

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Manufacturing (Double Award)

Engineering (Double Award)

Unit 3: Application of Technology in Engineering and Manufacturing

Paper D: Engineering Fabrication

Wednesday 15 May 2013 – Afternoon

Time: 1 hour 30 minutes

Paper Reference

5EM03/3D

You must have:

Notes and sketches collected during your pre-release research.
Ruler, pen, pencil, rubber.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 110.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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PEARSON

SECTION A

Answer ALL questions.

Some questions must be answered with a cross . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

1 All the products below belong to a manufacturing sector.

(a) Put a cross in the **two** boxes below where the products belong to the **engineering fabrication** sector.

(2)

Cod liver oil	<input type="checkbox"/>
Train ticket	<input type="checkbox"/>
G clamp	<input type="checkbox"/>
Pasta sauce	<input type="checkbox"/>
Aluminium frame	<input type="checkbox"/>
Music book	<input type="checkbox"/>

(b) Put a cross in the **two** boxes below where the products belong to the **engineering fabrication** sector.

(2)

Business card	<input type="checkbox"/>
Metal curtain rail	<input type="checkbox"/>
Fuel cap	<input type="checkbox"/>
Dumbbell bar	<input type="checkbox"/>
Computer mouse	<input type="checkbox"/>
Engineers overalls	<input type="checkbox"/>

(Total for Question 1 = 4 marks)



2 The tables below show some tools and components used during the manufacture of engineering fabrication products.

(a) Complete Table 1 by naming each tool.

(2)


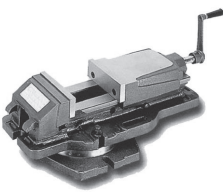
Tool	Tool name	Use
		Marks or creates a line on metal surfaces when used with a rule or engineers' square.
		Used to hold material or a component when clamped to a pillar drill table.

Table 1

(b) Complete Table 2 by explaining what each component is used for.

(4)

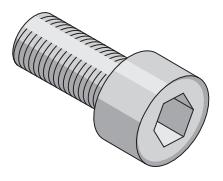
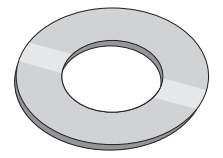
Component	Component name	Use
	Socket head cap screw	
	Washer	

Table 2

(Total for Question 2 = 6 marks)



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3 Draw a straight line to link each **Term** listed below to the most appropriate **Key Area**.

Each Key Area can be used more than once.

Term

Key Area

Computer-aided design

Automated conveyors

Polymer

Embedded computers

3D prototyping

Aluminium alloy

Kevlar

Information and
communication technology
(ICT)

Control technology

Modern materials

(Total for Question 3 = 7 marks)



4 Office staplers belong to the engineering fabrication sector and use information and communication technology (ICT) in their manufacture.

(a) Name **two other** products from this sector where ICT is used in their manufacture. (2)

Product 1

.....

Product 2

.....

(b) (i) Name **one stage** where ICT is used in the manufacture of **Product 1**. (1)

.....

(ii) Explain **two** benefits to a **manufacturer** of using ICT at the stage named in 4(b)(i). (4)

1

.....

.....

2

.....

.....

.....



(c) (i) Name **one modern material** used in the manufacture of **Product 1**.

(1)

(ii) Describe how this modern material changes the characteristics of **Product 1**.

(2)

(Total for Question 4 = 10 marks)



5 Computer-aided manufacture (CAM) and computer-aided design (CAD) are both used by manufacturers of engineering fabrication products.

(a) (i) State **one** use of CAM during manufacturing.

(1)

(ii) Explain **one** benefit to a manufacturer of using CAM in processing and production.

(2)

CAD is used when modifying existing products.

(b) (i) State **one other** use of CAD during manufacturing.

(1)

(ii) Explain **one** benefit to a **manufacturer** of using CAD when modifying existing products.

(2)

(c) Explain **one** benefit to the **consumer** when a manufacturer uses CAM.

(2)

(Total for Question 5 = 8 marks)



6 Sourcing and handling information and data is important to manufacturers.

(a) Describe the term **spreadsheet**.

(2)

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(b) A database is also an example of sourcing and handling information and data.

(i) State **one** traditional method it has replaced.

(1)

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.....

(ii) Explain **two advantages** to the **distributor** when a manufacturer uses databases.

(4)

1

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2

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(iii) Explain **one disadvantage** to a **manufacturer** of using databases.

(2)

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(Total for Question 6 = 9 marks)



7 Systems and control technology is an essential feature in engineering fabrication companies.

Explain **one** benefit to a manufacturer of using programmable logic controllers (PLCs) in relation to:

(a) safety during manufacture

(3)

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(b) production efficiency.

(3)

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(Total for Question 7 = 6 marks)

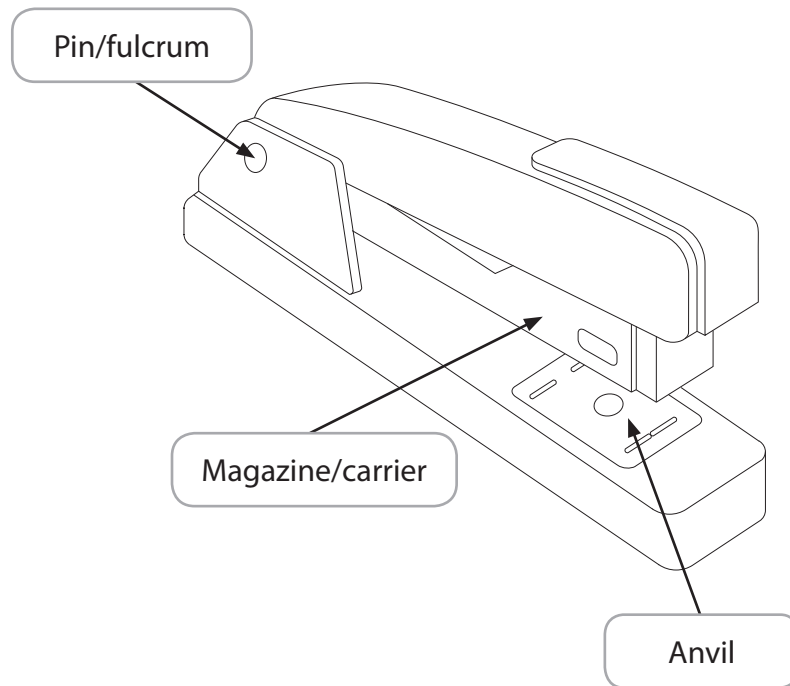
TOTAL FOR SECTION A = 50 MARKS



SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass-produced office staplers.

The diagram below shows **an office stapler**.



8 Describe, using notes and sketches:

(a) the function of the anvil

(3)

Anvil

(b) the function of the magazine/carrier

(3)

Magazine/carrier



(c) the function of the pin/fulcrum

(3)

Pin/fulcrum

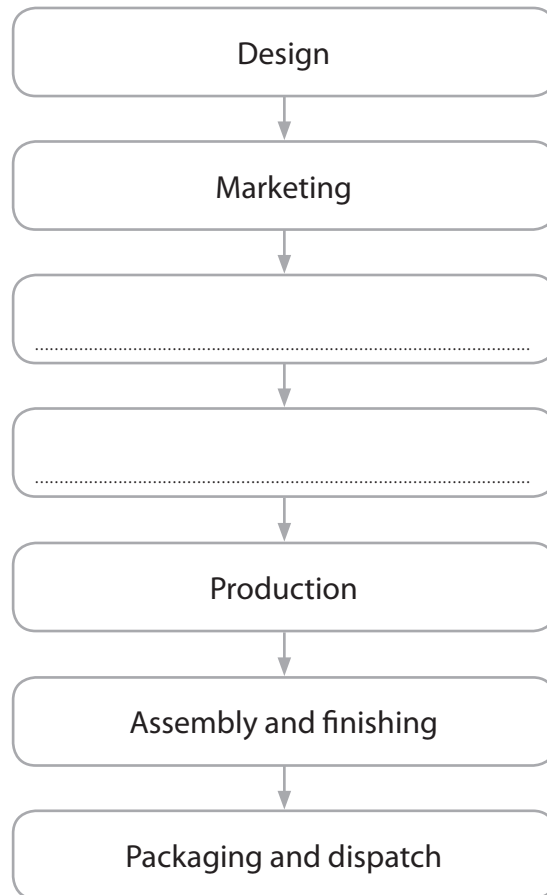
(Total for Question 8 = 9 marks)



9 (a) The incomplete flow diagram below indicates some of the main stages in the manufacture of office staplers.

(i) Complete the flow diagram by adding the **two** missing main stages in the manufacture of office staplers.

(2)



(ii) State the stage where the office staplers would be placed into cardboard boxes.

(1)

Stage



(b) Describe the following **two** stages in the manufacture of office staplers.

(i) Design

(3)

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(ii) Marketing

(3)

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(Total for Question 9 = 9 marks)



10 (a) State a **specific** metal commonly used for the pin/fulcrum of the office stapler. (1)

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(b) Stamping is a process used to produce some parts of the mass-produced office staplers.

(i) State **three** production processes, **other than** stamping, used during the manufacture of office staplers. (3)

Process 1

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Process 2

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Process 3

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(ii) Explain why stamping is a suitable process for making the magazine/carrier. (3)

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(iii) Explain why a manufacturer uses a polymer for some parts of the office stapler.

(3)

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(Total for Question 10 = 10 marks)



11 Process control and quality control are used in the manufacture of office staplers.

(a) (i) Explain the term **process control**.

(2)

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(ii) Explain **two** reasons why a **manufacturer** uses process control during automated stages of manufacture.

(4)

1

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2

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(b) Describe **two** examples of quality control used during the **production** stage of the manufacture of office staplers.

(4)

1

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2

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(Total for Question 11 = 10 marks)



12 (a) The use of modern technology in the manufacture of mass-produced office staplers has brought changes.

(i) State **two** changes the use of modern technology has had on the **type** of workforce manufacturers require.

(2)

Change 1

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.....

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Change 2

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(ii) Describe **two** changes the use of modern technology has had on the production environment.

(4)

Change 1

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Change 2

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(iii) Explain **one** environmental benefit that has resulted from the use of modern technology.

(2)

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(b) The use of barcodes is an important part of control technology in the manufacture of office staplers.

Describe the advantages to a **manufacturer** of using barcodes at the packaging and dispatch stage.

(4)

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(Total for Question 12 = 12 marks)



13 Modern materials are used in the manufacture of office staplers.

Explain how the use of modern materials has impacted on customer satisfaction.

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(Total for Question 13 = 4 marks)



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