

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 B: Food and Drink, Biological and Chemical**

Monday 14 May 2012 – 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** 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 **food and drink** sector.

(2)

MP3 player	<input type="checkbox"/>
Shower gel	<input type="checkbox"/>
Fruit smoothie	<input type="checkbox"/>
Swimwear	<input type="checkbox"/>
Marmalade	<input type="checkbox"/>
Smartphone	<input type="checkbox"/>

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

(2)

Shampoo	<input type="checkbox"/>
Padlock	<input type="checkbox"/>
Photographs	<input type="checkbox"/>
Indigestion tablets	<input type="checkbox"/>
Digital thermometer	<input type="checkbox"/>
Recipe book	<input type="checkbox"/>

(Total for Question 1 = 4 marks)



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

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

(2)

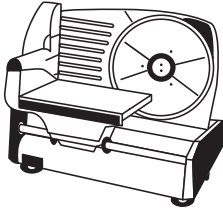
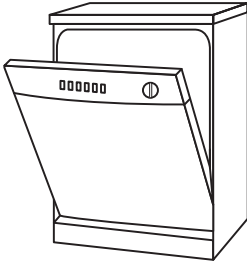
Equipment	Equipment name	Use
		Used to reduce larger pieces of food products into thinner pieces.
		Used to clean pieces of equipment such as pans, ladles etc.

Table 1

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

(4)



Symbol	Symbol name	Meaning
	Toxic	
	Non potable water	

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)

Citric acid

Databases

Pick and place robots

Fructose syrup

Word processing

Aspartame

Modern materials

Control technology

Information and communication technology (ICT)

(Total for Question 3 = 7 marks)



4 (a) Jam doughnuts belong to the food and drink sector.

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

(2)

Product 1

Product 2

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

(1)

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

(4)

1

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(b) Systems and control technology is used in the food and drink, biological and chemical sector.

(i) Name **one** stage in the manufacture of food and drink, biological and chemical 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 food and drink, biological and chemical products.

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

(6)

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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 food and drink, biological and chemical 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)

1

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2

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(Total for Question 7 = 6 marks)

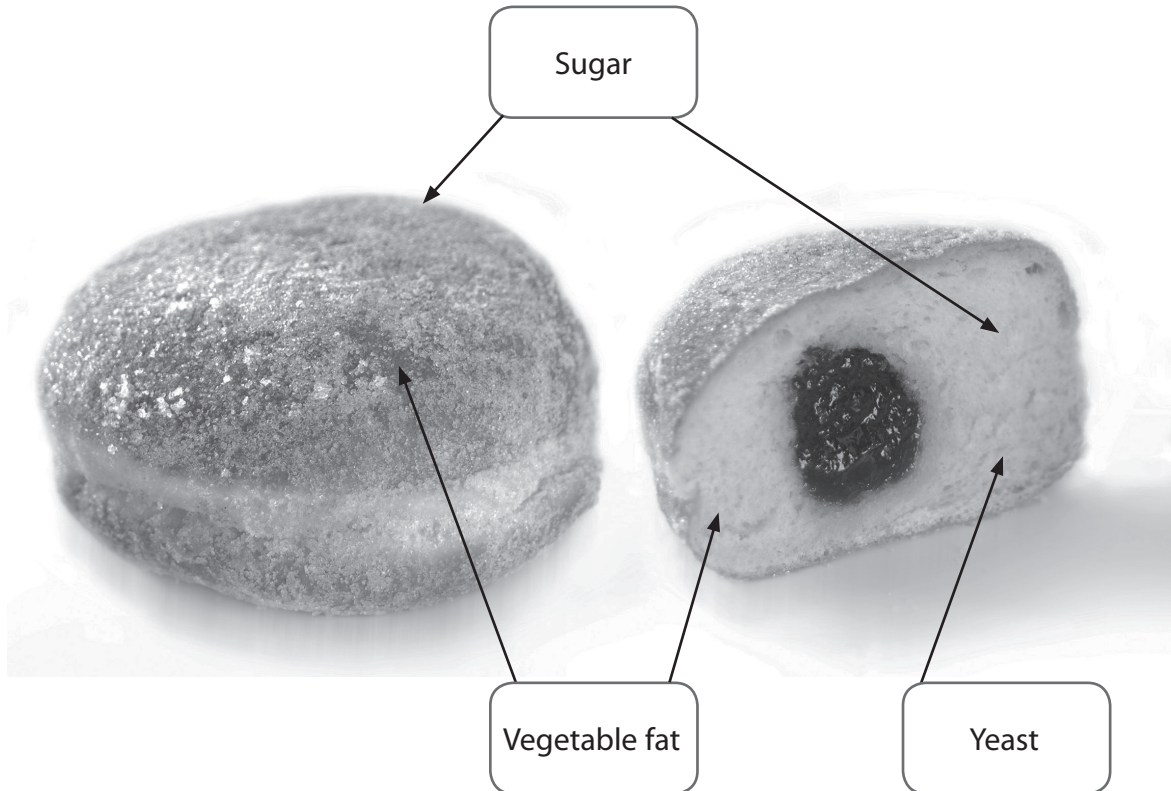
TOTAL FOR SECTION A = 50 MARKS



SECTION B

Answer ALL questions in section B with reference to the manufacture of mass produced jam doughnuts.

The diagrams below show **jam doughnuts**.



8 (a) State **three** functions of the sugar.

(3)

1

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2

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3

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(b) State **three** functions of the vegetable fat.

(3)

1

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2

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(c) State **three** functions of the yeast.

(3)

1

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2

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3

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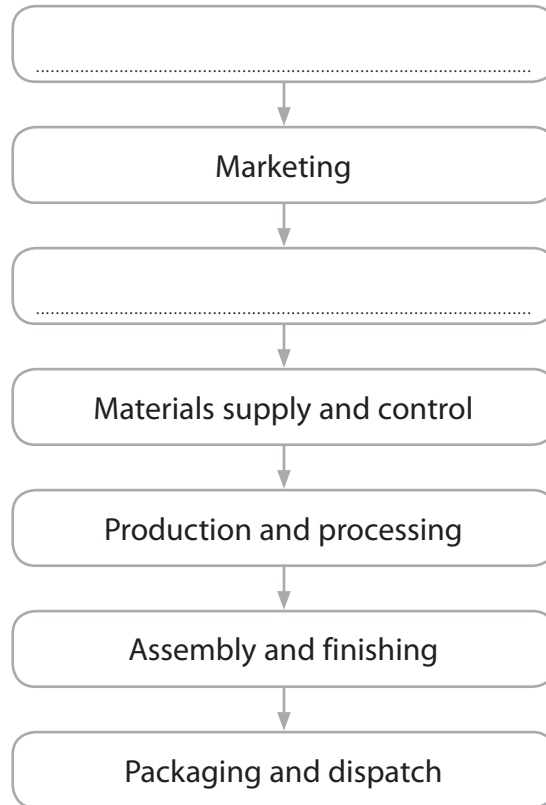
(Total for Question 8 = 9 marks)



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

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

(2)



(ii) State the stage where the jam doughnuts would be fried.

(1)

Stage



(b) Describe the following **two** stages in the manufacture of jam doughnuts.

(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 ingredient commonly used to bind the dough together for the jam doughnuts.

(1)

(b) Final proving is a process used to produce jam doughnuts.

(i) State **three** production processes, other than final proving, used during the manufacture of jam doughnuts.

(3)

Process 1

Process 2

Process 3

(ii) Explain why automated final proving is a suitable process for making the jam doughnuts.

(3)



(c) Explain how the development of modern materials has helped the manufacturer of jam doughnuts 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 jam doughnuts.

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

(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 jam doughnuts.

(4)

1

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2

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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 jam doughnuts 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 jam doughnuts.

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

(2)

1

2

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

(2)

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(iii) Explain **one** benefit of using ICT to the retailer of jam doughnuts.

(2)

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(Total for Question 12 = 12 marks)



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