

Write your name here

Surname

Other names

Pearson
Edexcel GCSE

Centre Number

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Candidate Number

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Manufacturing (Double Award)
Engineering (Double Award)

**Unit 3: Application of Technology in Engineering
and Manufacturing**
Paper D: Engineering Fabrication

Wednesday 24 May 2017 – Morning
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

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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 of the products listed 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)

Products	Put a cross in two boxes below
Door handle	<input type="checkbox"/>
Tea towel	<input type="checkbox"/>
Soldering iron	<input type="checkbox"/>
Tea cake	<input type="checkbox"/>
Ring binder	<input type="checkbox"/>
Machine vice	<input type="checkbox"/>

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

(2)

Products	Put a cross in two boxes below
CCTV	<input type="checkbox"/>
Train ticket	<input type="checkbox"/>
Moisturiser	<input type="checkbox"/>
Blender	<input type="checkbox"/>
Tank cutter	<input type="checkbox"/>
Piano hinge	<input type="checkbox"/>

(Total for Question 1 = 4 marks)



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

(a) Complete Table 1 by naming each component.

(2)


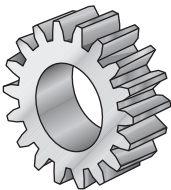
Component	Component name	Use
		A fixing that is used to secure two components together by passing through a hole in one component and into a female thread on the other component.
		Used to transfer and reverse directional rotary motion from one shaft to another, may change the speed.

Table 1

(b) Complete Table 2 by explaining how each tool is used.

(4)



Tool	Tool name	Use
	Ring Spanner	
	Drill Bit	

Table 2

(Total for Question 2 = 6 marks)



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

System remote panel

Modern materials

High impact polystyrene (HIPS)

Database

Control technology

Smart wire

Conveyor systems

Information and communications
technology (ICT)

Acrylic (PMMA)

Virtual learning environment
(VLE)

(Total for Question 3 = 7 marks)



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4 (a) Finishing processes are used when manufacturing bike stands in the engineering fabrication sector.

(i) Name **two** other products from this sector that use finishing processes in their manufacture.

(2)

Product 1

Product 2

(ii) Name **two** different finishing processes used in the manufacture of products from this sector.

(2)

Finishing process 1

Finishing process 2

(iii) Describe **one** finishing process you named in 4(a)(ii).

(2)



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(b) Quality control techniques are used in the manufacture of products in the engineering fabrication sector.

Describe **two** examples of quality control techniques used in the manufacture of products from this sector.

(4)

1

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2

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.....

.....

(Total for Question 4 = 10 marks)



5 (a) State **two** functions of a computer-aided manufacturing (CAM) system. (2)

1

.....

2

.....

(b) A manufacturer has changed from using traditional production methods to computer-aided manufacturing (CAM) techniques.
Describe **one** disadvantage of this change for the manufacturer. (2)

.....

.....

.....

(c) Programmable logic controllers (PLCs) are a control technology.
Describe **two** benefits of using PLCs for a manufacturer. (4)

1

.....

.....

2

.....

.....

(Total for Question 5 = 8 marks)



6 Communications technologies, including **Wi-Fi**, are used by manufacturers of engineering fabrication products.

(a) (i) Name **one** example, other than **Wi-Fi**, of a communications technology.

(1)

.....

.....

(ii) Describe the term **Wi-Fi**.

(2)

.....

.....

.....

(b) Embedded computers are used by manufacturers of engineering fabrication products.

Explain **three** reasons why a manufacturer would use embedded computers during manufacture.

(6)

1

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2

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3

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(Total for Question 6 = 9 marks)



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7 Handling information and data is an essential feature in engineering fabrication companies.

Explain **one** benefit that information and data handling systems have for:

(a) design

(3)

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.....

.....

(b) production planning

(3)

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(Total for Question 7 = 6 marks)

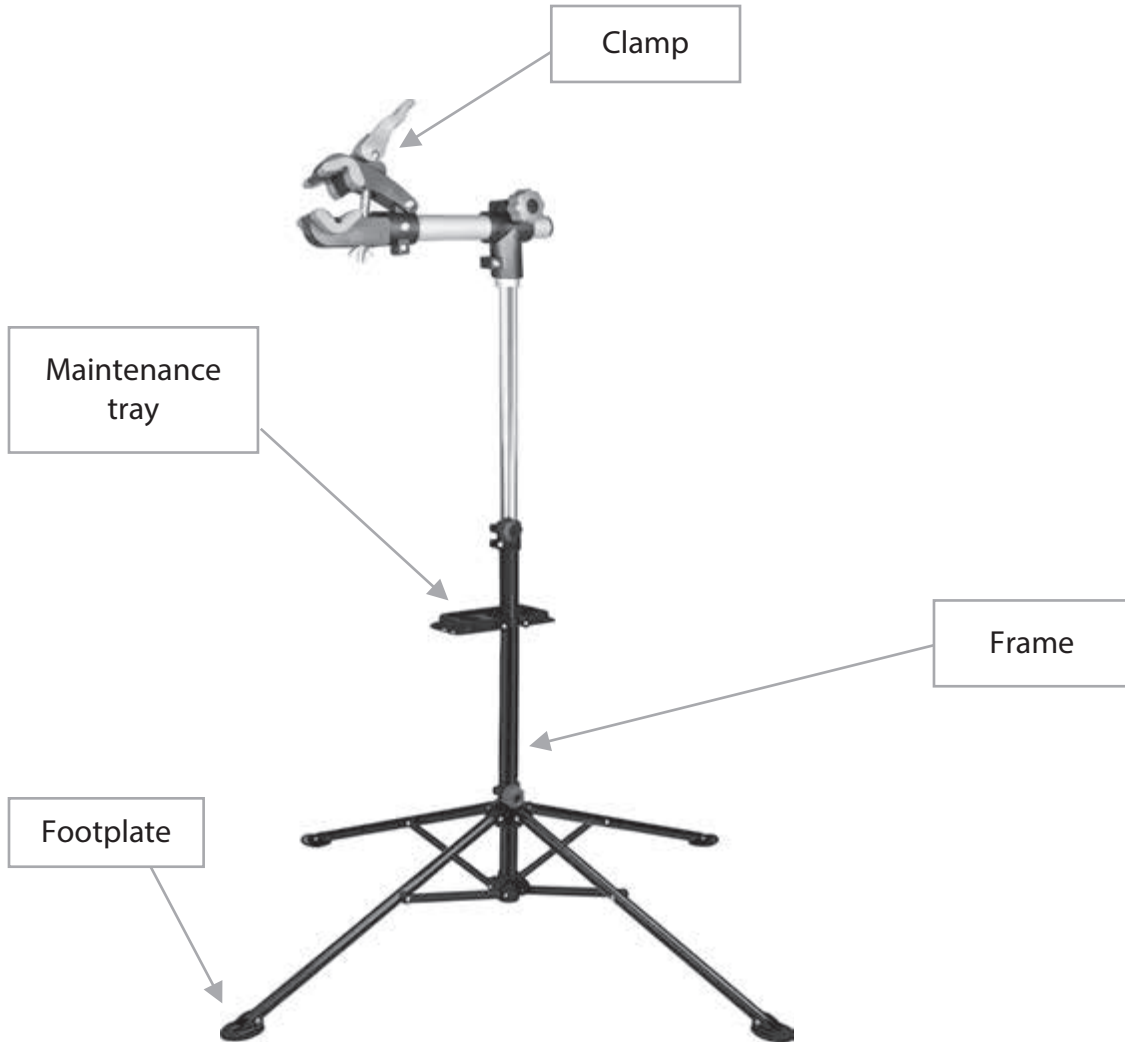
TOTAL FOR SECTION A = 50 MARKS



SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass produced bike stands.

The diagram below shows a bike stand.



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8 Describe, using notes and sketches:

(a) the function of the clamp

(3)

clamp

(b) the function of the maintenance tray

(3)

maintenance tray



P 4 8 6 6 1 A 0 1 1 2 0

(c) the function of the footplate

(3)

footplate

(Total for Question 8 = 9 marks)

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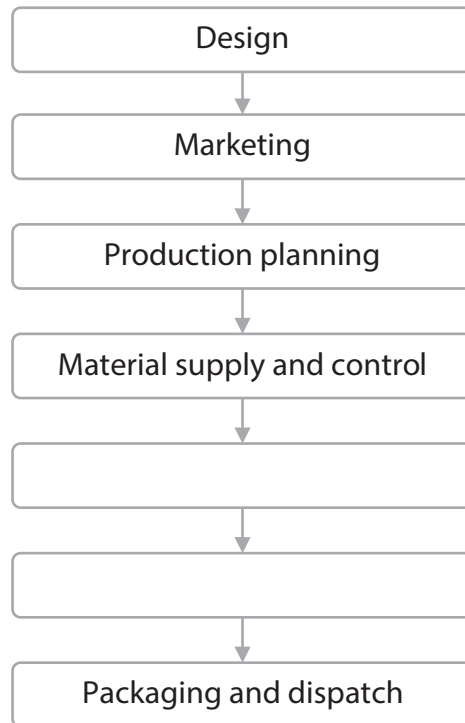
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9 (a) The incomplete flow diagram below indicates some of the main stages in manufacturing.

(i) Complete the flow diagram by adding the **two** missing stages in manufacturing.

(2)



(ii) State the stage in manufacturing where the drawings for the bike stands are created.

(1)

Stage

(b) List **three** activities carried out at the marketing stage when manufacturing the bike stands.

(3)

- 1
- 2
- 3



(c) Describe the packaging and dispatch stage when manufacturing the bike stands.

(3)

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(Total for Question 9 = 9 marks)

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10 (a) State a specific metal commonly used for the frame of the bike stand.

(1)

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(b) Injection moulding is one of the processes used during the manufacture of bike stands.

(i) State **three** production processes, other than injection moulding, used during the manufacture of bike stands.

(3)

Process 1

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Process 2

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Process 3

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(ii) Explain why injection moulding is a suitable process to use during the manufacture of bike stands.

(3)

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(c) Explain how the use of modern materials has helped manufacturers of bike stands to increase sales.

(3)

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(Total for Question 10 = 10 marks)

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11 Automation is used in the manufacture of mass produced bike stands.

(a) Explain the term **automation**.

(2)

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(b) (i) Describe **three** different examples of automation used in the production stage of the manufacture of bike stands.

(6)

1

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2

.....

3

.....

(ii) Explain **one** disadvantage to the manufacturer of applying a type of automation when manufacturing bike stands.

(2)

.....

.....

(iii) Explain **one** benefit to the consumer of applying a type of automation when manufacturing bike stands.

(2)

.....

.....

(Total for Question 11 = 12 marks)



12 (a) The introduction of modern technology has an impact on safety and efficiency when manufacturing mass produced bike stands.

(i) State **two** benefits the introduction of modern technology has had for the safety of the workforce.

(2)

1

2

(ii) Explain **two** effects the introduction of modern technology has had on the efficiency of the production process.

(4)

1

2

(b) The introduction of modern technology when manufacturing bike stands has an impact on the global environment.

Explain **two** advantages the use of modern technology has had for the global environment.

(4)

1

2

(Total for Question 12 = 10 marks)



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13 Information and communications technology (ICT) is an essential feature in the manufacture of mass produced bike stands.

Explain **two** impacts of ICT on the material supply and control stage in manufacturing.

1

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2

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(Total for Question 13 = 4 marks)



