

Name

Mark

Class

Date

GCSE Science/Biology

Internally Assessed Activity Unit B1b

Topic 3 – Electrical and Chemical Signals

Diabetes

Question 1

Ben is preparing a Powerpoint presentation about insulin and diabetes. As part of his research he found out that

- insulin controls blood glucose (sugar) levels.
- Sir Steve Redgrave, who has won 5 Olympic gold medals for rowing, has diabetes.
- some people with diabetes need insulin injections.
- today's treatments for diabetes mean that people can now live a relatively normal life.

(a) Use the words in the box to complete the sentences below.

bloodstream	body	glands	liver	pancreas
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Hormones are 'chemical messengers' produced by in the body.

They are carried by the and act on target organs. Insulin is a hormone produced by an organ called the Hormones help to control many activities in the Insulin controls the concentration of glucose in the blood.

4 marks

Printer's Log. No.

N28367A



Turn over

- (b) Ben told his classmate Gemma that the blood glucose concentration of a person who is diabetic sometimes falls too low.

In the table below tick the **two** foods that are most likely to raise blood glucose concentration.

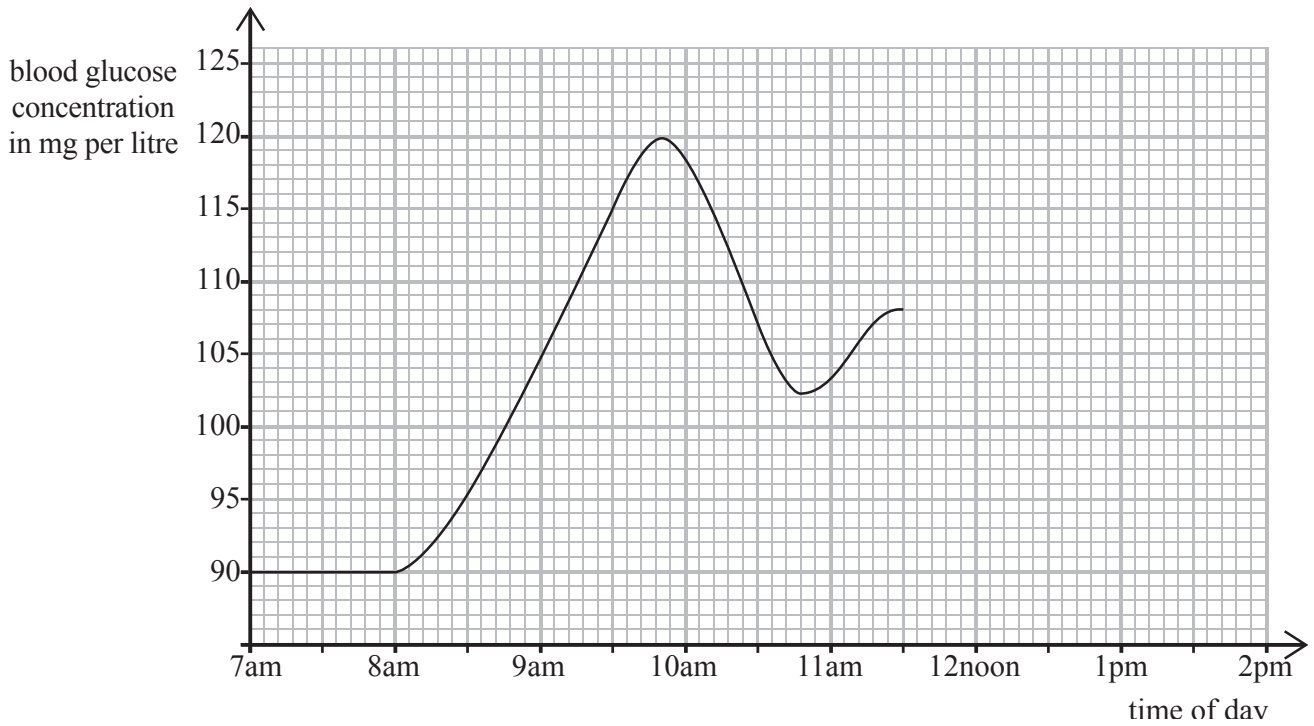
potato crisps	
water	
cabbage	
chicken	
chocolate	

2 marks

(6 marks)

Question 2

The graph shows how John's blood glucose concentration changes at different times of the day.



(a) Add the following data to the graph. Draw a smooth curve through the points.

time of day	blood glucose concentration (mg per litre)
12 noon	95
12.30 pm	90
1.00 pm	90

3 marks

(b) John got up at 7 am. Use the information given on the graph to answer the following questions.

(i) Write down at what time he ate breakfast. Give a reason for your answer.

Time

Reason

2 marks

(ii) Explain how you can tell that John ate a snack during the morning.

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2 marks

(c) Sketch a line on the graph to show how the concentration of insulin would change from 7.00 am to 1.00 pm.

1 mark
(8 marks)

Question 3

Read the following article.

Inhaler may replace insulin shots

A form of insulin that can be **inhaled** (breathed in) rather than injected may soon be available to diabetics.

The drug company producing the inhaled insulin carried out trials. Their researchers found that inhaled insulin generally was as effective as injections in controlling blood sugar concentration. It has yet to be tested for its long-term effects.

The inhaled insulin could make a real difference to the daily lives of many people. However, it may not be suitable for everyone, particularly those with asthma or other respiratory problems.

- (a) State and explain **one** advantage to people who are diabetic of using insulin inhalers instead of having injections of insulin.

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2 marks

- (b) Explain why it may be some time before inhalers become widely available for diabetics to use.

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2 marks

- (c) Give **one** way in which the researchers could make their claim, that the inhaler would be as effective as an injection, more reliable.

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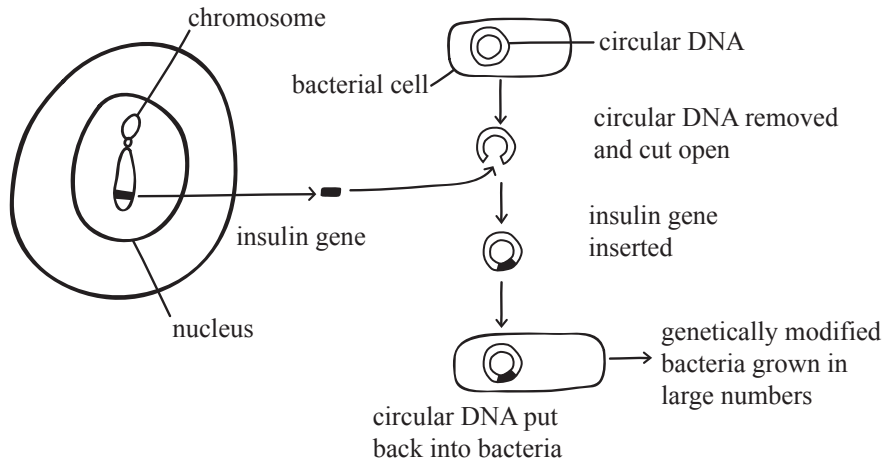
1 mark

(5 marks)

Question 4

Most insulin used to be extracted from an organ from animals such as pigs. Problems with diseases like BSE have made people cautious about using insulin from animals.

- (a) Ben drew this diagram as part of his presentation to the rest of his class. It shows how bacteria can be genetically modified to produce insulin.

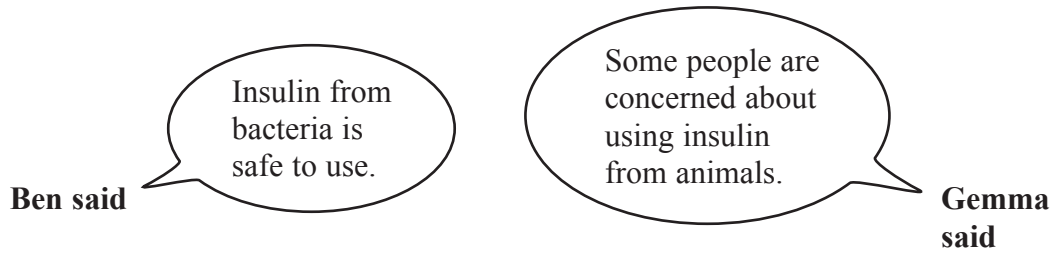


Use the information in the diagram to describe the **main** steps used to genetically modify a bacterium to contain the extracted human insulin gene.

- 1
- 2
- 3

3 marks

(b) Ben had a discussion with his classmate, Gemma.



Explain why insulin from genetically modified **bacteria** is likely to be safer to the people with diabetes than the insulin extracted from animals.

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2 marks

(c) Why do genetically modified bacteria need to be grown in very large numbers?

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1 mark

(d) Explain why it is important that only the gene for insulin production is inserted into the bacteria.

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2 marks

(8 marks)
27 marks

Quality of written communication

/3

Total 30 marks