

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 16 May 2011 – 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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## 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)

Golden syrup	<input type="checkbox"/>
Perfume	<input type="checkbox"/>
Welding hearth	<input type="checkbox"/>
Toaster	<input type="checkbox"/>
Orange squash	<input type="checkbox"/>
Computer mouse	<input type="checkbox"/>

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

(2)

Table cloth	<input type="checkbox"/>
Acetic acid	<input type="checkbox"/>
Pastry cutter	<input type="checkbox"/>
Rollerball pen	<input type="checkbox"/>
Car phone holder	<input type="checkbox"/>
Spray oven cleaner	<input type="checkbox"/>

(Total for Question 1 = 4 marks)


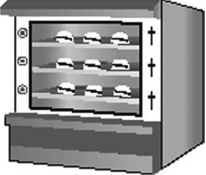


2 The tables below show some equipment and symbols used during the manufacture of food and drink, biological and chemical products.

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

(2)



**Table 1**

Equipment	Equipment name	Use
		To show the temperature of food and drink products during manufacture.
		Used to bake bread, cakes, pies and similar food products.

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

(4)

**Table 2**

Symbol	Symbol name	Meaning
	Corrosive	
	Irritant	

**(Total for Question 2 = 6 marks)**



3 Draw a straight line to link each **Term** listed below to the correct **Key Area**.

Each Key Area can be used more than once.

**Term**

**Key Area**

Bluetooth

Robotics

Fungicide

Anionic surfactant

Video conferencing

Computer aided  
manufacture (CAM)

Humectant

Modern materials

Control technology

Information and  
communications technology  
(ICT)

**(Total for Question 3 = 7 marks)**



**4** Baking powder belongs to the food and drink, biological and chemical sector.

(a) Name **two** other products from this sector, apart from baking powder, that utilise modern materials in their manufacture.

(2)

1 .....

2 .....

(b) (i) State **one** modern material used in the manufacture of a product you named in 4(a).

(1)

.....

(ii) Explain **two** benefits to the **manufacturer** of using the modern material named in 4(b)(i).

(4)

1 .....

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.....

.....

2 .....

.....

.....

.....



(c) (i) State **two** smart materials used in the food and drink, biological and chemical sector.

(2)

1 .....

2 .....

(ii) Describe the characteristics of **one** smart material named in 4(c)(i).

(2)

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.....  
.....  
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**(Total for Question 4 = 11 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 why a **manufacturer** would use CAD rather than traditional methods. (2)

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(b) (i) State **two** benefits to the **manufacturer** of using CAM. (2)

1 .....

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2 .....

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(ii) Explain **two** benefits to the **retailer** when the manufacturer uses CAD and CAM. (4)

1 .....

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2 .....

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**(Total for Question 5 = 8 marks)**



6 Systems and control technologies are widely used by manufacturers of food and drink, biological and chemical products.

(a) Explain the term 'systems and control technology'.

(2)

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(b) Robotics is an example of a systems and control technology.

(i) Name **one** other example of a systems and control technology.

(1)

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(ii) Name the traditional method this has replaced.

(1)

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(iii) Explain **two** benefits of using robotics in hazardous conditions.

(4)

1 .....

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2 .....

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**(Total for Question 6 = 8 marks)**





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

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

(a) marketing

(3)

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(b) materials supply.

(3)

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**(Total for Question 7 = 6 marks)**

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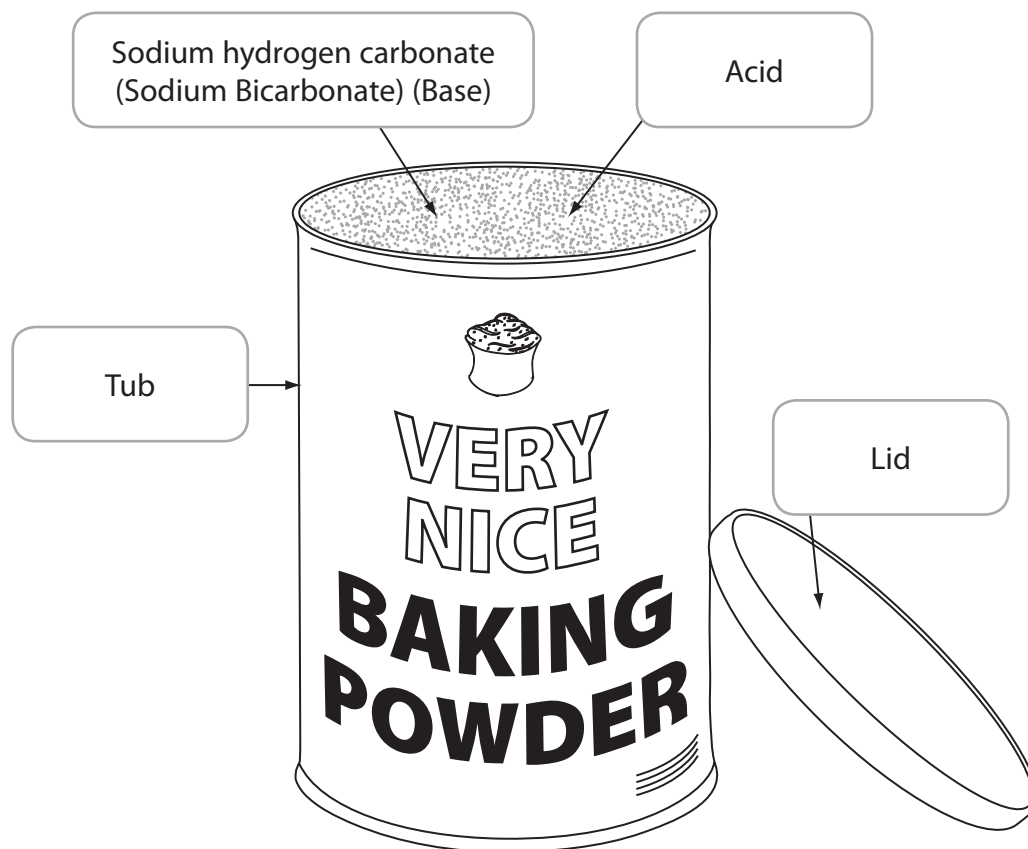
**TOTAL FOR SECTION A = 50 MARKS**



## SECTION B

Answer ALL questions in Section B with reference to the manufacture of mass produced baking powder.

The diagram below shows a retail size carton of **baking powder**.



8 (a) State **three** functions of the sodium hydrogen carbonate (sodium bicarbonate).

(3)

1 .....

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2 .....

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3 .....

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

(3)

1 .....

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2 .....

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3 .....

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

(3)

1 .....

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2 .....

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3 .....

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**(Total for Question 8 = 9 marks)**



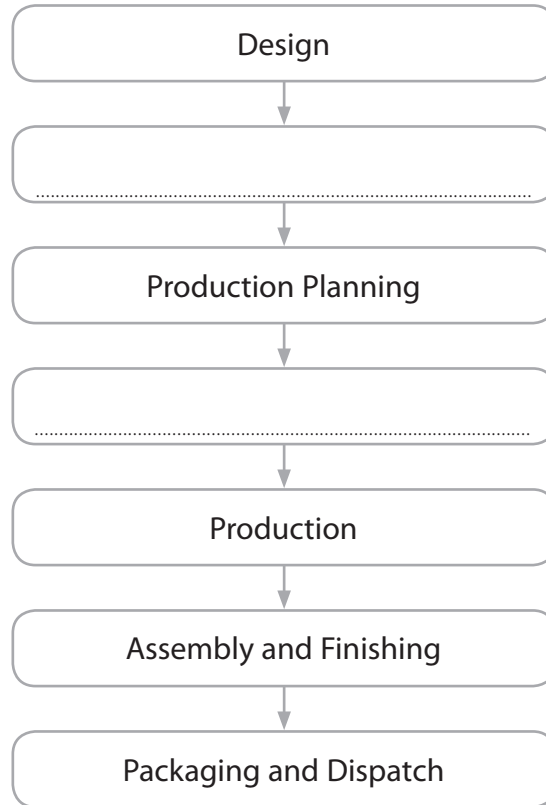
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9 (a) The incomplete flow diagram below indicates some of the main stages in manufacturing baking powders.

(i) Complete the flow diagram by writing the **two** missing main stages in manufacturing baking powders.

(2)



(ii) State the stage where the baking powder would be first developed.

(1)

Stage

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(b) Describe the following **two** stages in the manufacture of baking powder.

(i) Production planning

(3)

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(ii) Packaging and dispatch

(3)

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**(Total for Question 9 = 9 marks)**



10 (a) State a specific material commonly used as an inert filler in baking powders.

(1)

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(b) Automated blending-mixing is used as part of the process when making commercial baking powder.

(i) State **three** production processes, other than automated blending-mixing, used during the manufacture of baking powder.

(3)

Process 1

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Process 2

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Process 3

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(ii) Explain why automated blending-mixing is a suitable process for producing baking powder.

(3)

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(c) Explain how the use of modern materials has helped the manufacturer of baking powder to increase sales.

(3)

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**(Total for Question 10 = 10 marks)**



11 Automation is used in the manufacture of baking powder.

(a) Explain the term 'automation'.

(2)

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(b) (i) Describe **two** examples of automation used at the production stage of the manufacture of baking powder.

(4)

1 .....

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2 .....

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(ii) Explain **one** benefit to the **manufacturer** of applying a type of automation described in 11(b)(i).

(2)

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(iii) Explain **one** benefit to the **consumer** of applying a type of automation described in 11(b)(i).

(2)

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(c) Explain the difference between automation and mechanisation.

(2)

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**(Total for Question 11 = 12 marks)**

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**12** Communications technology and quality control play an important role in the manufacture of baking powder.

(a) (i) State **two** types of communications technology used at the **design** stage when manufacturing baking powder.

(2)

1 .....

2 .....

(ii) Using an example from 12(a)(i), describe **one** benefit of the use of communications technology at the **design** stage.

(2)

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.....  
.....  
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(b) During the manufacture of baking powder, physical damage quality checks are carried out on the packaging.

(i) State **one** other quality check used during the **production** stage.

(1)

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(ii) Describe how the quality check stated in 12(b)(i) would be carried out.

(2)

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(iii) Explain the benefits of the use of quality control to the baking powder end user.

(3)

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**(Total for Question 12 = 10 marks)**



**13** The utilisation of modern technology in the manufacture of baking powder has brought changes. Explain the effect of these changes for the workforce **and** the working environment.

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**(Total for Question 13 = 4 marks)**





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