ safety visor

**[2]**

**(b) Describe TWO safety 'precautions' other than 'PPE' that you should take when operating a grinding machine.**

**1** _____

_____

_____

_____

_____ **[2]**

**2** _____

_____

_____

_____

_____ **[2]**

**(c) It is important to ensure that a finished product meets the design specification.**

**Give TWO checks that would be made on a finished product to ensure that it meets the design specification.**

**1** _____

_____ **[1]**

**2** _____

_____ **[1]**

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

**BRASS**
**GLASS**
**MEDIUM CARBON STEEL**
**DURALUMIN**
**MDF**
**PVC**

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

**(i)** _____
**is an alloy** **[1]**

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

**(iii)** _____
**is a ferrous material** **[1]**

**(iv)** _____
**is a non-ferrous material** **[1]**

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

**(b) State what is meant by the term 'ferrous.'**

_____

_____ **[1]**

**(c) Name TWO ferrous metals, other than the one named in part (a), that are commonly used in the engineering industry.**

**1** _____ **[1]**

**2** _____ **[1]**

**4 Robotic technology is increasingly being used by engineering industries.**

**(a) Give ONE example of an engineered product that is produced using robots.**

_____ **[1]**

**(b) Describe ONE way in which robots may be used when making an engineered product.**

_____

_____

_____

_____

_____ **[2]**

**(c) Give TWO benefits to an engineering company of using robotics when making an engineered product.**

**1** _____

_____ **[1]**

**2** _____

_____ **[1]**

**(d) Give TWO disadvantages to an engineering company of using robotics when making an engineered product.**

**1** _____

_____ **[1]**

**2** _____

_____ **[1]**

**5 (a) Complete the table below by giving TWO examples of each of the engineering processes listed.**

| ENGINEERING PROCESS | EXAMPLE OF ENGINEERING PROCESSES |
|---|---|
| **Shaping and Manipulation** | _____ **[1]**<br>_____ **[1]** |
| **Surface finishing** | _____ **[1]**<br>_____ **[1]** |

**(b) Describe TWO benefits of using information, communication and digital technologies in the supply of engineering components.**

**1** _____

_____

_____

_____

_____ **[2]**

**2** _____

_____

_____

_____

_____ **[2]**

**6 Explain, using sketches and/or notes, the function of any THREE of the engineering components listed below.**
**Give ONE example of each component chosen.**

**FILTER**
**POP RIVET**
**SINGLE ACTING CYLINDER**
**LIGHT DEPENDENT RESISTOR (LDR)**
**POTENTIOMETER**
**SPRING**

**(i) Component 1** _____

**Function** _____

_____

_____

_____

_____ **[2]**

**Example** _____

_____ **[1]**

(ii) **Component 2**_____

**Function**_____

_____

_____

_____

_____ **[2]**

**Example**_____

_____ **[1]**

(iii) **Component 3**_____

**Function**_____

_____

_____

_____

_____ **[2]**

**Example**_____

_____ **[1]**

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

| | FACTORS TO BE CONSIDERED | | | | |
|---|---|---|---|---|---|
| **MATERIAL** | **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 safest to use.**

_____ **[1]**

**(b) Give TWO reasons why material B would be best 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 for the WORKFORCE to use.**

_____

_____

_____

_____

_____

_____

_____ **[3]**

**8* Discuss the impact of modern technology on the range of engineered products available.**

[6]