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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 B: Food and Drink, Biological and Chemical

Tuesday 24 May 2016 – Morning
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

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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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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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 **food and drink** sector.

(2)

Products	Put a cross in two boxes below
Mustard	<input type="checkbox"/>
T-shirt	<input type="checkbox"/>
Hairdryer	<input type="checkbox"/>
Bottled water	<input type="checkbox"/>
A4 diary	<input type="checkbox"/>
Ring spanner	<input type="checkbox"/>

(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
Bluetooth speaker	<input type="checkbox"/>
Bus ticket	<input type="checkbox"/>
Sun cream	<input type="checkbox"/>
Pizza cutter	<input type="checkbox"/>
Bolt cutter	<input type="checkbox"/>
Dishwasher powder	<input type="checkbox"/>

(Total for Question 1 = 4 marks)



2 The tables below show some equipment used during the manufacture of food and drink, biological and chemical products.

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

(2)

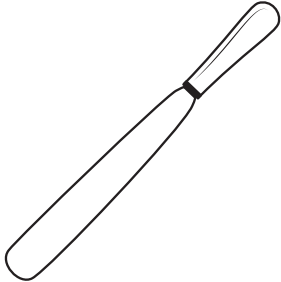
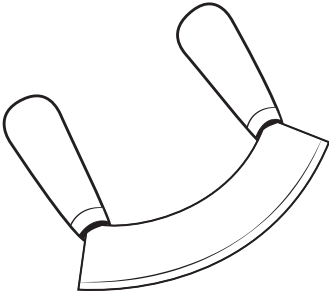
Equipment	Equipment name	Use
		To create a smooth surface when applying creams, icing etc.
		To cut herbs, vegetables etc. into smaller pieces.

Table 1

(b) Complete Table 2 by explaining the use of each piece of equipment.

(4)

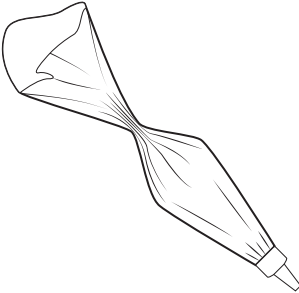
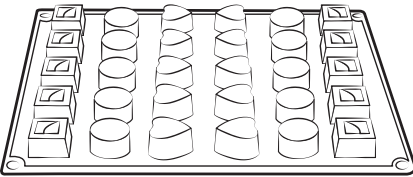
Equipment	Equipment name	Use
	Piping bag and tube	
	Silicone mould	

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
Thermostat	Modern materials
Voice over internet protocol	
Preservative	
Xanthan gum	Control technology
Programmable logic controllers (PLCs)	
Stabiliser	
Video conferencing	Information and communications technology (ICT)

(Total for Question 3 = 7 marks)



4 Rich tea biscuits belong to the food and drink sector and use a mixing process and automation in their manufacture.

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

(2)

Product 1

Product 2

(b) (i) Name a type of mixing process used in the manufacture of a product you named in 4(a).

(1)

(ii) Describe the mixing process used in the manufacture of a product you named in 4(a).

(3)

(c) Describe **two** examples of automation used in the manufacture of a product you named in 4(a).

(4)

1

2

(Total for Question 4 = 10 marks)



5 Computer-aided design (CAD) and computer-integrated manufacturing (CIM) are both used by manufacturers of food and drink, biological and chemical products.

(a) State **two** functions of a computer-aided design (CAD) system.

(2)

1

2

(b) A manufacturer has changed from using traditional design methods to computer-aided design (CAD).

Describe **one** disadvantage of this change for the manufacturer.

(2)

.....

.....

(c) State **two** functions of a computer-integrated manufacturing (CIM) system.

(2)

1

2

(d) Explain **one** benefit of linking computer-aided design (CAD) and computer-integrated manufacturing (CIM) for the manufacturer.

(2)

.....

.....

(Total for Question 5 = 8 marks)



6 Information and data are important to manufacturers.

(a) (i) Describe the term **database**.

(3)

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

(2)

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.....

(b) Explain **two** reasons why a manufacturer would use an electronic spreadsheet.

(4)

1

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2

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(Total for Question 6 = 9 marks)



7 Communications technology is an essential feature in food and drink, biological and chemical companies.

(a) Explain **one** benefit of using communications technology on the global environment.

(3)

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(b) Other than environmental benefits, explain **one** advantage of using communications technology when marketing a product.

(3)

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(Total for Question 7 = 6 marks)

TOTAL FOR SECTION A = 50 MARKS



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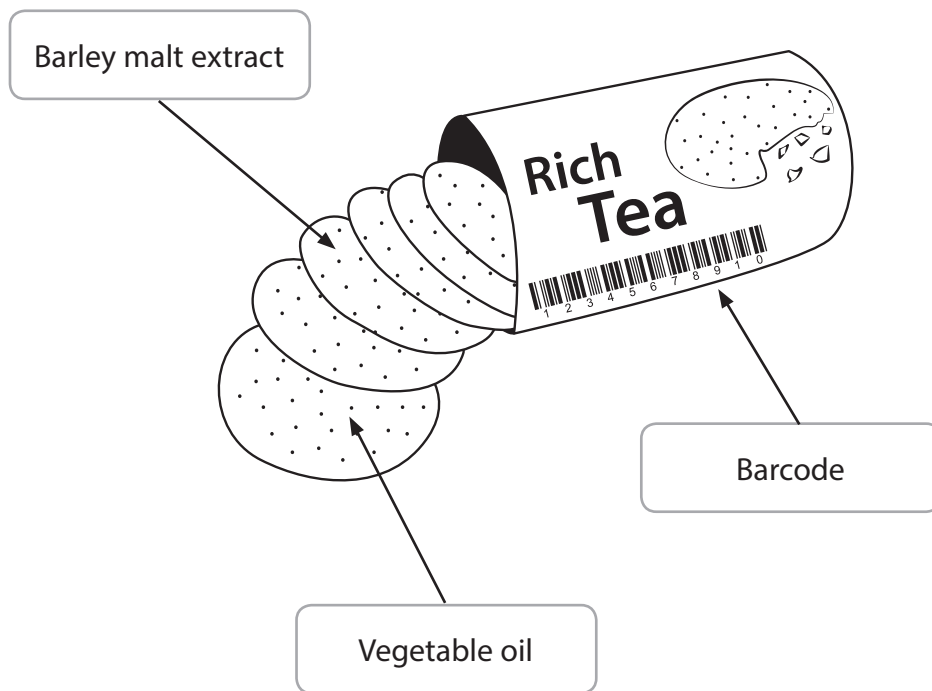
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SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass-produced packs of Rich Tea biscuits.

The diagram below shows a pack of Rich Tea biscuits.



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

(3)

barcode

(b) State **three** functions of the barley malt extract.

(3)

1

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2

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3

.....



(c) State **three** functions of the vegetable oil.

(3)

- 1
- 2
- 3

(Total for Question 8 = 9 marks)

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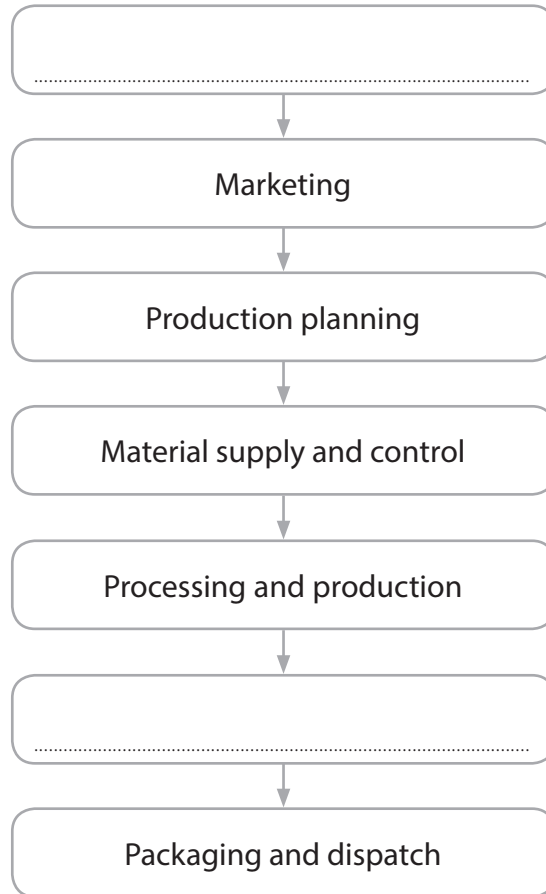
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9 (a) The incomplete flow diagram below indicates some of the main stages in manufacturing packs of Rich Tea biscuits.

(i) Complete the flow diagram by adding the **two** missing stages in manufacturing packs of Rich Tea biscuits.

(2)



(ii) State the stage in manufacturing where the packs of Rich Tea biscuits are advertised.

(1)

Stage

(b) List **three** activities carried out at the production planning stage when manufacturing packs of Rich Tea biscuits.

(3)

1

2

3



(c) Describe the materials supply and control stage when manufacturing packs of Rich Tea biscuits.

(3)

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(Total for Question 9 = 9 marks)

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10 (a) State a specific material commonly used as a raising agent in Rich Tea biscuits. (1)

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(b) The ingredients used to make Rich Tea biscuits are mixed and baked using automated equipment.

(i) State **three** production processes, other than mixing and automated baking, used during the manufacture of packs of Rich Tea biscuits. (3)

Process 1

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Process 2

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Process 3

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(ii) Explain why automated baking is a suitable process to use during the manufacture of packs of Rich Tea biscuits. (3)

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(c) Explain how the use of modern materials can reduce wastage when producing packs of Rich Tea biscuits.

(3)

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(Total for Question 10 = 10 marks)

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11 Computer-aided manufacture (CAM) and quality control are used in the manufacture of packs of Rich Tea biscuits.

(a) State **two** reasons why computer-aided manufacture (CAM) is used at the packaging and dispatch stage.

(2)

1

2

(b) Describe **three** quality control procedures carried out at the packaging and dispatch stage.

(6)

1

2

3

(c) Explain **two** benefits of using quality control at the packaging and dispatch stage.

(4)

1

2

(Total for Question 11 = 12 marks)



12 The introduction of modern technology and modern materials in the manufacture of mass produced packs of Rich Tea biscuits has brought changes.

(a) (i) State **two** different changes the introduction of modern technology has had on the workforce.

(2)

1

2

(ii) Explain **two** different effects the introduction of modern technology has had on the working environment.

(4)

1

2

(b) Explain **two** different benefits modern materials have had on product characteristics and sales.

(4)

1

2

(Total for Question 12 = 10 marks)



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13 Control technology is an essential feature in the manufacture of packs of Rich Tea biscuits.

Explain the impact of control technology on safety.

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(Total for Question 13 = 4 marks)



