OCR
RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION

ENGINEERING

A622

Engineering Processes

OCE/27526

Candidates answer on the question paper.

OCR supplied materials:
None

Other materials required:
None

Monday 24 January 2011
Morning

Duration: 1 hour

A622

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. 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.
- 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 is assessed in questions marked with an asterisk (*****).
- This document consists of **12** pages. Any blank pages are indicated.

1 Engineering sectors produce different products.

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

Engineering Sector	Product
Rail and Marine	Carbon fibre brake pads
Automotive	Jet engine turbine blade
Electrical and Electronics	Washer dryer
Aerospace	Automatic signalling system

[4]

(b) Complete the table below to show **three** different engineering sectors to those shown above. For each sector, identify a product produced in that sector.

Engineering Sector	Product

[2]

[2]

[2]

2 **(a)** Tick (✓) **two** items of personal protective equipment (PPE) that you should use when operating an electric arc welding machine.

- ☐ darkened glass face mask
- ☐ leather apron
- ☐ PVC gloves
- ☐ safety helmet

[2]

(b) Describe **two** safety precautions, other than PPE, that you should take when operating an electric arc welding machine.

1 .....

.....

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

2 .....

.....

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

(c) Describe **one** test that could be carried out to check the quality of a welded joint.

.....

.....

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

3 The list below shows a number of engineering materials.

aluminium
bronze
cast iron
PTFE (Teflon)
teak
tungsten carbide

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

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

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

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

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

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

(b) Describe what is meant by the term 'composite material.'

.....

.....

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

(c) Name **two** composite materials that are commonly used in the engineering industry.

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

2 ..... **[1]**

4 **(a)** Describe how information, communication and digital technologies can be used during the following stages of the manufacture of an engineered product.

(i) Design .....

.....

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

(ii) Material supply and control .....

.....

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

(iii) Packaging and Dispatch .....

.....

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

5 **(a)** Systems and control technology is commonly used in engineering.

Describe, using **one** example, how systems and control technology is used in a joining and assembly process.

.....

.....

.....

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

(b) Describe **two** ways in which an engineering company can save money by using systems and control technology.

1 .....

.....

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

2 .....

.....

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

6 Explain, using sketches and/or notes, the function of any **three** of the engineering components listed below:

flow control valve	**gear train**
light emitting diode	**reservoir**
resistor	**split pin**

Component 1 .....

Function .....

.....

.....

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

Component 2 .....

Function .....

.....

.....

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

Component 3 .....

Function .....

.....

.....

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

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**	**Machinability**	**Ease of handling**	**Value for money**	**Availability**
A	2	4	1	6	3
B	3	2	5	4	6
C	2	9	7	3	8
D	8	4	9	7	7
E	6	2	1	3	4
F	6	5	4	8	3

10 = excellent and 1 = very poor

(a) (i) State which material would be the best choice for use in a milling operation.

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

(ii) Give **two** reasons for your choice of material.

1 .....

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

2 .....

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

(b) Explain why material **D** would be the most suitable material for a small engineering company employing only one production engineer.

.....

.....

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

(c) When selecting materials for engineered products, factors other than those listed in the table would need to be considered.

State **one** other factor that would need to be considered when selecting materials, and explain why this factor is important.

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

.....

.....

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

8* Discuss the impact of modern technology on working conditions in the engineering industry.

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

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