Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Manufacturing (Double Award)
Engineering (Double Award)

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

Monday 21 May 2018 – 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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1/1/1/1/1

P 5 5 5 6 0 A 0 1 2 0

Pearson

SECTION A

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. 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
Toothpaste	☒
Whey protein	☒
Mechanics vice	☒
Aluminium ladders	☒
Cycling shorts	☒
Shampoo	☒

(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
Satellite navigation	☒
Zeus chart	☒
MicroSD card	☒
Road barrier	☒
Curry powder	☒
Chuck key	☒

(Total for Question 1 = 4 marks)

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

(a) Complete Table 1 by naming each piece of equipment.

(2)

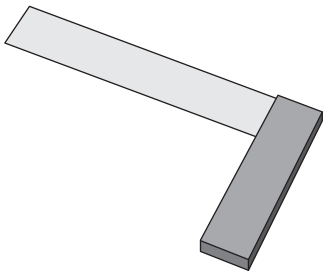
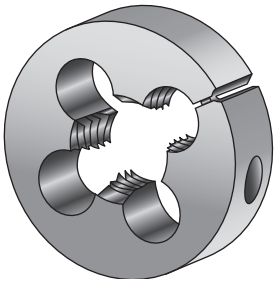
Equipment	Equipment name	Use
		To mark out lines 90 degrees to the edge of a material.
		Used with a holder to create an external thread.

Table 1

(b) Complete Table 2 by explaining the function of each component.

(4)

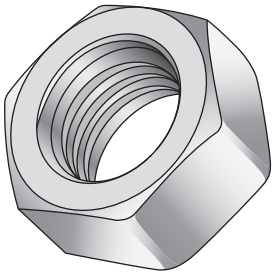
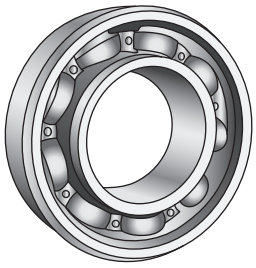
Component	Component name	Function
	Nut	
	Bearing	

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
Polypropylene (PP)	Modern materials
Internet	
Word processing	Control technology
Phosphor bronze	
Remote operated vehicles (ROVs)	Information and communications technology (ICT)
Integrated manufacturing systems	
Carbon fibre	

(Total for Question 3 = 7 marks)

4 Stunt scooters belong to the engineering fabrication sector and use automation and modern materials in their manufacture.

(a) Name **two** other products from this sector that use automation in their manufacture.

(2)

Product 1

.....

Product 2

.....

(b) (i) Name **one** type of automation used in the manufacture of products from this sector.

(1)

.....

(ii) Explain **two** different reasons why the automation named in 4(b)(i) is used.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

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(c) (i) Name **one** modern material used in the manufacture of a product from this sector.

(1)

.....

(ii) Describe how the modern material named in 4(c)(i) changes the characteristics of a product from this sector.

(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) Using CAM can reduce the product price for the consumer.

Describe **one other** benefit to the consumer of using CAM.

(2)

.....

.....

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(b) Using CAD speeds up the design process for the manufacturer.

Describe **three other** advantages of using CAD during the design process.

(6)

1 .....

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2 .....

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3 .....

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(Total for Question 5 = 8 marks)

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6 Communications technology is widely used by manufacturers of engineering fabrication products.

(a) (i) Describe the communications technology 'Bluetooth'.

(2)

(ii) Explain **one** advantage to a manufacturer of using video conferencing.

(2)

(b) Electronic Point of Sale (EPOS) is also an example of communications technology.

(i) Name a traditional method it has replaced.

(1)

(ii) Explain **two** advantages to a manufacturer of using EPOS.

(4)

1

2

(Total for Question 6 = 9 marks)

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7 Systems and control technology, including the use of programmable logic controllers (PLCs), is an essential feature of engineering fabrication companies.

Explain **one** benefit to a manufacturer of using PLCs in relation to:

(a) production efficiency

(3)

(b) safety during manufacture.

(3)

(Total for Question 7 = 6 marks)

TOTAL FOR SECTION A = 50 MARKS

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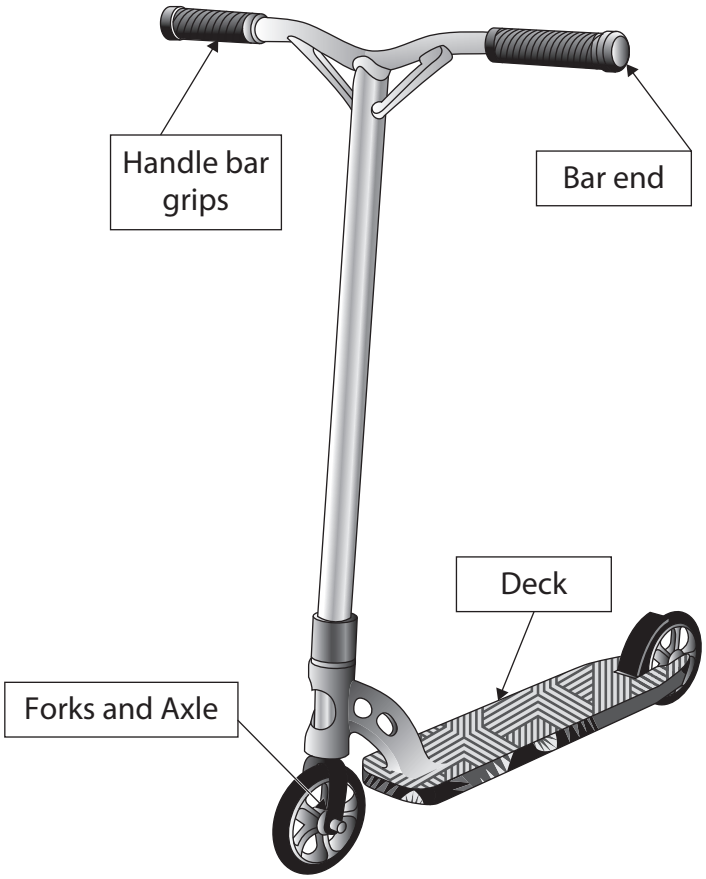
SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass produced stunt scooters.

The diagram below shows a stunt scooter.



8 Describe, using notes and sketches:

(a) the function of the forks and axle

(3)

forks and axle

(b) the function of the deck

(3)

deck

(c) the function of the bar end.

(3)

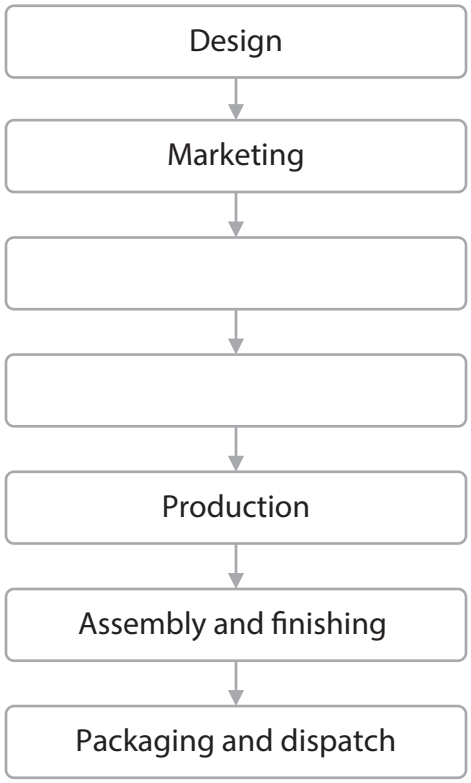
bar end

(Total for Question 8 = 9 marks)

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 handle bars for the stunt scooter would be made.

(1)

Stage

.....

(b) List **three** activities carried out at the assembly and finishing stage when manufacturing stunt scooters.

(3)

1 .....

2 .....

3 .....

(c) Describe the marketing stage when manufacturing stunt scooters.

(3)

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(Total for Question 9 = 9 marks)

10 (a) State a specific metal commonly used for the forks of the stunt scooter.

(1)

(b) Stunt scooters are manufactured using a range of computer numerical control (CNC) machining processes.

(i) State **three** production processes, other than CNC machining, used during the manufacture of the stunt scooter.

(3)

Process 1

Process 2

Process 3

(ii) Explain why CNC machining is a suitable process to use during the manufacture of stunt scooters.

(3)

(c) Explain why a polymer material is appropriate for the handle bar grips of the stunt scooter.

(3)

(Total for Question 10 = 10 marks)

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11 Quality control is used when manufacturing mass produced stunt scooters.

(a) Explain the term 'quality control'.

(2)

(b) (i) Describe **three** different examples of quality control procedures used in the production stage when manufacturing stunt scooters.

(6)

1

2

3

(ii) Explain **one** disadvantage to the manufacturer of using quality control when manufacturing stunt scooters.

(2)

(iii) Explain **one** benefit to the consumer of using quality control when manufacturing stunt scooters.

(2)

.....

.....

.....

(Total for Question 11 = 12 marks)

12 (a) The use of modern technology in the manufacture of mass produced stunt scooters has brought changes.

(i) State **two** positive changes the use of modern technology has had on the working environment.

(2)

1 .....

.....

2 .....

.....

(ii) Explain **two** effects the use of modern technology has had on the efficiency of the packaging and dispatch stage.

(4)

1 .....

.....

.....

2 .....

.....

.....

(b) The use of modern technology when manufacturing stunt scooters has had an impact on the workforce.

Explain **two** disadvantages the use of modern technology has had on the workforce.

(4)

1 .....

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2 .....

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(Total for Question 12 = 10 marks)

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13 The use of 'just in time' (JIT) techniques when manufacturing mass produced stunt scooters has brought changes.

Explain the effects of these changes for the manufacturer.

(Total for Question 13 = 4 marks)

*14 Discuss the impact of the use of modern technologies on the sustainable manufacture of stunt scooters.

(Total for Question 14 = 6 marks)

TOTAL FOR SECTION B = 60 MARKS
TOTAL FOR PAPER = 110 MARKS