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 B: Food and Drink, Biological and Chemical

Friday 23 May 2014 – Afternoon
Time: 1 hour 30 minutes

Paper Reference
5EM03/3B

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.
- 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 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 **food and drink** sector.

(2)

Products	Put a cross in **two** boxes below
Stock cube	☒
Computer keyboard	☒
Lemonade	☒
Fabric bracelet	☒
Drill set	☒
Headache capsules	☒

(b) Put a cross in the **two** boxes below where the products belong to the **biological and chemical** sector.

(2)

Products	Put a cross in **two** boxes below
Recipe book	☒
Antibacterial soap	☒
Box file	☒
Safety boots	☒
Flu vaccine	☒
Anti-static mat	☒

(Total for Question 1 = 4 marks)

2 The tables below show some symbols often seen on food and drink, biological and chemical sector packaging.

(a) Complete Table 1 by naming each symbol.

(2)

Symbol	Symbol name	Meaning
		Tells consumers that they have a responsibility to keep the environment around them litter free.
		Tells consumers that the manufacturer has paid a fee towards packaging recovery.

Table 1

(b) Complete Table 2 by explaining the meaning of each symbol.

(4)

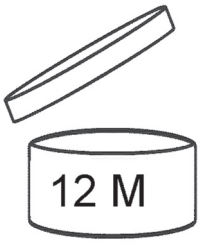
Symbol	Symbol name	Meaning
	Fairtrade	
	Period-after-opening	

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	
Liquid glucose	Modern materials
Enteric coating	
Assembly robot	Control technology
Yeast	
Social media	Information and communications technology (ICT)
Continuous operation	

(Total for Question 3 = 7 marks)

4 Milk chocolate bars belong to the food and drink, biological and chemical sector and use control technology and a heating process in their manufacture.

(a) Name **two other** products from this sector that use control technology and a heating 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 .....

.....

.....

.....

2 .....

.....

.....

.....

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

(1)

.....

(ii) Briefly describe a heating 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 food and drink, biological and chemical 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 .....

.....

.....

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 food and drink, biological and chemical 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 .....

.....

.....

(b) In the food and drink, biological and chemical sector, finishes and smart materials are used in the manufacture of modern products.

(i) Name **one** smart material used in the food and drink, biological and chemical sector.

(1)

.....

(ii) Explain why finishes are applied to modern food products.

(2)

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.....

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(Total for Question 6 = 9 marks)

7 Handling information and data is an essential feature in food and drink, biological and chemical companies.

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

(a) Product sales

(3)

(b) Production

(3)

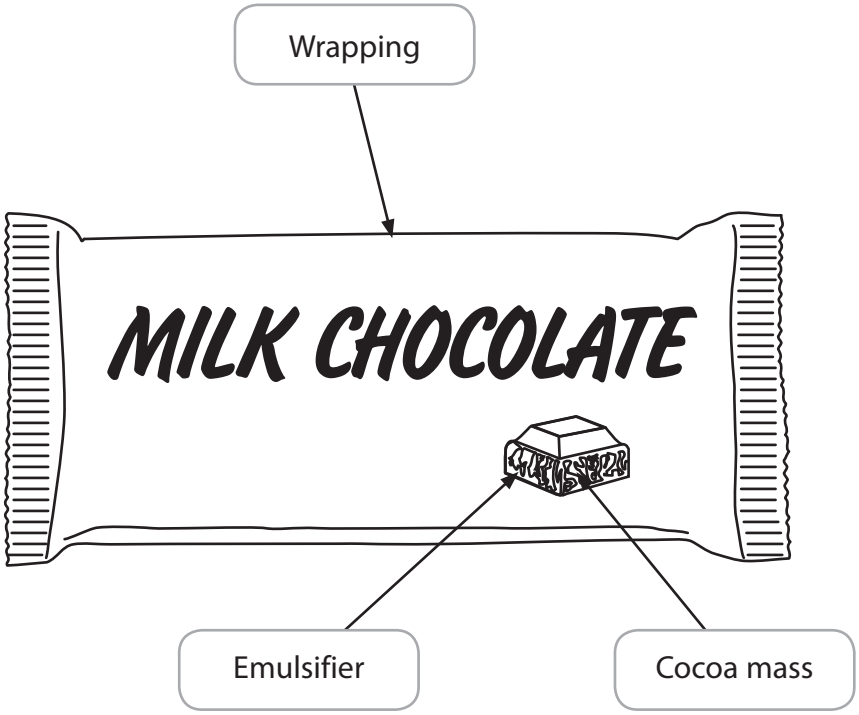
(Total for Question 7 = 6 marks)

TOTAL FOR SECTION A = 50 MARKS

SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass produced milk chocolate bars.

The diagram below shows a **milk chocolate bar**.



8 (a) Describe, using notes and sketches, the function of the wrapping.

(3)

Wrapping

(b) State **three** functions of the emulsifier.

(3)

1 .....

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2 .....

.....

3 .....

.....

(c) State **three** functions of the cocoa mass.

(3)

1 .....

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2 .....

.....

3 .....

.....

(Total for Question 8 = 9 marks)

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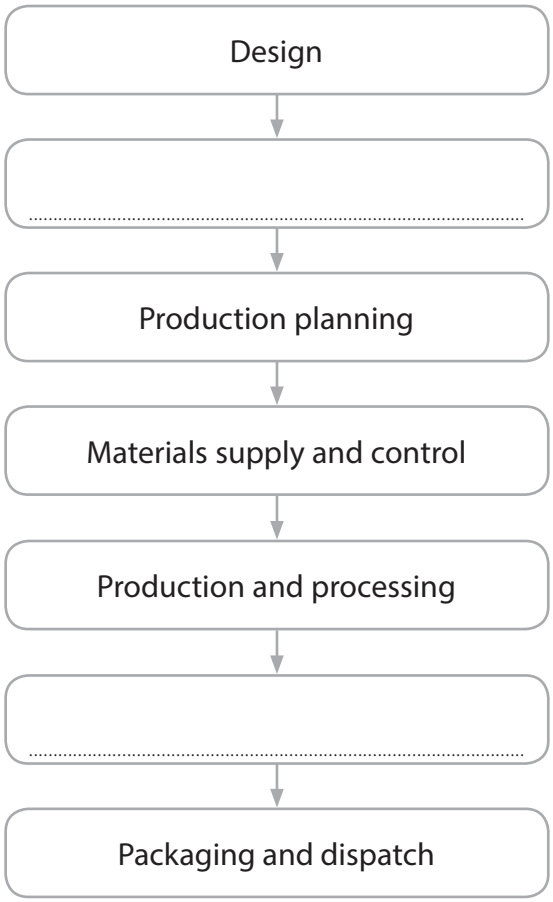
9 (a) The incomplete flow diagram below indicates some of the main stages in manufacturing milk chocolate bars.

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

(2)



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

(1)

Stage

.....

(b) List **three** activities carried out at the materials supply and control stage when manufacturing milk chocolate bars.

(3)

1 .....

2 .....

3 .....

(c) Describe the production planning stage when manufacturing milk chocolate bars.

(3)

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(Total for Question 9 = 9 marks)

10 (a) State a specific ingredient commonly used to sweeten milk chocolate bars.

(1)

(b) Tempering is a process used to produce milk chocolate bars.

(i) State **three** production processes, other than tempering, used during the manufacture of milk chocolate bars.

(3)

Process 1

Process 2

Process 3

(ii) Explain why tempering is a suitable process for making milk chocolate bars.

(3)

(c) Explain how the use of modern materials has reduced the environmental impact of manufacturing milk chocolate bars.

(3)

(Total for Question 10 = 10 marks)

11 Information and communication technology (ICT) plays an important role in the manufacture and sales of milk chocolate bars.

(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 .....

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.....

(b) Explain **one** benefit of the use of ICT to the retailer of milk chocolate bars.

(2)

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.....

.....

(c) Explain the impact ICT has on the design, development and production of milk chocolate bars.

(4)

(Total for Question 11 = 12 marks)

12 A manufacturer of milk chocolate bars 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 .....

.....

(Total for Question 12 = 10 marks)

13 Most modern production processes generate heat.
Explain how waste heat can be used by a manufacturer of milk chocolate bars.

(Total for Question 13 = 4 marks)

*14 Discuss the benefits of using 'just-in-time' techniques when manufacturing milk chocolate bars.

(Total for Question 14 = 6 marks)

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

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