

**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

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**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.

2

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 .....

.....

.....

2 .....

.....

.....

[4]

2 Malleability is one important property of engineering materials.

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

.....  
.....  
.....  
..... [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.

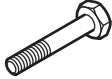




1 .....  
2 ..... [2]

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

.....  
.....  
.....  
.....  
..... [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.

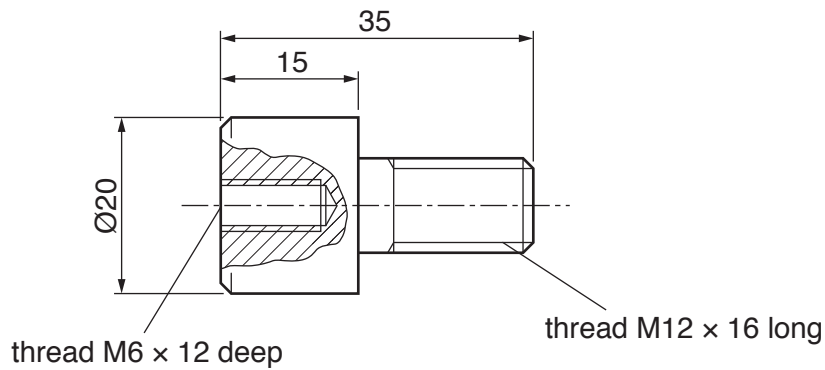


Fig. 1

(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.

.....

.....

.....

.....

.....

..... [3]

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

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

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

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

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



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.

.....

.....

.....

.....

.....

..... [3]

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

1 .....

.....

.....

.....

2 .....

.....

..... [4]

**END OF QUESTION PAPER**



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