

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

Friday 23 May 2014 – 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

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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 **electrical and electronics, telecommunications** sector.

(2)

Products	Put a cross in two boxes below
Reward sticker	<input type="checkbox"/>
Infrared keyboard	<input type="checkbox"/>
Event leaflet	<input type="checkbox"/>
Fabric bracelet	<input type="checkbox"/>
Drill set	<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)

Products	Put a cross in two boxes below
Medium density fibreboard	<input type="checkbox"/>
Hard drive	<input type="checkbox"/>
Torch	<input type="checkbox"/>
Safety boots	<input type="checkbox"/>
Box file	<input type="checkbox"/>
Smoke detector	<input type="checkbox"/>

(Total for Question 1 = 4 marks)



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

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

(2)



Equipment	Equipment name	Use
		For holding a tool used in making an electronic circuit.
		Used on a circuit to check hi-lo signal levels.

Table 1

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

(4)



Component	Component name	Function
	Transistor	
	Inductor (choke)	

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

Electronic mail

Modern materials

Copper

Silicon

Control technology

Assembly robot

Composites

Information and communications technology (ICT)

Social media

Continuous operation

(Total for Question 3 = 7 marks)



4 Night lights belong to the electrical and electronics, process control, computers, telecommunications sector and use control technology and a soldering process in their manufacture.

(a) Name **two other** products from this sector that use control technology and a soldering process in their manufacture.

(2)

Product 1

.....

Product 2

.....

(b) (i) State **one** type of control technology used in the manufacture of **Product 1**.

(1)

(ii) Explain **two** different reasons why this type of control technology is used.

(4)

1

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.....

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2

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.....



(c) (i) Name a soldering process used in the manufacture of **Product 1**.

(1)

(ii) Briefly describe a soldering process used in the manufacture of **Product 1**.

(2)

(Total for Question 4 = 10 marks)



5 Information and communication technology (ICT) and computer-aided manufacture (CAM) are both used by manufacturers of electrical and electronics, process control, computers, telecommunications products.

(a) Describe **one** example of how a manufacturer would use websites to reduce its costs.

(2)

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(b) As a result of high product demand, a manufacturer has changed from using traditional to computer-aided manufacturing (CAM) methods.

Describe **three** benefits of this change for the manufacturer.

(6)

1

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2

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3

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(Total for Question 5 = 8 marks)



6 (a) Communications technologies are widely used by manufacturers of electrical and electronics, process control, computers, telecommunications products. Email is an example of an electronic communications technology.

(i) Name **two other** examples of an electronic communications technology. (2)

1

2

(ii) A customer needs products to be made urgently. Describe **two** examples of how a manufacturer could make use of email in this situation. (4)

1

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2

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(b) In the electrical and electronics, process control, computers, telecommunications sector, smart and modern materials are used in the manufacture of products.

(i) Name **one** smart material used in the electrical and electronic, process control, computers, telecommunications sector. (1)

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(ii) Explain why finishes are applied to modern materials. (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.

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

(a) Product sales

(3)

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(b) Production

(3)

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(Total for Question 7 = 6 marks)

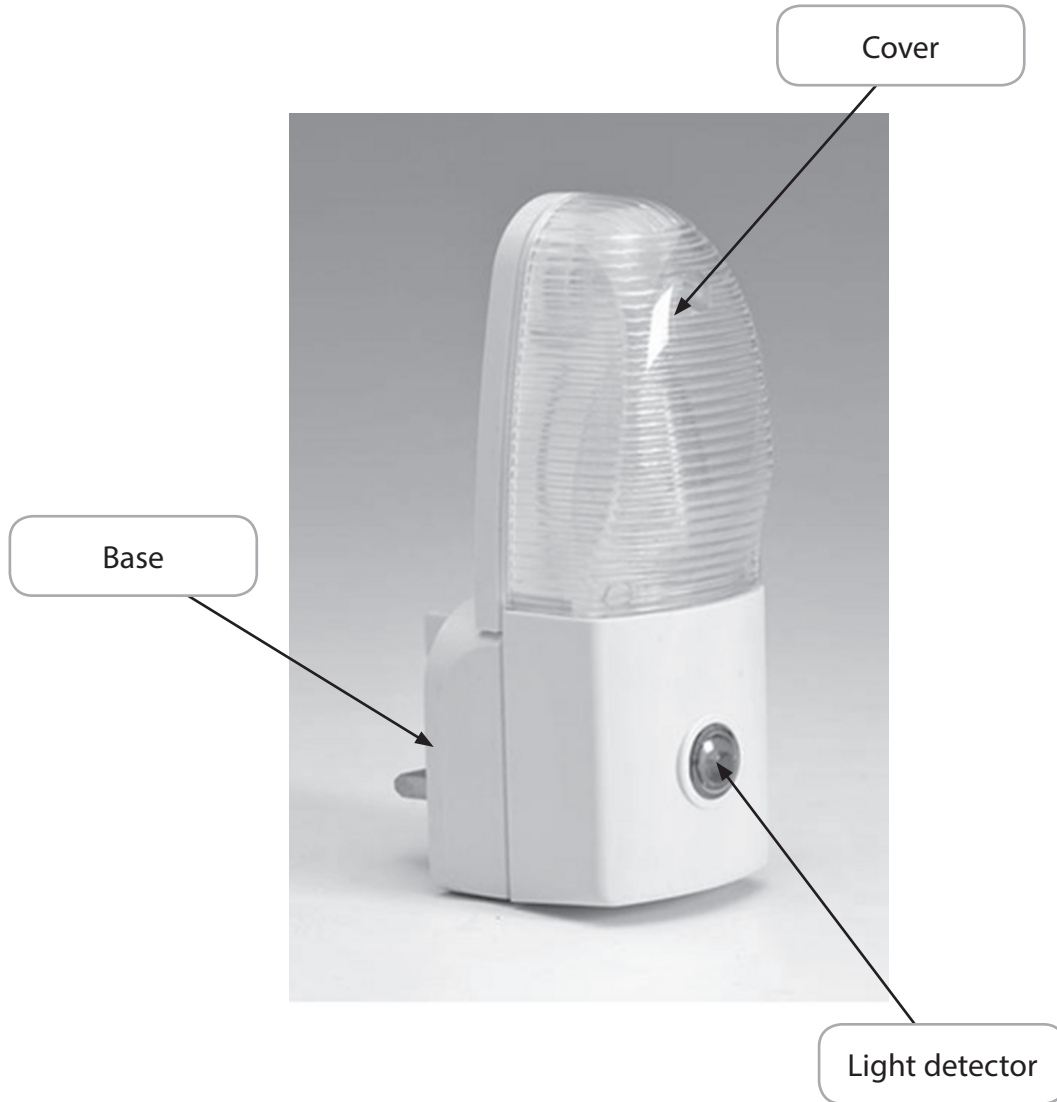
TOTAL FOR SECTION A = 50 MARKS



SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass produced night light.

The diagram below shows a **night light**.



8 Describe, using notes and sketches:

(a) the function of the base.

(3)

Base

(b) the function of the light detector.

(3)

Light detector



(c) the function of the cover.

(3)

Cover

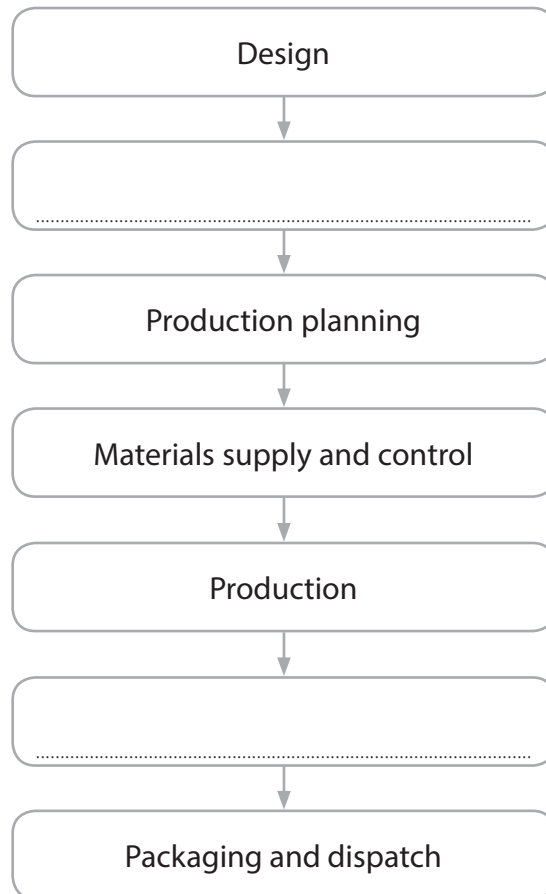
(Total for Question 8 = 9 marks)



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

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

(2)



(ii) State the stage in manufacturing where images and text are created for the night light.

(1)

Stage

(b) List **three** activities carried out at the materials supply and control stage when manufacturing night lights.

(3)

- 1
- 2
- 3



(c) Describe the production planning stage when manufacturing night lights.

(3)

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(Total for Question 9 = 9 marks)



10 (a) State a specific polymer commonly used for the cover of the night light. (1)

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(b) Vacuum forming is a process used to produce the cover for the night light.

(i) State **three** production processes, other than vacuum forming, used during the manufacture of night lights. (3)

Process 1

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Process 2

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Process 3

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(ii) Explain why vacuum forming is a suitable process for making the cover. (3)

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(c) Explain how the use of modern materials has reduced the environmental impact of manufacturing night lights.

(3)

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(Total for Question 10 = 10 marks)



11 Information and communication technology (ICT) plays an important role in the manufacture and sale of night lights.

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

(2)

- 1
- 2

(ii) Describe **two** uses of ICT in the packaging and dispatch stage.

(4)

- 1
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-
-
- 2
-
-
-

(b) Explain **one** benefit of the use of ICT to the distributor of night lights.

(2)

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-



(c) Explain the impact ICT has on the design, development and production of night lights.

(4)

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(Total for Question 11 = 12 marks)



12 A manufacturer of night lights is considering increasing its use of automation. It is aware that an increase in its use of automation will have an impact on the workforce and working environment.

(a) Explain **two** different effects the increased use of automation will have on the workforce.

(4)

1

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2

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(b) Explain **two** benefits the increased use of automation will have on the working environment.

(4)

1

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2

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(c) State **two** other issues that the manufacturer should consider, other than the impact on the workforce and working environment.

(2)

1

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2

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(Total for Question 12 = 10 marks)



13 Most modern production processes generate heat.

Explain how waste heat can be used by a manufacturer of night lights.

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(Total for Question 13 = 4 marks)



***14** Discuss the benefits of using 'just-in-time' techniques when manufacturing night lights.

A series of horizontal dotted lines for writing the answer to Question 14.

(Total for Question 14 = 6 marks)

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



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