

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 E: Electrical and Electronics, Process Control, Computers,
Telecommunications**

Monday 14 May 2012 – 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** the 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 **electrical and electronics, telecommunications** sector.

(2)

MP3 player	<input type="checkbox"/>
Shower gel	<input type="checkbox"/>
Trampoline frame	<input type="checkbox"/>
Swimwear	<input type="checkbox"/>
Adjustable spanner	<input type="checkbox"/>
Smartphone	<input type="checkbox"/>

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

(2)

Security alarm panel	<input type="checkbox"/>
Nail varnish	<input type="checkbox"/>
Photographs	<input type="checkbox"/>
Scriber	<input type="checkbox"/>
Laptop computer	<input type="checkbox"/>
Torch	<input type="checkbox"/>

(Total for Question 1 = 4 marks)



2 The tables below show some components used during the manufacture of electrical and electronics products.

(a) Complete Table 1 by naming each component.

(2)



Component	Component name	Use
		To convert temperature to resistance.
		To convert electronic signal to sound.

Table 1

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

(4)



Component	Component name	Use
	Relay	
	MES filament lamp	

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

Programmable logic controllers (PLCs)

Anodised aluminium

Databases

Pick and place robots

Glass reinforced plastic (GRP)

Word processing

Acrylic

Modern materials

Control technology

Information and communication technology (ICT)

(Total for Question 3 = 7 marks)



4 (a) Mobile phones belong to the electrical and electronics, process control, computers, telecommunications sector and use a variety of modern materials in their manufacture.

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

(2)

Product 1

Product 2

(ii) Name a polymer used in **Product 1**.

(1)

(iii) Explain **two** different reasons why this polymer is used in **Product 1**.

(4)

1

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2

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(b) Systems and control technology is used in the electrical and electronics, process control, computers, telecommunications sector.

(i) Name **one** stage in the manufacture of electrical and electronics, process control, computers, telecommunications products where systems and control technology is used.

(1)

(ii) Explain **one** advantage to a **manufacturer** of using systems and control technology at this stage.

(2)

(Total for Question 4 = 10 marks)



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

(a) Describe **three** ways that CAD contributes to the efficiency of new product development.

(6)

1

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2

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(b) Explain why a **manufacturer** would use CAM rather than traditional methods.

(2)

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(Total for Question 5 = 8 marks)



6 Communication technology is widely used by manufacturers.

(a) (i) Describe the term 'electronic mail' (email).

(2)

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(ii) Explain **one disadvantage** to a **manufacturer** of using email.

(2)

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(b) Video conferencing is also an example of communication technology.

(i) Name the traditional method it has replaced.

(1)

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

(4)

1

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2

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(Total for Question 6 = 9 marks)



7 Handling information and data is an essential feature in electrical and electronics, process control, computers, telecommunications companies.

(a) Explain **one** benefit information and data handling systems have on production efficiency.

(2)

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(b) Explain **two** benefits information and data handling systems have on packaging and dispatch.

(4)

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(Total for Question 7 = 6 marks)

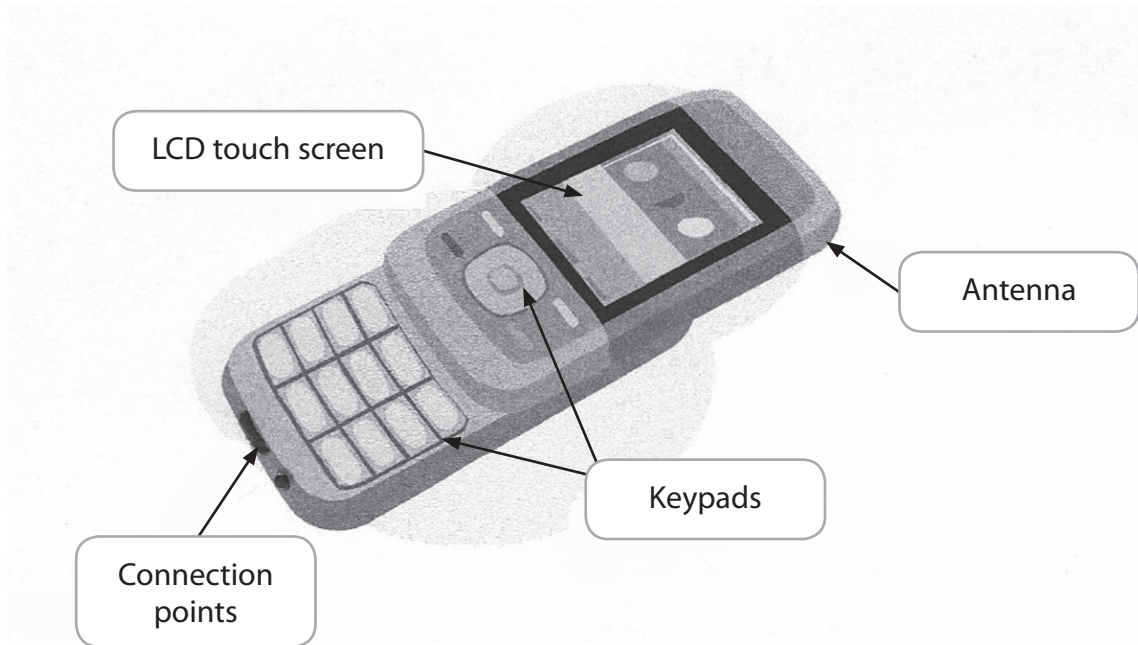
TOTAL FOR SECTION A = 50 MARKS



SECTION B

Answer ALL questions in section B with reference to the manufacture of mass produced mobile phones.

The diagram below shows a mobile phone.



8 Describe, using notes and sketches:

(a) the function of the LCD touch screen

(3)

LCD touch screen

(b) the function of the keypads

(3)

Keypads



(c) the function of the connection points

(3)

Connection points

(Total for Question 8 = 9 marks)



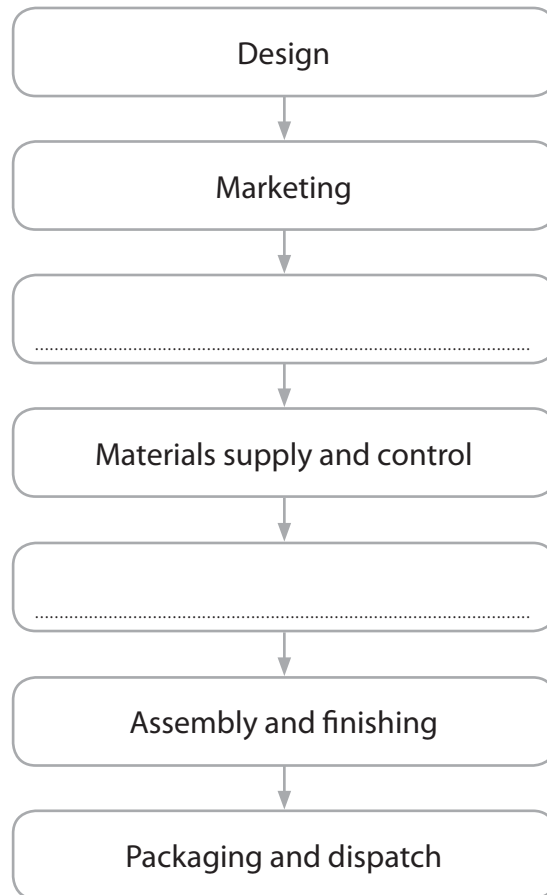
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9 (a) The incomplete flow diagram below indicates some of the main stages in manufacturing mobile phones.

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

(2)



(ii) State the stage where the mobile phones would be put together.

(1)

Stage



(b) Describe the following **two** stages in the manufacture of mobile phones.

(i) Marketing

(3)

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(ii) Materials supply and control

(3)

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(Total for Question 9 = 9 marks)



10 (a) State a specific metal commonly used for the antenna of the mobile phone.

(1)

(b) Surface mount technology is a process used to produce some parts of the mobile phone.

(i) State **three** production processes, other than surface mount technology, used during the manufacture of mobile phones.

(3)

Process 1

Process 2

Process 3

(ii) Explain why surface mount technology is a suitable process for mounting components onto the printed circuit board (PCB).

(3)



(c) Explain how the development of modern materials has helped the manufacturer of mobile phones improve their products.

(3)

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(Total for Question 10 = 10 marks)



11 Quality control and automation are used in the manufacture of mobile phones.

(a) (i) Describe **two** examples of quality control used at the packaging and dispatch stage during the manufacture of mobile phones.

(4)

1

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2

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(ii) Describe **two** examples of automation used at the packaging and dispatch stage during the manufacture of mobile phones.

(4)

1

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(b) Explain **one** advantage to the **manufacturer** of applying quality control during automated stages of manufacture.

(2)

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(Total for Question 11 = 10 marks)



12 (a) A manufacturer of mobile phones has changed their working environment from traditional to modern technology as a result of high product demand.

Explain the impact of these changes for:

(i) employees

(3)

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(ii) the global environment

(3)

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(b) Information and communication technology (ICT) plays an important role in the manufacture of mobile phones.

(i) State **two** uses of ICT at the marketing stage.

(2)

1

2

(ii) Describe **one** use of ICT at the assembly and finishing stage.

(2)

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(iii) Explain **one** benefit of using ICT to the distributor of mobile phones.

(2)

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(Total for Question 12 = 12 marks)



13 Control technology is an essential feature in the manufacture of mobile phones.

Explain the impact of control technology on safety when manufacturing.

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(Total for Question 13 = 4 marks)



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