

OCR

Oxford Cambridge and RSA

Wednesday 23 May 2018 – Morning**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 **12** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Many different materials are used in the manufacture of engineered products.

(a) (i) Give **three** examples of non-ferrous metals.

- 1
- 2
- 3 [3]

(ii) Describe what is meant by the term 'alloy'.

-
-
-
- [2]

(b) (i) Describe the main difference between thermoplastics and thermosetting plastics.

-
-
-
- [2]

(ii) Name **three** thermoplastics.

- 1
- 2
- 3 [3]

3

- 2 (a) Complete the table below by giving **one** typical use for each of the materials given.

One has been done for you.

Material	Typical use
Tungsten carbide	Cutting tool tips
Stainless steel	
Carbon fibre	
Cast iron	

[3]

- (b) Explain why sustainability is an important characteristic of engineering materials.

.....

.....

.....

..... [2]

- (c) Three types of smart materials are listed below.

Shape memory alloy (SMA)

Thermochromic materials

Quantum tunnelling composite (QTC)

Choose **one** type of smart material from the list and describe its use in a product.

.....

.....

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.....

.....

..... [3]

- (d) Describe **one** simple workshop test that could be used to test the hardness of a metal.

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.....

.....

..... [2]

3 Fig. 1 shows an aluminium alloy angle section made by the extrusion process.

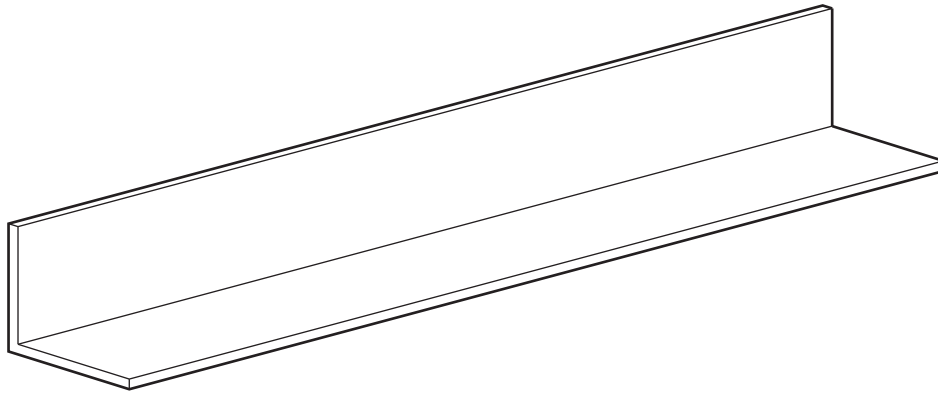


Fig. 1

(a) Describe how the extrusion process would be used to produce the aluminium alloy angle section.

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

(b) Extrusion is a forming process.

(i) Name **two** other forming processes for metal.

1
2 [2]

(ii) Describe **two** benefits of using forming processes in engineering production.

1

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2

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[4]

(c) The ends of the angle section are to be modified as shown in Fig. 2.

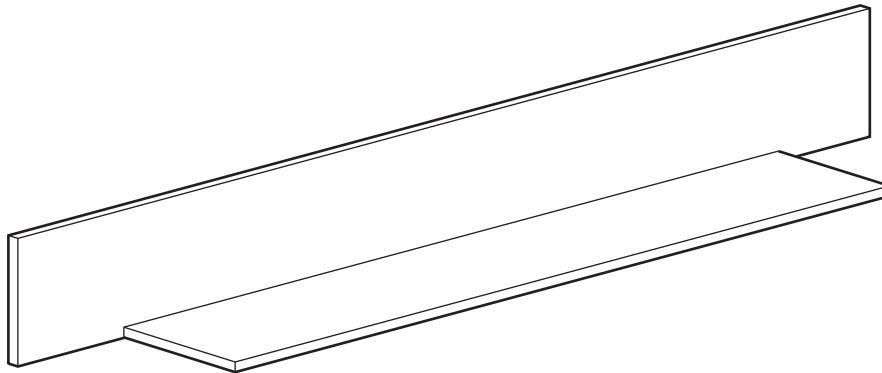


Fig. 2

Give **one** process that could be used to modify the ends of the angle section.

..... [1]

4 Heat treatment processes are used to modify the properties of engineering materials.

(a) (i) Name the heat treatment process that would be used to soften brass before bending and describe how it would be carried out.

Process [1]

Description

.....

.....

..... [2]

(ii) Name **three** other heat treatment processes.

1

2

3

[3]

(iii) Give **three** safety precautions needed when carrying out heat treatment processes.

1

2

3

[3]

(b) Name **one** surface finishing process suitable for use on brass.

..... [1]

(b) Email is one example of digital communication.

(i) Give **two** other examples of digital communication.

1

2

[2]

(ii) Describe how email might be used in material supply and control.

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..... [2]

END OF QUESTION PAPER

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