Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
January 2012

Additional Science BLY2F
Unit Biology B2

F

Biology
Unit Biology B2

Written Paper

Tuesday 24 January 2012 9.00 am to 9.45 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 45 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.

There are no questions printed on this page

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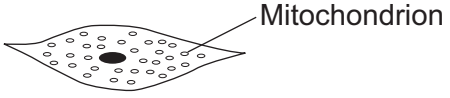
ANSWER IN THE SPACES PROVIDED

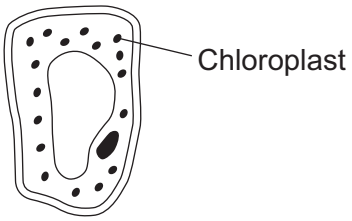
Answer **all** questions in the spaces provided.

1 The diagrams show four cells, **A**, **B**, **C** and **D**.

A

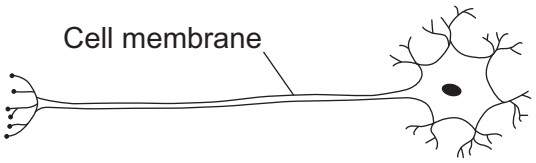


B



C

D



Use letters **A**, **B**, **C** or **D** to answer these questions.

1 (a) Which cell can photosynthesise? ☐ *(1 mark)*

1 (b) Which cell is adapted for receiving and sending information? ☐ *(1 mark)*

1 (c) Which cell is adapted to respire quickly? ☐ *(1 mark)*

3

Turn over for the next question

2 The photographs show four ways of farming.

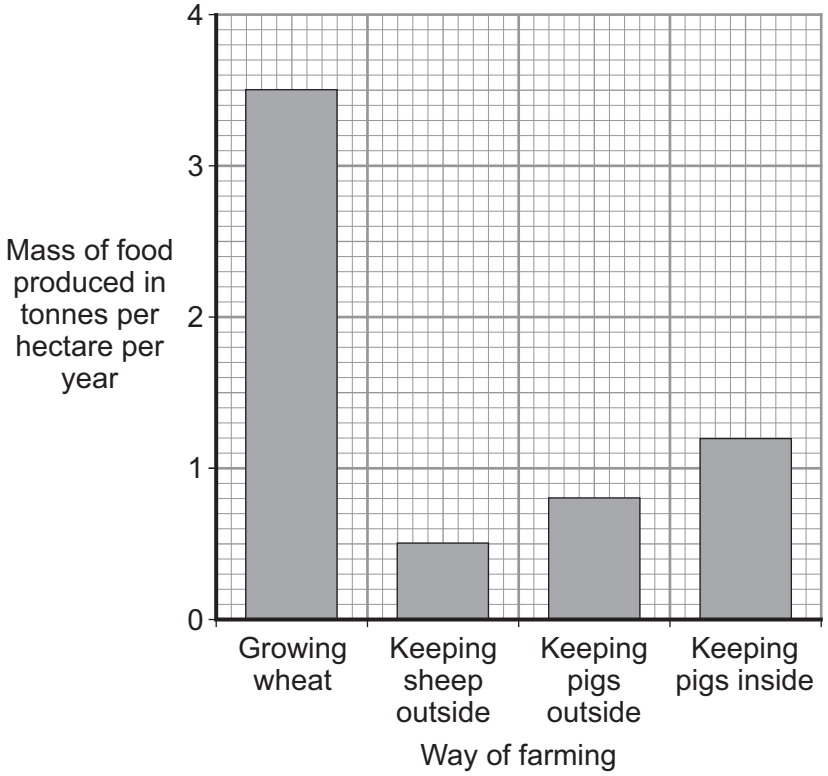
Growing wheat

Keeping sheep outside

Keeping pigs outside

Keeping pigs inside

The bar chart shows the amount of food produced from these four ways of farming.



2 (a) How much extra food can be produced when farmers grow wheat, compared with keeping sheep outside?

Show clearly how you work out your answer.

.....

.....

Answer ..... tonnes per hectare per year

(2 marks)

2 (b) Sheep eat grass.
For every 1000 g of grass eaten, a sheep increases in mass by only 50 g.
The other 950 g is lost.

How is the other 950 g lost?

Tick (✓) **two** boxes.

As oxygen from photosynthesis ☐

As faeces ☐

As meat ☐

As carbon dioxide from respiration ☐

(2 marks)

2 (c) (i) Pigs kept inside lose less energy than pigs kept outside.

Why?

Tick (✓) **two** boxes.

Pigs kept inside are fed more. ☐

Pigs kept inside are kept in small pens. ☐

Pigs kept inside are kept warm in the winter. ☐

Pigs kept inside are healthier. ☐

(2 marks)

Question 2 continues on the next page

2 (c) (ii) Meat from pigs kept inside is usually cheaper than meat from pigs kept outside.

Give **one** reason why.

.....

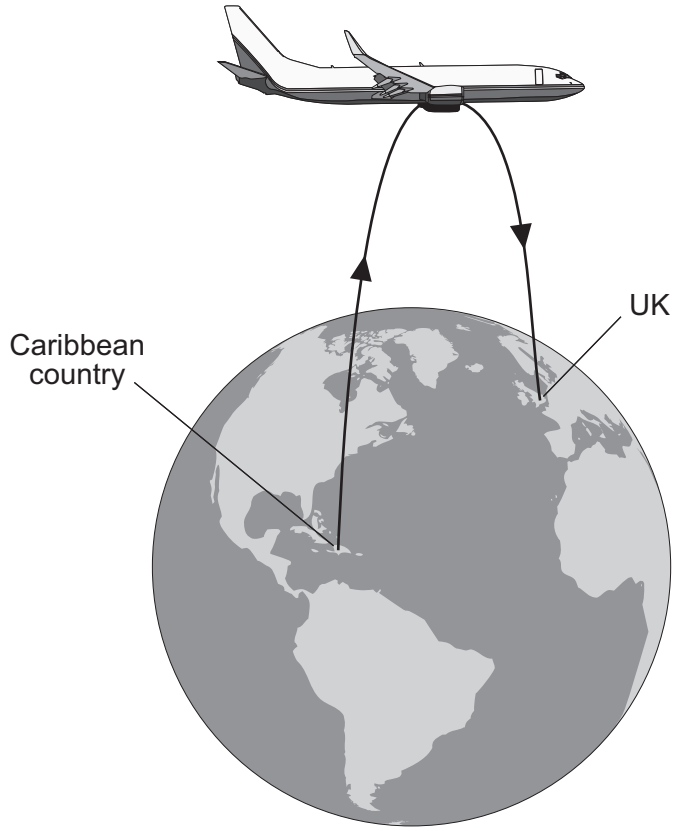
.....

(1 mark)

7

3 Bananas are grown in countries in the Caribbean.

Bananas are transported by aeroplane from the Caribbean to the UK.



Complete the sentences.

3 (a) The aeroplane uses a lot of ..... to fly.
(1 mark)

3 (b) (i) The aeroplane produces a waste gas called ..... .
(1 mark)

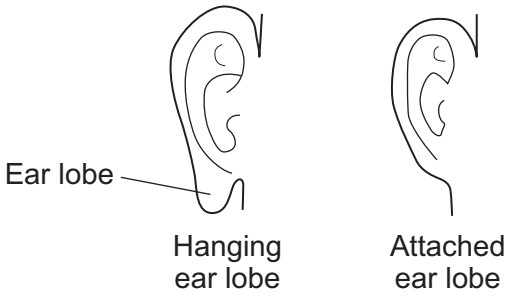
3 (b) (ii) The waste gas pollutes the..... .
(1 mark)

3

Turn over for the next question

4 People have different shaped ear lobes, either 'hanging' or 'attached'.

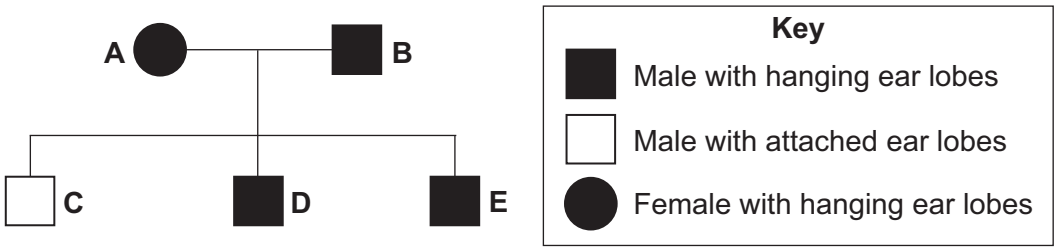
The diagrams show the two shapes of ear lobe.



A gene controls the shape of a person's ear lobes.

The diagram shows a family tree.

Parents **A** and **B** both have hanging ear lobes.



4 (a) The key does **not** show the symbol for a female with attached ear lobes.

Draw the symbol for the key to show a female with attached ear lobes.

Use information in the family tree and the key.

Symbol = ...

(1 mark)

4 (b) Look at the family tree.

What does the information in the family tree tell you about the allele for hanging ear lobes?

Draw a ring around the correct word to complete the sentence.

The allele for hanging ear lobes is

dominant.

weak.

recessive.

(1 mark)

4 (c) (i) Parents **A** and **B** have three children, **C**, **D** and **E**.
All three children are boys.

What are the chances that the next child of parents **A** and **B** will be a girl?

Draw a ring around **one** answer.

no chance (0%) **a half (50%)** **certain (100%)**

(1 mark)

4 (c) (ii) Which statement explains your answer to part **(c)(i)**?

Tick (✓) **one** box.

Some of **B**'s sperm cells have an X chromosome. ☐

Some of **A**'s egg cells have a Y chromosome. ☐

All of **B**'s sperm cells have an X chromosome. ☐

(1 mark)

4

Turn over for the next question

5 (a) Complete the word equation for photosynthesis.

Use words from the box.

chlorophyll	**minerals**	**oxygen**	**water**

carbon dioxide + ... → glucose + ...

(2 marks)

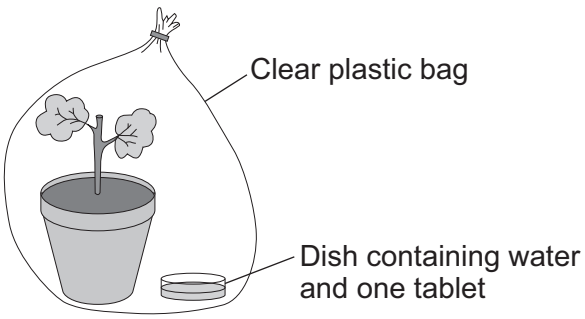
5 (b) Plants may grow faster if they have more carbon dioxide.

Indigestion tablets dissolve in water to form a solution.
This solution slowly gives off carbon dioxide.

A student set up an investigation to see what concentration of carbon dioxide is best for increasing the growth of geranium plants.

The student:

- put a geranium plant in a clear plastic bag
- put a dish containing water and one tablet in the bag
- sealed the top of the bag.



The student:

- set up 5 more experiments each with water and a different number of tablets
- left all the plants in a well-lit place for four weeks.

The student used a clear plastic bag, not a black plastic bag.

Explain why.

.....

.....

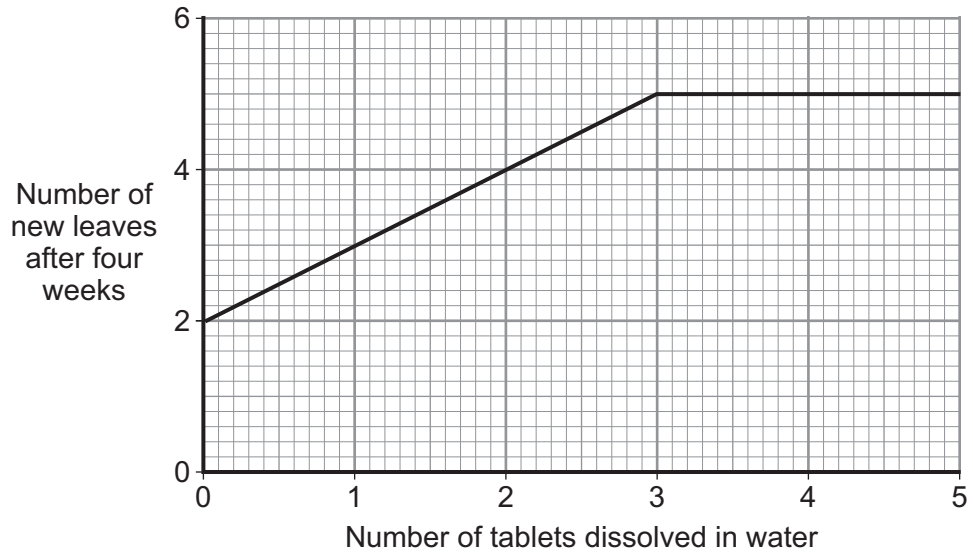
.....

.....

(2 marks)

5 (c) After four weeks, the student counted the number of new leaves on each plant.

The graph shows his results.



Describe the effect of increasing the number of tablets dissolved in water on the number of new leaves that grew in four weeks.

.....

.....

.....

.....

.....

.....

(3 marks)

7

Turn over ▶

6 Stem cells can be collected from human embryos and from adult bone marrow. Stem cells can develop into different types of cell.

The table gives information about using these two types of stem cell to treat patients.

Stem cells from human embryos	**Stem cells from adult bone marrow**
It costs £5000 to collect a few cells.	It costs £1000 to collect many cells.
There are ethical issues in using embryo stem cells.	Adults give permission for their own bone marrow to be collected.
The stem cells can develop into most other types of cell.	The stem cells can develop into only a few types of cell.
Each stem cell divides every 30 minutes.	Each stem cell divides every four hours.
There is a low chance of a patient's immune system rejecting the cells.	There is a high chance of a patient's immune system rejecting the cells.
More research is needed into the use of these stem cells.	Use of these stem cells is considered to be a safe procedure.

Scientists are planning a new way of treating a disease, using stem cells.

Use **only** the information above to answer these questions.

6 (a) Give **three** advantages of using stem cells from embryos instead of from adult bone marrow.

1 .....

2 .....

3 .....

(3 marks)

6 (b) Give **three** advantages of using stem cells from adult bone marrow instead of from embryos.

1 .....

2 .....

3 .....

(3 marks)

6

7 In a woodland, bluebells grow well every year.

Bluebells growing well in woodland

Each year the dead flowers and leaves of the bluebells and leaves from the trees fall onto the ground.
The bluebells do not run out of mineral ions.

Explain why the bluebells do **not** run out of mineral ions.

The words in the box may help you.

roots	**dead leaves**	**mineral ions**
	microorganisms	**decay**

.....

.....

.....

.....

.....

.....

(3 marks)

3

Turn over ▶

8 A group of students is going on an outdoor expedition.
The students need to keep warm in windy conditions.

The table shows the effect of wind speed on how quickly someone gets frostbite at different air temperatures.

Wind speed in metres per second	**Air temperature in °C**				
	10	**0**	**–10**	**–20**	**–30**
0					
5					
10					
15					
20					

Key

Time taken to get frostbite:
- No frostbite
- 30 minutes
- 10 minutes
- 5 minutes

8 (a) (i) Describe the effect of changing air temperature on the time taken to get frostbite.

.....

.....

(1 mark)

8 (a) (ii) What is the longest time it is safe to stay outside when the air temperature is –20 °C and the wind speed is 10 metres per second?

..... minutes

(1 mark)

8 (b) When core body temperature begins to fall, changes may happen in the body.

Which **two** changes will happen when core body temperature begins to fall?

Tick (✓) **two** boxes.

More blood flows through skin capillaries ☐

Muscles 'shiver' ☐

Blood vessels supplying the skin capillaries constrict ☐

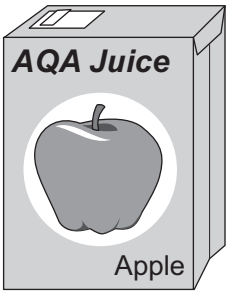
Sweat glands release more sweat ☐

(2 marks)

4

Turn over for the next question

9 Fruit is crushed to release fruit juice.



More juice can be collected if the plant cell walls in the fruit are broken down.

Some students tested the effect on the volume of fruit juice that they could collect of:

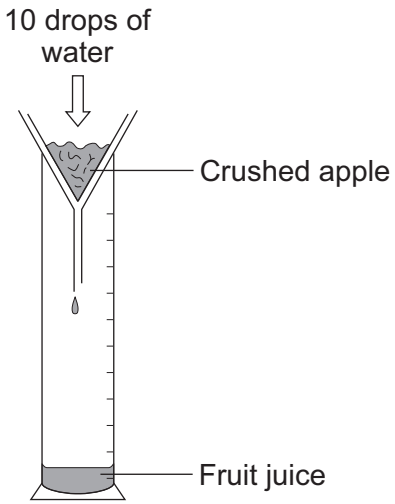
- **either** boiling the fruit
- **or** adding the enzyme pectinase to the fruit
- **or** adding the enzyme amylase to the fruit.

In their first experiment the students:

- crushed 20 g of apple
- added 10 drops of water
- measured the volume of fruit juice that they collected.

Diagram 1 shows how they collected the fruit juice.

Diagram 1



The students did three more experiments.

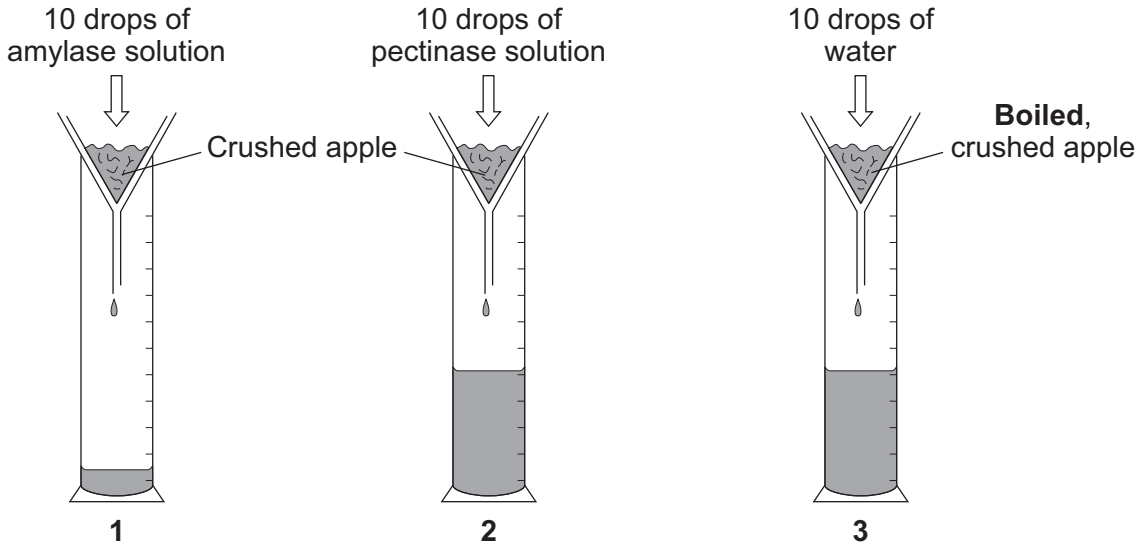
1 They added 10 drops of amylase solution to 20 g of crushed apple.

2 They added 10 drops of pectinase solution to 20 g of crushed apple.

3 They added 10 drops of water to 20 g of **boiled**, crushed apple.

Diagram 2 shows these experiments.

Diagram 2



9 (a) Give **one** control variable in this investigation.

.....

(1 mark)

9 (b) Using drops to measure the volume of water and enzyme added might lead to inaccurate results.

Give **one** reason why.

.....

(1 mark)

Question 9 continues on the next page

Turn over ▶

9 (c) The students' results are shown in the table.

What was added to the crushed apple	Was the apple boiled?	Volume of juice collected in cm^3
10 drops of water	No	1.2
10 drops of amylase solution	No	1.2
10 drops of pectinase solution	No	11.3
10 drops of water	Yes	11.6

Explain as fully as you can the students' results shown in the table.

Use all the information given in question 9 to help you to answer this question.

.....

.....

.....

.....

.....

.....

(3 marks)

9 (d) One student said:

'If we add 10 drops of pectinase solution to crushed apple *while it is boiling*, we should collect more juice than if we add 10 drops of water to boiled apple.'

This is **not** correct.

What volume of juice would you predict the students would collect if 10 drops of pectinase solution were added to crushed apple *while it was boiling*?

Draw a ring around **one** answer.

1.2 cm^3 **11.3 cm^3** **11.6 cm^3** **22.9 cm^3**

(1 mark)

Explain your answer.

.....

.....

.....

.....

(2 marks)

8

END OF QUESTIONS

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