

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	
-----------------------	--	----------------------	--

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.
- 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.

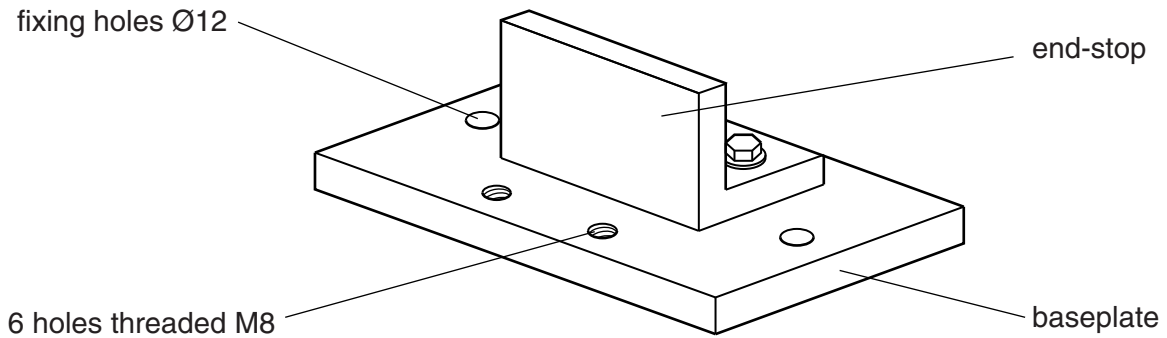


Fig. 1

- (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.

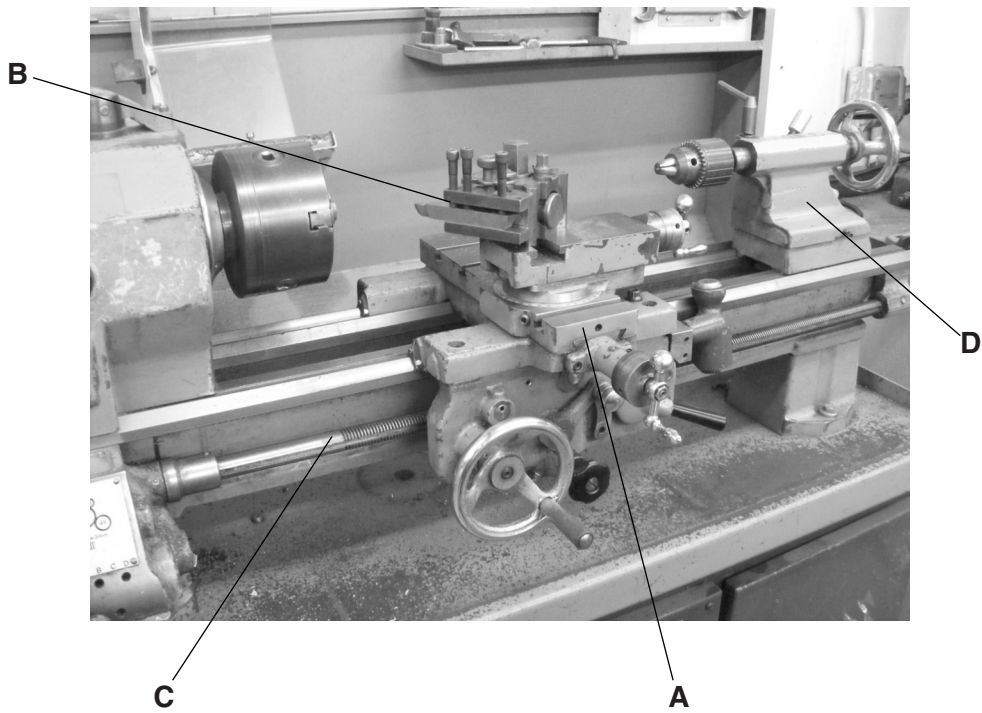


Fig. 2

(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.

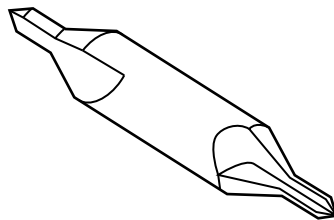


Fig. 3

..... [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.

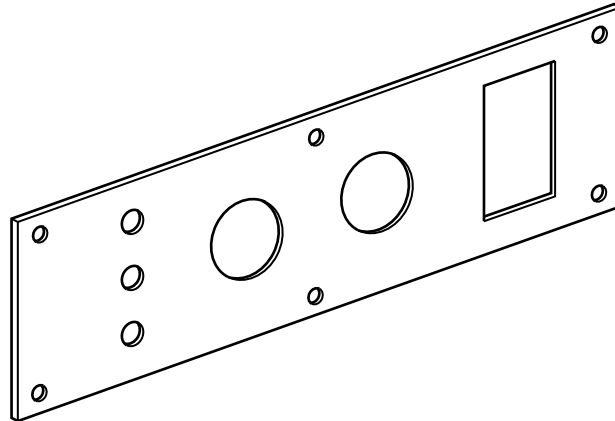


Fig. 4

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

6 (a) Describe **two** uses of digital communications in material supply and control.

1

.....

.....

.....

2

.....

.....

[4]

(b)* Discuss the impact of automation on the quality of engineered products.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[6]

END OF QUESTION PAPER

11
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.