OCR
Oxford Cambridge and RSA

Thursday 12 January 2017 – Afternoon

LEVEL 1/2 CAMBRIDGE NATIONAL IN ENGINEERING MANUFACTURE

R109/01 Engineering materials, processes and production

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
None

Duration: 1 hour

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* 5 1 9 9 5 4 8 8 5 5 *

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Use black ink. HB pencil may be used for graphs and diagrams only.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- 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 total number of marks for this paper is **60**.
- The number of marks for each question is given in brackets **[ ]** at the end of each question or part question.
- Dimensions are in millimetres unless stated otherwise.
- Your quality of written communication will be assessed in questions marked with an asterisk (*****).
- This document consists of **8** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Non-ferrous metals are widely used in engineering manufacture.

(a) Complete the table below by placing a tick (✓) to show whether the non-ferrous metal given is a pure metal or an alloy.
The first one has been done for you.

Non-ferrous metal	Pure metal	Alloy
Aluminium	✓	
Brass		
Bronze		
Copper		
Lead		
Tin		
Titanium		

[6]

(b) Give **two** reasons why a non-ferrous metal might be used for making a product rather than a ferrous metal.

1 .....

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2 .....

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[4]

2 Malleability is one important property of engineering materials.

(a) **(i)** Explain what is meant by 'malleability'.

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

(ii) Give **three** other properties of engineering materials.

1 .....

2 .....

3 .....

[3]

(b) New materials, such as composites and advanced metal alloys, are constantly being developed.

(i) Give **two** examples of composite materials.

1 .....

2 .....

[2]

(ii) Explain the advantages of metal alloys compared with pure metals.

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

3 **(a)** The table below shows a number of threaded components.

Complete the table by giving the correct name for each of the components shown.

Component	Name
	
	
	
	
	

[5]

(b) Fig. 1 shows a special fixing component with internal and external threads.

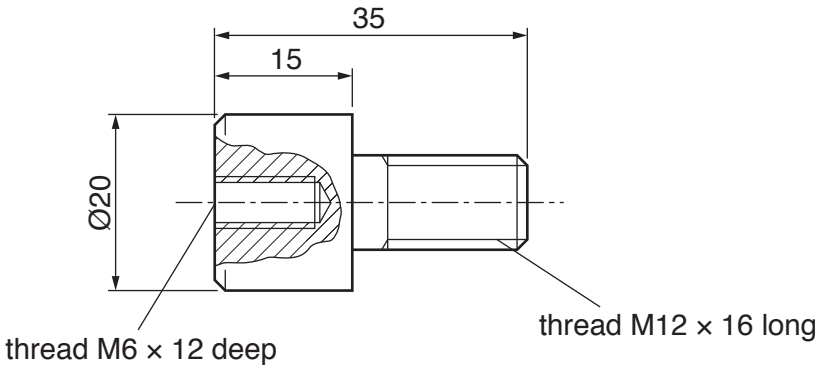

Fig. 1

(i) Name **three** tools needed to cut the M6 internal thread.

1 .....

2 .....

3 .....

[3]

(ii) Give **two** methods that could be used to cut the M12 external thread.

1 .....

2 .....

[2]

4 Grinding is a machine process used for material removal.

(a) (i) Name **three** other machine processes used for material removal.

1 .....

2 .....

3 .....

[3]

(ii) Give **three** safety precautions that should be taken when carrying out machine processes for material removal.

1 .....

2 .....

3 .....

[3]

(b) Plastics moulding processes are widely used in engineering manufacture.

(i) Place a tick (✓) to show which process should be used for moulding thermosetting plastics.

Vacuum forming	Blow moulding	Compression moulding	Line bending

[1]

(ii) Explain why thermoplastics are more commonly used for making products than thermosetting plastics.

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

5 Computer Numerical Control (CNC) is widely used in engineering manufacture.

(a) Describe what is meant by the term 'CNC machining centre'.

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

(b) Describe the operation of a CNC press brake machine.

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

(c)* Discuss the impact of CNC machining on engineering production.

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

6 **(a)** Give **three** cost issues that a manufacturer should consider before introducing modern technologies into production.

1 .....

2 .....

3 .....

[3]

(b) Explain the impact of modern technologies on working conditions in manufacturing factories.

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

(c) Describe **two** ways that digital communications might be used in global manufacturing.

1 .....

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2 .....

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[4]

END OF QUESTION PAPER