

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 E: Electrical and Electronic, Process Control, Computer, Telecommunications

Monday 21 May 2018 – Afternoon

Time: 1 hour 30 minutes

Paper Reference

5EM03/3E

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 ►

P55561A

©2018 Pearson Education Ltd.

1/1/1/1



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 **electrical and electronic, telecommunications** sector.

(2)

Products	Put a cross in two boxes below
Toothpaste	<input type="checkbox"/>
Whey protein	<input type="checkbox"/>
Soldering Iron	<input type="checkbox"/>
Digital Radio	<input type="checkbox"/>
Cycling shorts	<input type="checkbox"/>
Rip saw	<input type="checkbox"/>

(b) Put a cross in the **two** boxes below where the products belong to the **process control, computer** sector.

(2)

Products	Put a cross in two boxes below
Smart watch	<input type="checkbox"/>
Zeus chart	<input type="checkbox"/>
Fire alarm system	<input type="checkbox"/>
Road barrier	<input type="checkbox"/>
Curry powder	<input type="checkbox"/>
Light fitting	<input type="checkbox"/>

(Total for Question 1 = 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

2 The tables below show some equipment and components used during the manufacture of the electrical and electronic, process control, computer, telecommunications sector products.

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

(2)


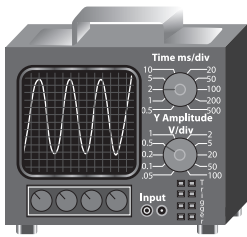
Equipment	Equipment name	Use
		To allow the tightening of fasteners.
		To measure electronic signals.

Table 1

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

(4)


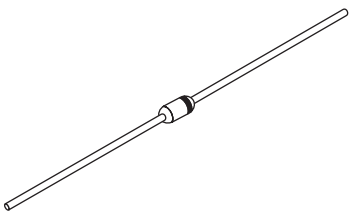
Component	Component name	Function
	Battery	
	Diode	

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 Key finders belong to the electrical and electronic, process control, computer, telecommunications 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



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(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)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

5 Computer-aided manufacture (CAM) and computer-aided design (CAD) are both used by manufacturers of electrical and electronic, process control, computer, telecommunications products.

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

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

(2)

.....

.....

.....

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

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

(6)

1

.....

.....

2

.....

.....

3

.....

.....

(Total for Question 5 = 8 marks)



6 Communications technology is widely used by manufacturers of electrical and electronic, process control, computer, telecommunications 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)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

7 Systems and control technology, including the use of programmable logic controllers (PLCs), is an essential feature of electrical and electronic, process control, computer, telecommunications 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)

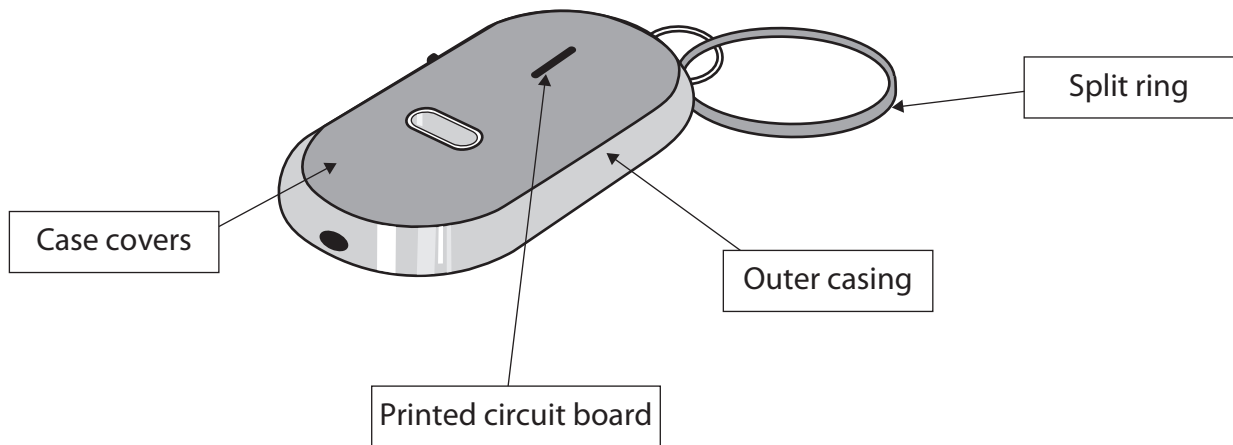
TOTAL FOR SECTION A = 50 MARKS



SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass produced key finders.

The diagram below shows a key finder.



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

8 Describe, using notes and sketches:

(a) the function of the case covers

(3)

case covers

(b) the function of the printed circuit board

(3)

printed circuit board



(c) the function of the outer casing.

(3)

outer casing

(Total for Question 8 = 9 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

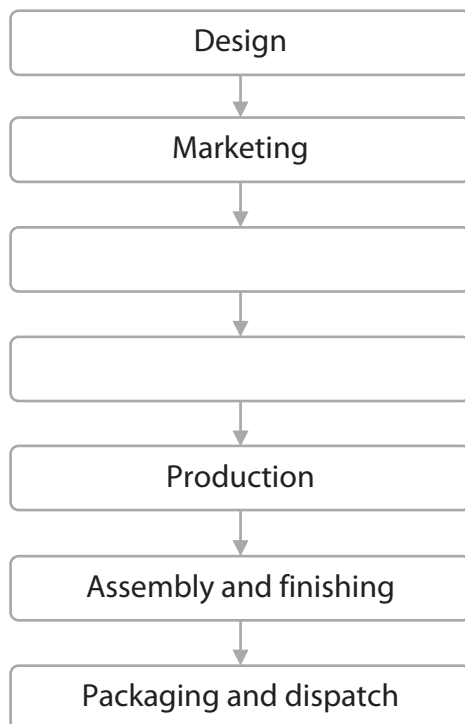
DO NOT WRITE IN THIS AREA



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 cases for the key finder would be made.

(1)

Stage



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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

(3)

- 1
- 2
- 3

(c) Describe the marketing stage when manufacturing key finders.

(3)

.....

.....

.....

.....

.....

(Total for Question 9 = 9 marks)



10 (a) State a specific material used for the split ring of the key finder. (1)

.....

(b) Key finders 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 key finder. (3)

Process 1

.....

Process 2

.....

Process 3

.....

(ii) Explain why CNC machining is a suitable process to use during the manufacture of key finders. (3)

.....

.....

.....

.....

.....

.....

.....

(c) Explain why a polymer material is appropriate for the outer casing of the key finder. (3)

.....

.....

.....

.....

.....

.....

(Total for Question 10 = 10 marks)



11 Quality control is used when manufacturing mass produced key finders.

(a) Explain the term 'quality control'.

(2)

.....

.....

.....

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

(6)

1

.....

.....

2

.....

.....

3

.....

.....

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

(2)

.....

.....

.....

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

(2)

.....

.....

.....

(Total for Question 11 = 12 marks)



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

12 (a) The use of modern technology in the manufacture of mass produced key finders 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 key finders has had an impact on the workforce.

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

(4)

1

2

(Total for Question 12 = 10 marks)



P 5 5 5 6 1 A 0 1 7 2 0

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

Explain the effects of these changes for the manufacturer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for Question 13 = 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

***14** Discuss the impact of the use of modern technologies on the sustainable manufacture of key finders.

Dotted lines for writing.

(Total for Question 14 = 6 marks)

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



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

