

Wednesday 14 January 2015 – Afternoon

**LEVEL 1/2 CAMBRIDGE NATIONAL AWARD/CERTIFICATE IN
ENGINEERING MANUFACTURE**

R109: 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.
- Do **not** write in the bar codes.

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 the question or part question.
- Dimensions are in millimetres unless stated otherwise.
- This document consists of **12** pages. Any blank pages are indicated.
- Your quality of written communication will be assessed in questions marked with an asterisk (*).

Answer **all** questions.

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

(a) (i) Name **two** commonly used ferrous metals.

1

2 [2]

(ii) Explain, giving **one** example, what is meant by the term 'non-ferrous alloy'.

.....

.....

.....

..... [3]

(b) Name **three** thermoplastic materials.

1

2

3 [3]

(c) Give **two** reasons why saucepan handles are usually made from a thermosetting plastic material.

Reason 1

.....

Reason 2

..... [2]

2 (a) Give **two** properties of copper that make it suitable for making electric cables.

1

2 [2]

(b) Explain why availability is an important characteristic of a material used in the large scale manufacture of engineered products.

.....

..... [2]

(c) Give **one** example of a use of the following materials.

Cast iron

Acrylonitrile-Butadiene-Styrene (ABS)

High speed steel [3]

(d) Describe, using **one** example, the use of a non-destructive testing (NDT) procedure.

.....

.....

.....

..... [3]

- 3 Fig. 1 shows an adjustable end-stop assembly for a mechanical saw. The two parts of the assembly are made from mild steel.

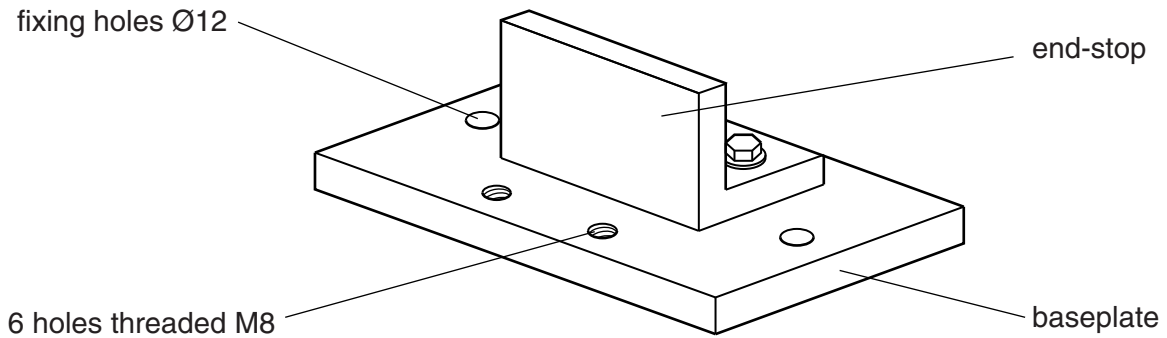


Fig. 1

- (a) Give **two** reasons why mild steel is a suitable material for the end-stop assembly shown in Fig. 1.

Reason 1

Reason 2

[2]

- (b) (i) Complete the table below to give the stages needed to produce one of the M8 threaded holes in the baseplate. Give **one** tool or item of equipment needed at each stage. Three stages have been done for you as examples.

	Stage	Tool or item of equipment
1	Measure and mark position of hole	Scriber
2		
3	Drill hole ready for threading	Drilling machine
4		
5	Remove burrs and sharp edges	File

[4]

- (ii) Place a tick (✓) to show what size hole should be drilled before producing the thread.

8.0 mm	7.6 mm	6.8 mm	6.0 mm

[1]

(c) Explain why the end-stop shown in Fig. 1 might be case hardened before use.

.....

.....

.....

..... [3]

Question 4 begins on page 6

4 Fig. 2 shows a centre lathe.

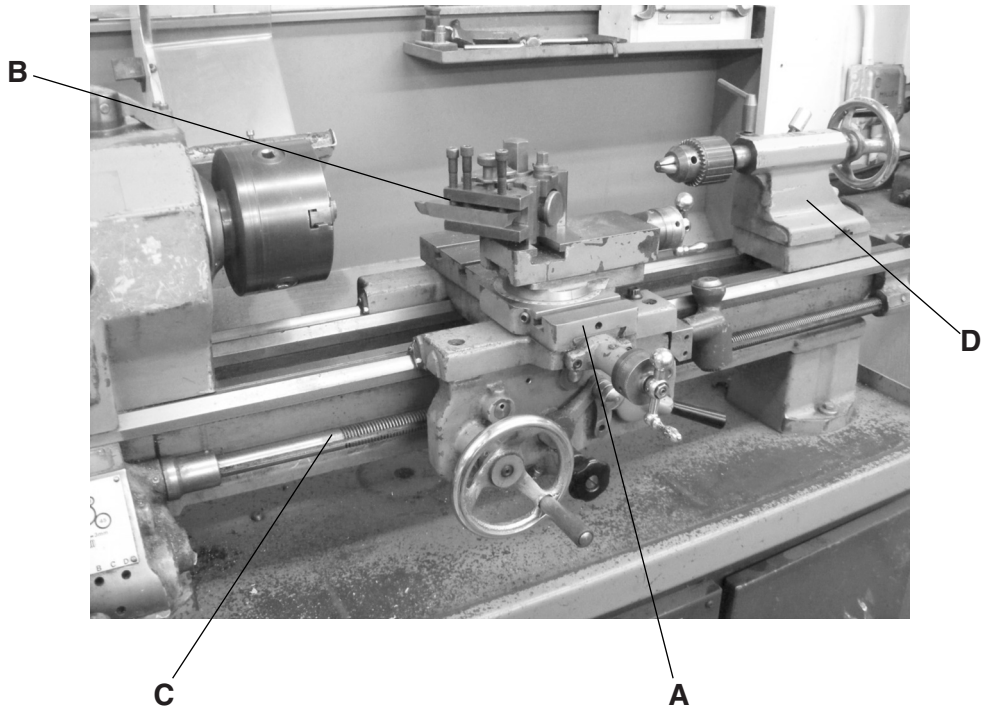


Fig. 2

(a) (i) Name the **four** parts of the centre lathe that have been labelled in Fig. 2.

- A
- B
- C
- D

[4]

(ii) Name the specific process carried out by the tool below.

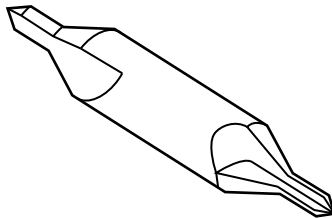


Fig. 3

..... [1]

(iii) Give **three** safety precautions, other than using Personal Protective Equipment (PPE), that should be taken when operating a centre lathe.

1

2

3

[3]

(b) Give **two** factors that should be considered when setting the spindle (chuck) speed of a centre lathe.

1

2

[2]

Question 5 begins on page 8

5 CNC machines are widely used in engineering production.

(a) State what the letters CNC stand for.

C N C [1]

(b) Fig. 4 shows an instrument panel produced on a laser cutting machine.

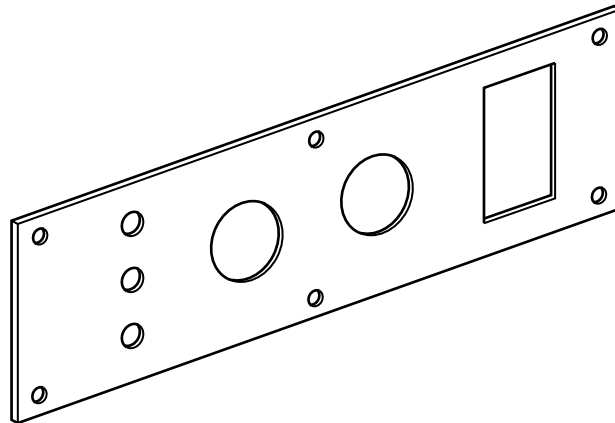


Fig. 4

Describe **three** advantages of using a laser cutting machine rather than a CNC milling machine to produce batches of the instrument panel.

- 1
-
- 2
-
- 3
-

[6]

(c) Describe **one** rapid prototyping process.

.....

.....

.....

.....

..... [3]

Question 6 begins on page 10

11
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