AQA GCSE BIOLOGY (4411)

BIOLOGY



EXAM QUESTION PACK

UNIT B2 FOUNDATION TIER BLY2F PAPERS

STEMUP

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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	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
June 2012

Additional Science
Unit Biology B2

BLY2F

F

Biology
Unit Biology B2

Written Paper

Monday 21 May 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.

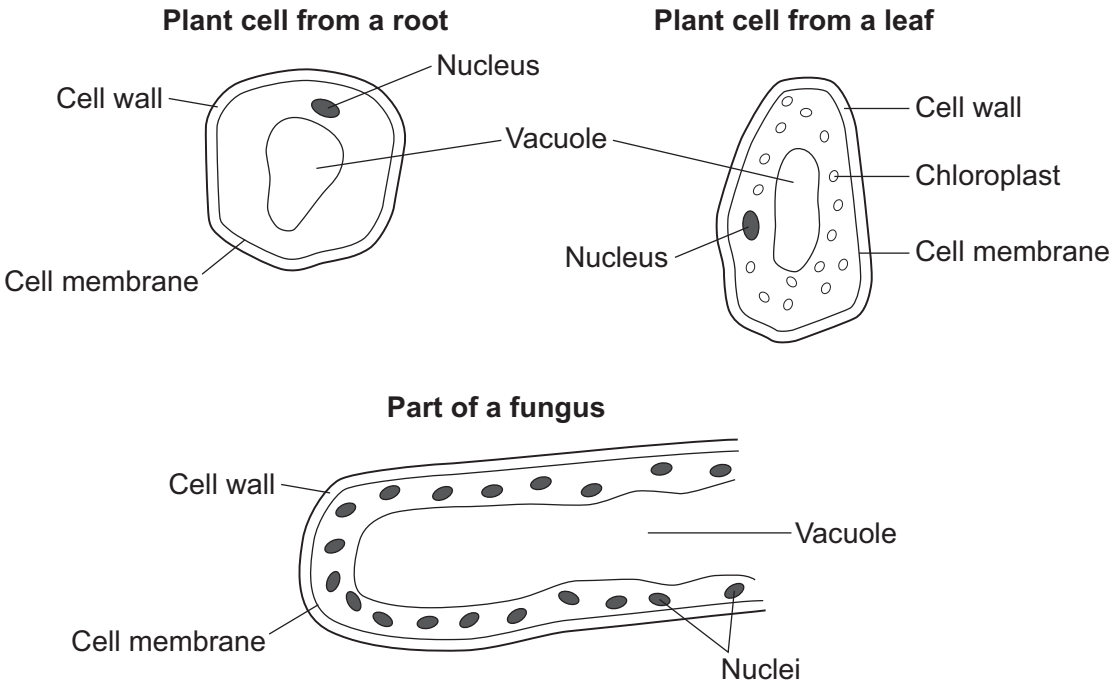
Advice
- In all calculations, show clearly how you work out your answer.

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Do not write outside the box

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

1 The diagrams show plant cells from a root and a leaf, and part of a fungus.



1 (a) There are differences and similarities between the plant cells and the fungus.

Use evidence from the diagrams to answer these questions.

1 (a) (i) Draw a ring around the correct answer to complete the sentence.

The fungus is different from **both** plant cells because

the fungus contains	many nuclei.
	a cell membrane and a cell wall.
	no chloroplasts.

(1 mark)

1 (a) (ii) Give **one** way in which the fungus is similar to **both** plant cells.

.....

(1 mark)

Do not write outside the box

1 (b) Fungi decay dead organisms.

1 (b) (i) Which **two** conditions will speed up the process of decay?

Tick (✓) **two** boxes.

Warm ☐

Dry ☐

Plenty of carbon dioxide ☐

Moist ☐

Cold ☐

(2 marks)

1 (b) (ii) What happens to the dead organisms during the process of decay?

Draw a ring around **one** answer.

they are digested **they photosynthesise** **they respire**

(1 mark)

5

Turn over for the next question

Do not write outside the box

2 The table shows the mass of carbon dioxide passed into the atmosphere in one year.

	Mass of carbon dioxide passed into the atmosphere in billions of tonnes per year
Animals	45
Plants	15
Microorganisms	60
Human activity	9

2 (a) (i) Calculate the total mass of carbon dioxide passed into the atmosphere in one year.

.....

.....

Answer = ... billion tonnes
(1 mark)

2 (a) (ii) Plants take 120 billion tonnes of carbon dioxide out of the atmosphere per year.

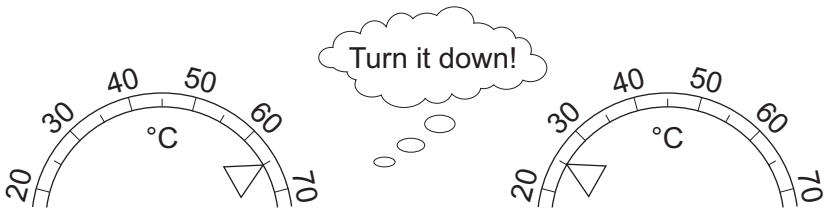
Use your answer to part **(a)(i)** to calculate the change in the mass of carbon dioxide in the atmosphere in one year.

.....

.....

Answer = ... billion tonnes
(1 mark)

2 (b) The drawing shows part of a campaign to encourage householders to reduce the temperature of the water used to wash clothes.



Do not write outside the box

Give **two** advantages to the environment of reducing the temperature of the water used to wash clothes.

1 .....

.....

2 .....

.....

(2 marks)

2 (c) A householder reduces the temperature of the water he uses to wash clothes.
He finds that some stains are not removed at the new temperature.
He decides to use a biological washing powder.
Biological washing powders contain enzymes.

2 (c) (i) Draw a line from each enzyme in **List 1** to the type of stain the enzyme will remove, in **List 2**.

List 1 **Enzyme**	**List 2** **Type of Stain**
	Starch
Protease	
	Fat
Lipase	
	Protein

(2 marks)

2 (c) (ii) The biological washing powder would **not** have removed the stains from clothes if the water had been at 65 °C.

Use **one** word from the box to complete the sentence.

killed	**denatured**	**diffused**

At 65 °C the enzymes would be..... .

(1 mark)

7

Turn over ▶

Do not write outside the box

3 The volume of water the body needs depends on a number of factors.

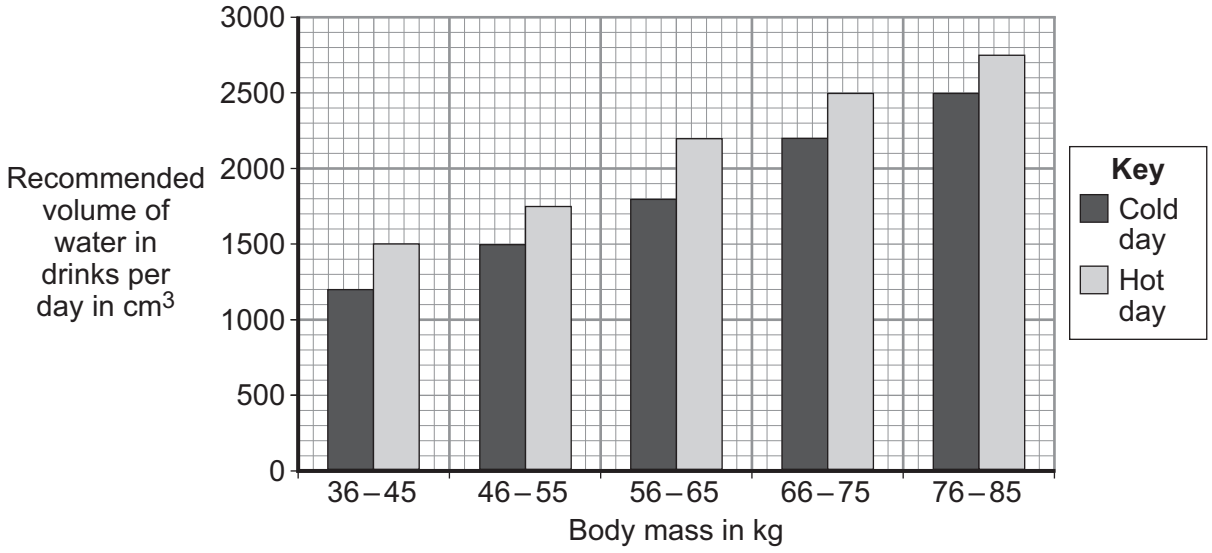
3 (a) Water enters the body in drinks.

Give **one** other way the body can get water.

.....

(1 mark)

3 (b) The chart shows the recommended volume of water that women of different body masses should drink, on a cold day and on a hot day.



3 (b) (i) Describe the relationship between body mass and the recommended volume of water that a woman should drink.

.....

.....

(1 mark)

3 (b) (ii) What is the recommended volume of water that a 70 kg woman should drink on a cold day?

..... cm^3

(1 mark)

Do not write outside the box

3 (b) (iii) While following a diet, the 70 kg woman loses 10 kg of body mass.

Calculate how much less water she is recommended to drink on a cold day.

Use information from the chart.

Show clearly how you work out your answer.

.....

.....

.....

Answer = ... cm^3

(2 marks)

3 (c) It is recommended that women should drink more water on a hot day than on a cold day.

Why?

.....

.....

.....

.....

(2 marks)

3 (d) Excess water is lost from the body in urine.

Name the organ that produces urine.

.....

(1 mark)

8

Turn over for the next question

Do not write outside the box

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED

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4 The diagram shows a strawberry plant.

The parent plant grows side shoots.

New plants grow on the side shoots.



The new plants will all have the same inherited characteristics as the original parent plant.

Complete the sentences to explain why.

Use words from the box.

asexual	**differentiation**	**embryos**	**fertilisation**
gametes	**genes**	**mitosis**	**sexual**

4 (a) The new plant is produced by ..... reproduction.
(1 mark)

4 (b) In this type of reproduction, body cells divide by ..... .
(1 mark)

4 (c) The new plant has the same ..... as the parent plant.
(1 mark)

3

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5 There are plans for a 'cattle factory' to be built in the UK.

Information about the cattle factory and traditional cattle farming in the UK is given below.



Cattle factory



Traditional cattle farming

Cattle factory

- There will be over 8 000 cows in three large sheds.
- Each cow will be milked three times a day.
- Each cow will produce about 50 litres of milk every day.
- Waste will be collected and used to produce electricity for 2 000 homes.
- Cows are kept near to each other so disease can spread easily.

Traditional cattle farming

- Most farms have between 5 and 500 cows.
- The cows spend most of the time in fields.
- Cows are milked once or twice a day.
- Each cow produces up to 20 litres of milk a day.
- The waste is used as natural fertiliser for crops.

5 (a) Use the information to answer the questions.

5 (a) (i) Give **two** reasons why some people think the cattle factory is a good idea.

1 .....

.....

2 .....

.....

(2 marks)

Do not write outside the box

5 (a) (ii) Give **two** reasons why some people think traditional farming is better than the cattle factory.

1 .....

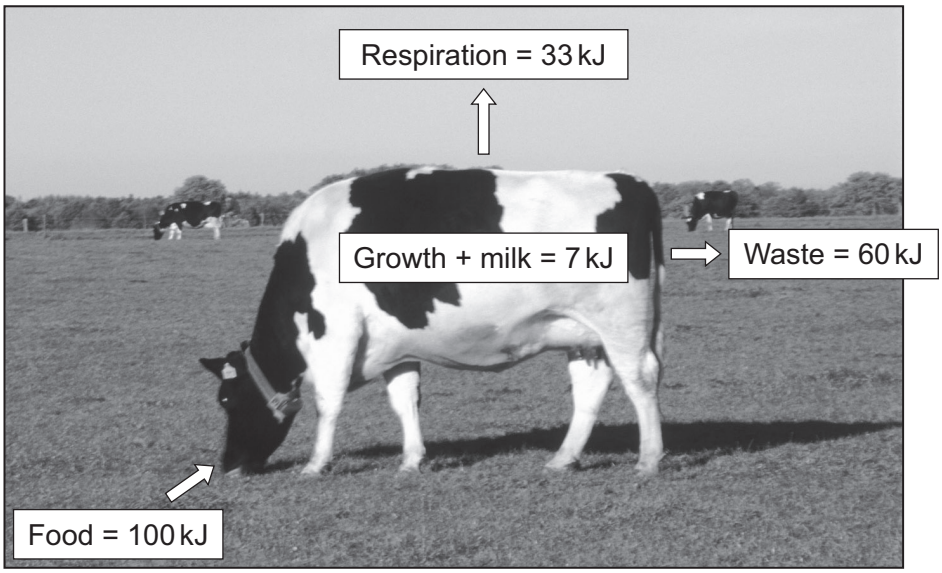
.....

2 .....

.....

(2 marks)

5 (b) The diagram shows what happens to 100 kJ of energy in the food eaten by a cow on a traditional farm.



Use your knowledge and the information in the diagram to answer this question.

Compare the transfer of energy from the food eaten by cows in the cattle factory with the energy transferred by cows on a traditional farm.

Use words from the box to complete the table.

more	less	the same

Energy	Amount of energy transferred by cows in a cattle factory compared with cows on a traditional farm
transferred for growth and milk	
transferred in respiration	

(2 marks)

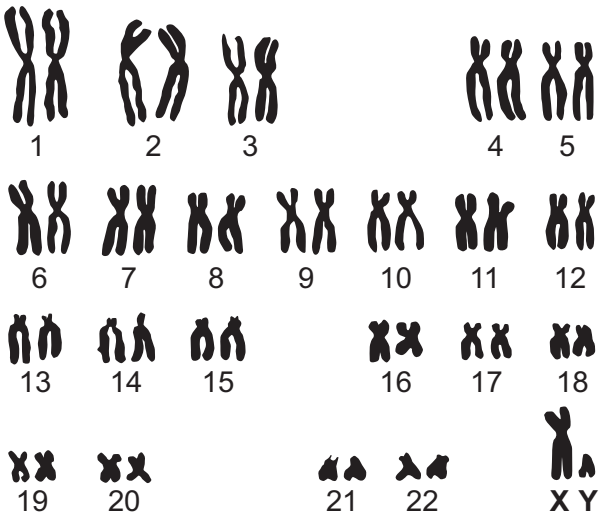
6

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6 When scientists look at dividing cells under a microscope, they can see strands that contain a chemical called DNA.

A photograph of these strands can be cut up and re-arranged.

The diagram shows an arrangement of the strands from a human cell.



6 (a) What name is given to the strands containing DNA shown in the diagram?

Draw a ring around **one** answer.

alleles **chromosomes** **genes**

(1 mark)

6 (b) Look carefully at the diagram.

6 (b) (i) The cell was taken from a man and not from a woman.

How can you tell?

.....

(1 mark)

Do not write outside the box

6 (b) (ii) What evidence is there that the strands are from a body cell, and not from a gamete?

Tick (✓) **one** box.

The strands are arranged in order of size. ☐

The strands are in pairs. ☐

Gametes are made in the testes and ovaries. ☐

(1 mark)

6 (b) (iii) When a human cell is not dividing the strands containing DNA are **not** clearly visible.

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

In a human cell, the DNA is normally found in the

cell membrane.

cytoplasm.

nucleus.

(1 mark)

4

Turn over for the next question

Do not write outside the box

7 People often grow pondweed in fishponds to *oxygenate* the water.

7 (a) Name the process that the pondweed uses to produce oxygen.

.....

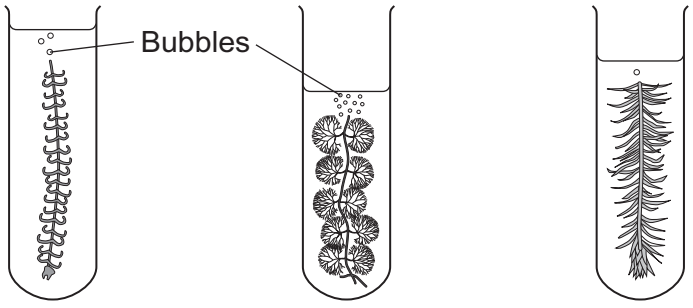
(1 mark)

7 (b) A student investigated oxygen production in three different pondweeds, *Elodea*, *Cabomba* and *Egeria.*

The student:

- cut a piece of pondweed from an *Elodea* plant
- put the pondweed into a tube of water
- counted the bubbles given off in one minute
- did the experiment again using a piece of pondweed from a *Cabomba* plant
- did the experiment a third time using a piece of pondweed from an *Egeria* plant.

The diagram shows the student's investigation.



The table shows the results.

Pondweed	Number of bubbles produced in 1 minute
Elodea	17
Cabomba	28
Egeria	8

Do not write outside the box

7 (b) (i) The student said:

"I suggest that people grow *Cabomba* in garden ponds to oxygenate the water fastest."

Give **three** variables the student should have controlled to make sure his conclusion was valid.

Use information from the student's method and the diagram.

1 .....

.....

2 .....

.....

3 .....

.....

(3 marks)

7 (b) (ii) The three pondweeds all cost about the same.

Suggest **one** other factor that people with fishponds might think about before deciding which type of pondweed to use.

.....

(1 mark)

7 (c) A person grows *Cabomba* in his pond.

The *Cabomba* plants develop yellow leaves.

Which mineral ion would stop the leaves turning yellow?

.....

(1 mark)

6

Turn over for the next question

Do not write outside the box

8 It is important that the concentration of glucose (sugar) in the blood is controlled.

8 (a) (i) Which hormone controls the concentration of glucose in the blood?

.....

(1 mark)

8 (a) (ii) Which organ produces this hormone?

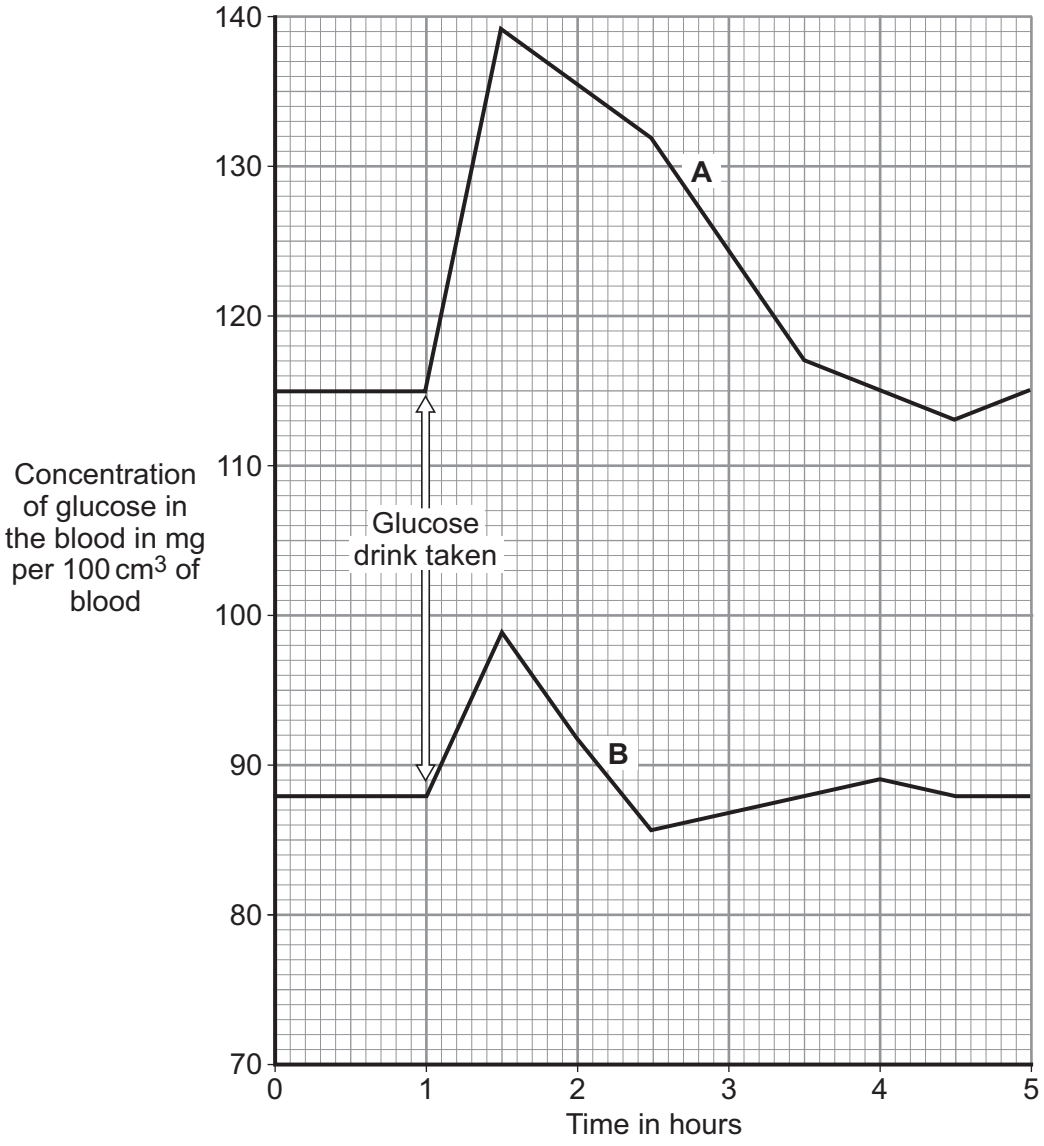
.....

(1 mark)

8 (b) The concentration of glucose in the blood of two people, **A** and **B**, was measured every half an hour.

One hour after the start, both people drank a solution containing 50 g of glucose.

The graph shows the result.



Do not write outside the box

8 (b) (i) By how much did the blood glucose concentration in person **B** rise after drinking the glucose drink?

..... mg per 100 cm^3 of blood
(1 mark)

8 (b) (ii) A doctor suggests that person **A** has diabetes.

Give **two** pieces of evidence from the graph to support this suggestion.

1 .....

.....

2 .....

.....
(2 marks)

8 (b) (iii) Give **one** reason for the fall in blood glucose concentration in person **B**, shown in the graph.

.....
(1 mark)

6

END OF QUESTIONS

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Version : 10/08/2012



General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

Mark Scheme

2012 examination – June series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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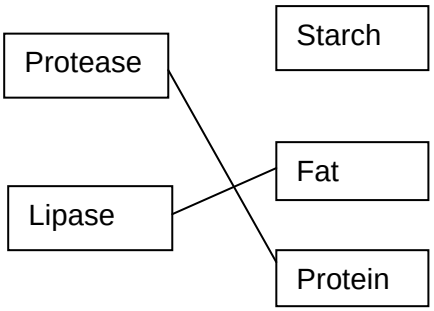
Question 1

question	answers	extra information	mark
1(a)(i)	many nuclei		1
1(a)(ii)	any **one** from: (all have) • (cell) wall • (cell) membrane • vacuole • cytoplasm		1
1(b)(i)	Warm Moist	if more than two boxes are ticked deduct **1** mark for each incorrect tick	1 1
1(b)(ii)	they are digested		1
Total			**5**

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Question 2

question	answers	extra information	mark
2(a)(i)	129		1
2(a)(ii)	9	accept calculated difference between answer to (a)(i) and 120	1
2(b)	less energy / power used less pollution / carbon dioxide **or** less hot water / less heat released	allow less fuel / named fuel used ignore cost allow less global warming / carbon emissions or reduced carbon footprints do **not** accept secondary effects alone, eg less melting of ice caps	1 1
2(c)(i)		**1** mark for each correct line do **not** accept two lines from an enzyme	2
2(c)(ii)	denatured	if no answer on the line accept a clear indication of correct answer in the box	1
Total			**7**

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Question 3

question	answers	extra information	mark
3(a)	any **one** from: • (in) food / named • (from) respiration	 allow eating do **not** allow breathing	1
3(b)(i)	the greater / heavier the body mass the more water (should be drunk)	ignore references to hot / cold day accept positive (relationship) ignore figures unqualified	1
3(b)(ii)	2200		1
3(b)(iii)	400	award **2** marks for correct answer, irrespective of working allow ecf from b(ii) for **2** marks if no answer or incorrect answer: 2200 – 1800 **or** b(ii) – 1800 gains **1** mark	2
3(c)	need to replace water lost / prevent dehydration / keep hydrated from / by (more) sweat	idea of balancing input and output ignore other losses	1 1
3(d)	kidney		1
Total			**8**

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Question 4

question	answers	extra information	mark
4(a)	asexual		1
4(b)	mitosis		1
4(c)	genes		1
Total			**3**

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Question 5

question	answers	extra information	mark
5(a)(i)	any **two** from: • more milk • electricity produced • farmers can keep more cows in the space	 (about) 50 litres milk compared to (up to) 20 litres / 30 litres more ignore costs / profit answers must refer to number of cows and space	2
5(a)(ii)	any **two** from: • less stress for cow **or** not cruel to cow **or** cows have freedom to move around • crops fertilised • less disease **or** disease not as easily spread	 ignore references to ethical / unnatural without qualification	2
5(b)	more less	in this order	1 1
Total			**6**

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Question 6

question	answers	extra information	mark
6(a)	chromosomes		1
6(b)(i)	has XY / Y	allow female would be XX / has no Y	1
6(b)(ii)	The strands are in pairs		1
6(b)(iii)	nucleus		1
Total			**4**

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Question 7

question	answers	extra information	mark
7(a)	photosynthesis	do **not** accept other additional processes	1
7(b)(i)	any **three** from, eg: • mass of pondweed • volume of water • other reasonable features of the water • light intensity • light colour • carbon dioxide • temperature • pH	ignore time / apparatus type of pondweed = max **2** accept amount / volume / length / size ignore number / surface area of leaves / pondweed unqualified accept amount accept distance between light source and tube / pondweed accept light if neither colour nor intensity is given	3

Question 7 continues on the next page ….

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Question 7 continued

question	answers	extra information	mark
7(b)(ii)	any **one** idea from, eg: • how much oxygen they give off • is pondweed poisonous to fish • will fish eat pondweed • is pondweed harmful to environment • how long the pondweed lives • growth rate / size of pondweed • reference to appearance / aesthetics • availability	ignore reference to cost	1
7(c)	magnesium / Mg	accept iron / Fe ignore ion and $^{+}$ or $^{-}$ ignore nitrate	1
Total			**6**

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Question 8

question	answers	extra information	mark
8(a)(i)	insulin	accept glucagon (correct spelling only)	1
8(a)(ii)	pancreas	accept phonetic spelling allow pancrease	1
8(b)(i)	11(.0)	accept in range 10.5–11 (.0)	1
8(b)(ii)	any **two** from: • high(er) concentration (of blood glucose) (anywhere / any time) • large(r) increase (in concentration after the drink) • fast(er) / steep(er) rise • slow(er) fall	ignore numbers unless comparative accept 115 not 88 139 not 99 accept increase by 24 not 11 / their b(i) accept it takes 3 hours not 1 ¼ hours to get back to original level accept it takes a long time to get back to normal	2
8(b)(iii)	any **one** from: • insulin present / produced • (used in) respiration • taken into cells	accept glucagon not produced allow exercise allow converted to glycogen allow taken into liver (cells) / muscle (cells) allow produce / make energy	1
Total			**6**

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Centre Number						Candidate Number				
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Other Names										
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Question	Mark
1	
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8	
9	
TOTAL	

AQA

General Certificate of Secondary Education
Foundation Tier
January 2012

Additional Science BLY2F
Unit Biology B2

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

Do not write outside the box

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ANSWER IN THE SPACES PROVIDED

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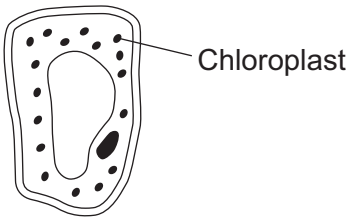
Answer **all** questions in the spaces provided.

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

A



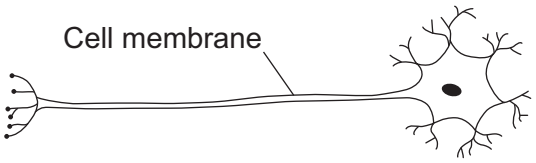
B



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

Do not write outside the box

2 The photographs show four ways of farming.

Growing wheat



Keeping sheep outside



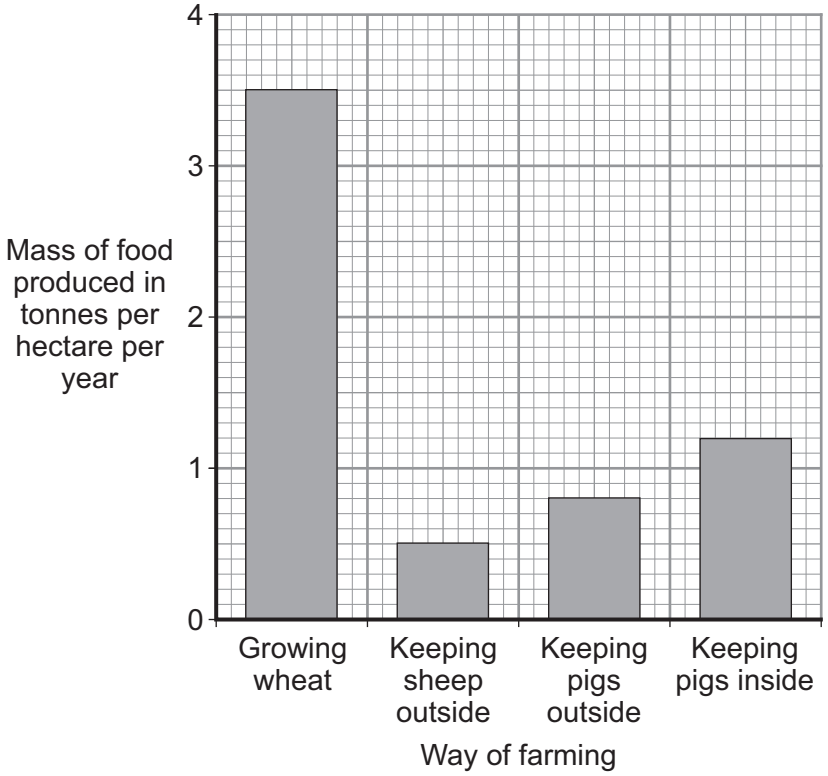
Keeping pigs outside



Keeping pigs inside



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



Do not write outside the box

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

Do not write outside the box

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

Give **one** reason why.

.....

.....

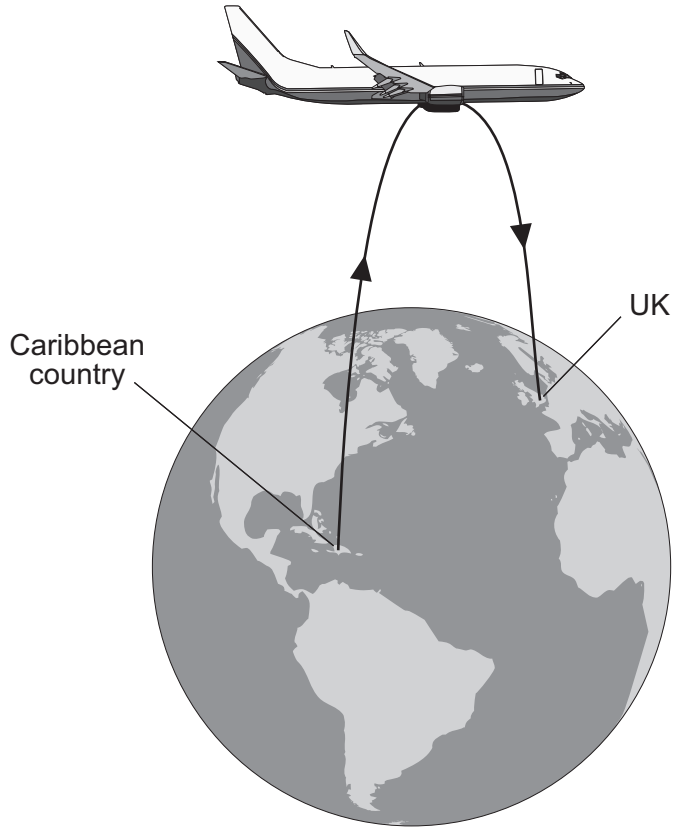
(1 mark)

7

Do not write outside the box

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)

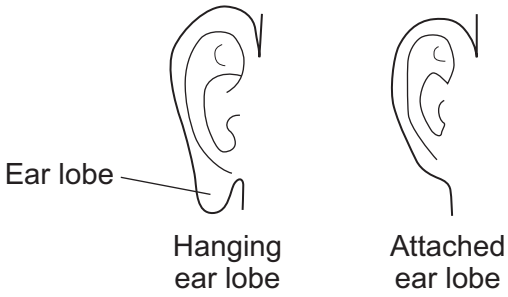
3

Turn over for the next question

Do not write outside the box

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

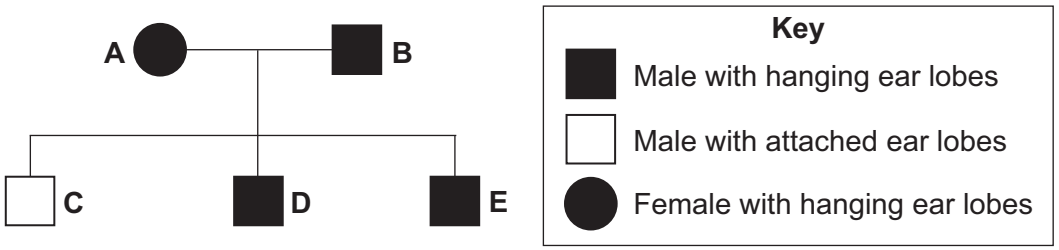
The diagrams show the two shapes of ear lobe.



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)

Do not write outside the box

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

Do not write outside the box

5 (a) Complete the word equation for photosynthesis.

Use words from the box.

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

carbon dioxide + ... → glucose + ...

(2 marks)

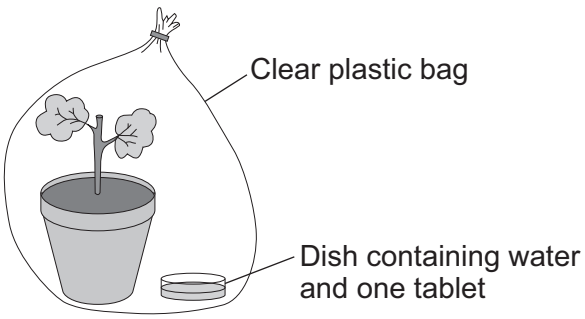
5 (b) Plants may grow faster if they have more carbon dioxide.

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.

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

Explain why.

.....

.....

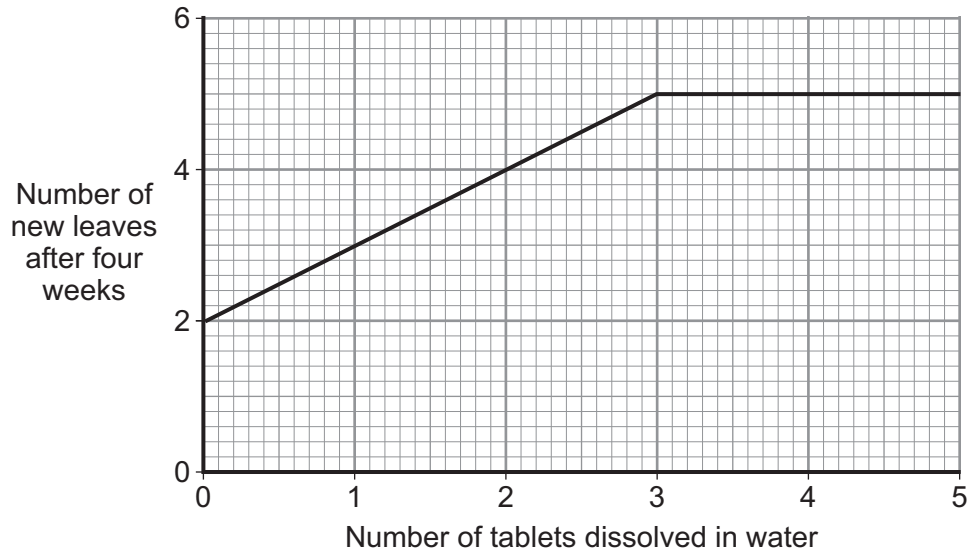
.....

.....

(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 ▶

Do not write outside the box

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

Do not write outside the box

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 ▶

Do not write outside the box

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)

Do not write outside the box

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 ☐

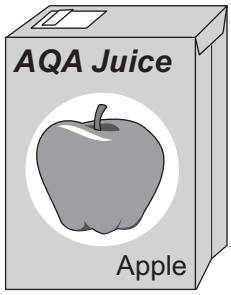
(2 marks)

4

Turn over for the next question

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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:

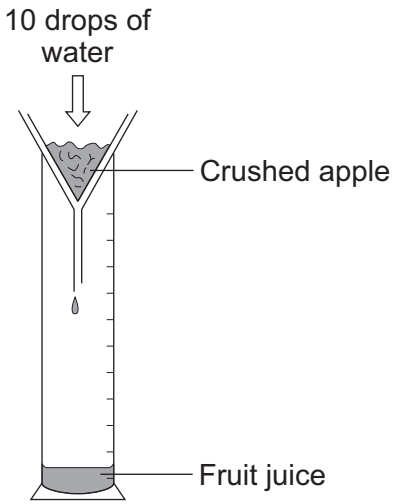
- **either** boiling the fruit
- **or** adding the enzyme pectinase to the fruit
- **or** adding the enzyme amylase to the fruit.

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



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The students did three more experiments.

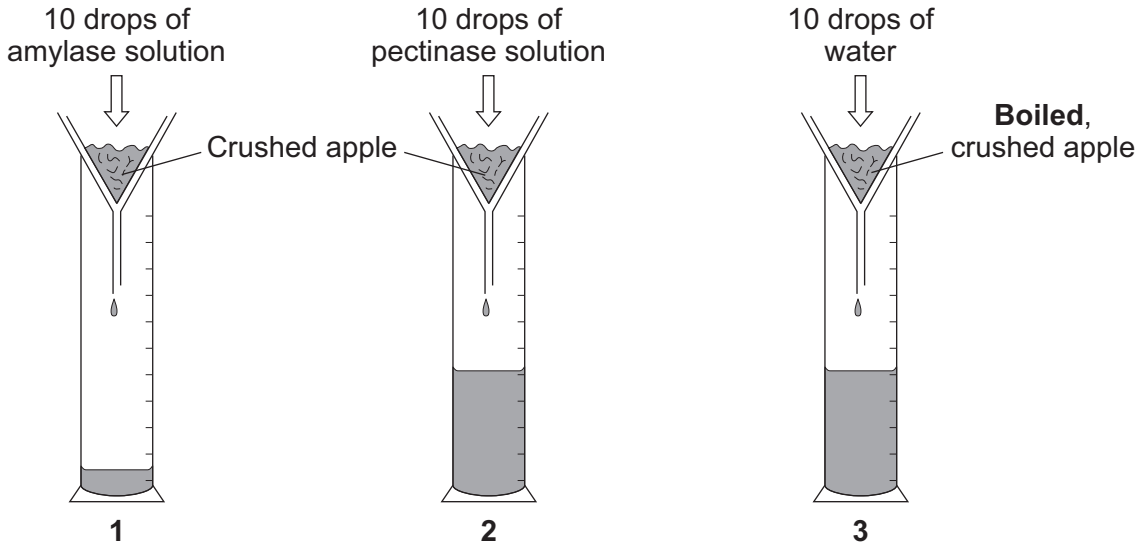
1 They added 10 drops of amylase solution to 20 g of crushed apple.

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 ▶

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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)

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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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Version : 07/03/2012



General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

Mark Scheme

2012 examination – January series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY2F

Question 1

question	answers	extra information	mark
1(a)	B		1
1(b)	D		1
1(c)	A		1
Total			**3**

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BLY2F

Question 2

question	answers	extra information	mark
2(a)	3 (.0)	correct answer, irrespective of working gains **2** marks. if the answer is incorrect or there is no answer, award **1** mark for use of correct figures (0.5 and 3.5) [and no other figures]	2
2(b)	as faeces	if more than two boxes ticked deduct **1** mark for each additional tick	1
	as carbon dioxide from respiration		1
2(c)(i)	pigs kept inside are kept in small pens	if more than two boxes ticked deduct **1** mark for each additional tick	1
	pigs kept inside are kept warm in the winter		1
2(c)(ii)	any **one** from: • faster growth • need less food • ready for market sooner	 ignore bigger / less flavour / fatty ignore references to movement / energy ignore ethical arguments	1
Total			**7**

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BLY2F

Question 3

question	answers	extra information	mark
3(a)	fuel	allow oxygen allow suitable / relevant types of fuel eg petrol / kerosene / energy / diesel / fossil fuel	1
3(b)(i)	carbon dioxide / CO_2 / CO2	apply list principle accept carbon monoxide / CO ignore sulfur dioxide	1
3(b)(ii)	air / atmosphere	apply list principle allow environment	1
Total			**3**

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BLY2F

Question 4

question	answers	extra information	mark
4(a)		the shape must be (roughly) circular **and** not shaded, for the mark accept the shape drawn in the key if it is not contradictory	1
4(b)	dominant		1
4(c)(i)	a half (50%)		1
4(c)(ii)	Some of B's sperm cells have an X chromosome		1
Total			**4**

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BLY2F

Question 5

question	answers	extra information	mark
5(a)	water	in this order only	1
	oxygen	accept correct chemical symbols allow H_2O / OH_2	1
5(b)	allow light (in / through) / need light	do **not** accept attracts light ignore heat / moisture / carbon dioxide ignore so the plants can be seen accept the converse, ie the black plastic bag would not let light in (1)	1
	for photosynthesis / make sugar / glucose	so there would be no photosynthesis (1) do **not** allow make food unqualified	1
5(c)	Increase (in leaves / new leaves)	ignore growth unqualified	1
	(then) level off **or** number of (new) leaves (then) stays the same		1
	numerical statement eg max at 3 tablets / 5 (new) leaves	should refer to one of the first two marking points for every extra tablet get 1 extra leaf = **2** marks for every extra tablet get 1 extra leaf then it levels off = **3** marks	1
Total			**7**

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BLY2F

Question 6

question	answers	extra information	mark
6(a)		comparisons are **not** required but should be credited accept a clear indication of the statement even if incomplete	
	can develop into most other types of cell		1
	each cell divides every 30 minutes		1
	low chance of rejection by the patient's immune system		1
6(b)	any **three** from: • cheaper / <u>only</u> costs £1000 • can collect many (stem) cells • adults give permission for their own bone marrow to be collected • safe	this **must** be comparative ignore costs £1000 *comparisons are not required but should be credited*	3
Total			**6**

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BLY2F

Question 7

question	answers	extra information	mark
7	any **three** from:	ignore references to carbon cycle accept digested / decomposed / broken down / rotted for decay throughout ignore eating	3
	• dead leaves / flowers / bluebells are decayed		
	• idea that microorganisms do the decaying	accept microbes / bacteria / fungi / mould / decomposers for microorganisms	
	• minerals / ions / nutrients / named released (by decay / microorganisms)	**not** mineral ions unqualified	
	• (released) into soil **or** minerals / ions / nutrients taken up / in by (bluebell) roots (next year)	look for idea that minerals / ions / nutrients are in soil (eg released into soil or taken up from soil)	
Total			**3**

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BLY2F

Question 8

question	answers	extra information	mark
8(a)(i)	the lower the temperature the shorter the time **or** the lower the temperature the more chance of frostbite	a trend is required accept reverse accept the lower the temperature the faster you get frostbite accept positive correlation but **not** directly proportional ignore wind speed	1
8(a)(ii)	any value from 5 to below 10	do **not** accept 10 allow less than 10 **or** < 10	1
8(b)	Muscles 'shiver' Blood vessels supplying the skin capillaries constrict	if more than two boxes ticked deduct **1** mark for each additional tick	1 1
Total			**4**

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Question 9

question	answers	extra information	mark
9(a)	any **one** from:	ignore control variables that are not given in the method, such as 'equally crushed' **or** same time do **not** accept volume of apple juice	1
	• 20 g (of apple) **or** (same) mass / amount / weight of apple	ignore volume / size	
	• crushed (apple)		
	• 10 drops (of solution) **or** (same) number / amount / volume of drops	do **not** accept 10 drops of amylase alone	
	• apple **or** type of fruit	ignore type of apple	
9(b)	(may) have different volume / amount / sizes	ignore reference to human error ignore don't know / can't measure size of drop	1
9(c)	amylase has no / little effect on cell / walls / apple **or** amylase does not breakdown / digest cell / walls / apple	accept ideas that refer to shape of enzyme being 'incorrect' accept amylase only breaks down / digests starch	1
	pectinase breaks down cell / walls / apple	allow digest for breakdown allow shape of pectinase fits cell / walls / apple	1
	boiling breaks down cell / walls / apple		1
9(d)	11.6		1
	enzyme / pectinase destroyed / denatured / damaged / broken down	do **not** allow kill	1
	only effect of boiling (relevant)		1
Total			**8**

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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
June 2011

Additional Science
Unit Biology B2

BLY2F

F

Biology
Unit Biology B2

Written Paper

Thursday 19 May 2011 1.30 pm to 2.15 pm

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.

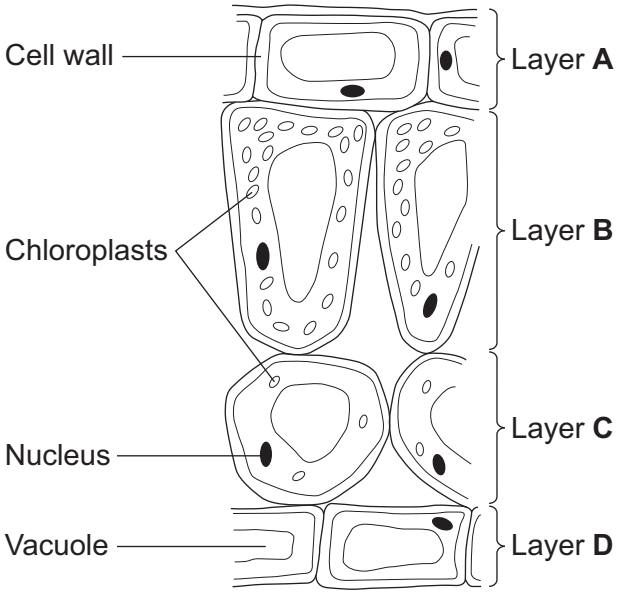
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Do not write outside the box

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

1 Leaves are made from layers of cells.

The diagram shows a section through part of a leaf.



1 (a) (i) Which word in the table describes layer **A**?

Tick (✓) **one** box.

Layer A	Tick (✓)
Tissue	
Organ	
Cell	

(1 mark)

1 (a) (ii) Which word describes a whole leaf?

Draw a ring around **one** answer.

organ **tissue** **organism**

(1 mark)

Do not write outside the box

1 (b) (i) Which **two** layers of cells, **A**, **B**, **C** and **D**, can photosynthesise?

Use information from the diagram to help you.

Tick (✓) **two** boxes.

Layer **A** ☐

Layer **B** ☐

Layer **C** ☐

Layer **D** ☐

(2 marks)

1 (b) (ii) Give **one** reason for your answer.

.....

.....

(1 mark)

1 (c) List **X** gives the names of two parts of a cell.
List **Y** gives information about parts of a cell.

Draw **one** line between each part of the cell in list **X** and information about it in list **Y**.

List X **Part of a cell**	**List Y** **Information**
	Controls the passage of substances into the cell
Vacuole	
	Contains the cell sap
Nucleus	
	Controls the activities of the whole cell

(2 marks)

7

Turn over ▶

Do not write outside the box

2 A gardener grows tomato plants.

The tomato plants develop yellow leaves.

2 (a) What would be the best way of improving the growth of these plants?

Tick (✓) **one** box.

Add mineral ions to the soil ☐

Water the plants more ☐

Add glucose to the soil ☐

(1 mark)

Do not write outside the box

2 (b) Most tomatoes are grown in greenhouses.



Tomato growers alter the conditions in greenhouses to make tomato plants grow faster.

Which changes in conditions will make tomato plants grow faster?

Tick (✓) **two** boxes.

Increasing the temperature ☐

Increasing the oxygen concentration in the air ☐

Increasing the nitrogen concentration in the air ☐

Turning lights on at night ☐

(2 marks)

3

Turn over for the next question

Do not write outside the box

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Do not write outside the box

3 Our bodies control the concentration of glucose in the blood.

Draw a ring around the correct answer to complete each sentence.

3 (a) The concentration of glucose in the blood is controlled by a

hormone called

- carbohydrase.
- insulin.
- protease.

(1 mark)

3 (b) This hormone is produced by the

- intestine.
- stomach.
- pancreas.

(1 mark)

3 (c) If the body does not produce enough of this hormone,

the person develops

- diabetes.
- cystic fibrosis.
- Huntington's disease.

(1 mark)

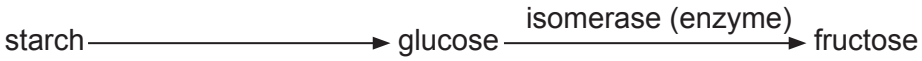
3

Turn over for the next question

Do not write outside the box

4 (a) Starch can be used to produce fructose for slimming foods.

The flow chart shows the process.



4 (a) (i) Isomerase is used to change glucose into fructose.

Which enzyme could be used to change the starch into glucose?

Draw a ring round **one** answer.

carbohydrase **isomerase** **protease**

(1 mark)

4 (a) (ii) What is the advantage of using fructose, instead of glucose, in slimming foods?

Tick (✓) **one** box.

Fructose is not as sweet as glucose so can be used in smaller amounts. ☐

Fructose is sweeter than glucose so can be used in larger amounts. ☐

Fructose is sweeter than glucose so can be used in smaller amounts. ☐

(1 mark)

Do not write outside the box

4 (b) Enzymes are used in industry.

These are some of the properties of industrial enzymes:

- enzymes work at low temperatures
- workers have to use face masks when working with enzymes
- enzymes work in a narrow range of pH values
- enzymes can be re-used many times
- enzymes are easily broken down by high temperature
- enzymes are very expensive to buy.

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

4 (b) (i) Give **two** advantages of using enzymes in industry.

1 .....

.....

2 .....

.....

(2 marks)

4 (b) (ii) Give **two** disadvantages of using enzymes in industry.

1 .....

.....

2 .....

.....

(2 marks)

6

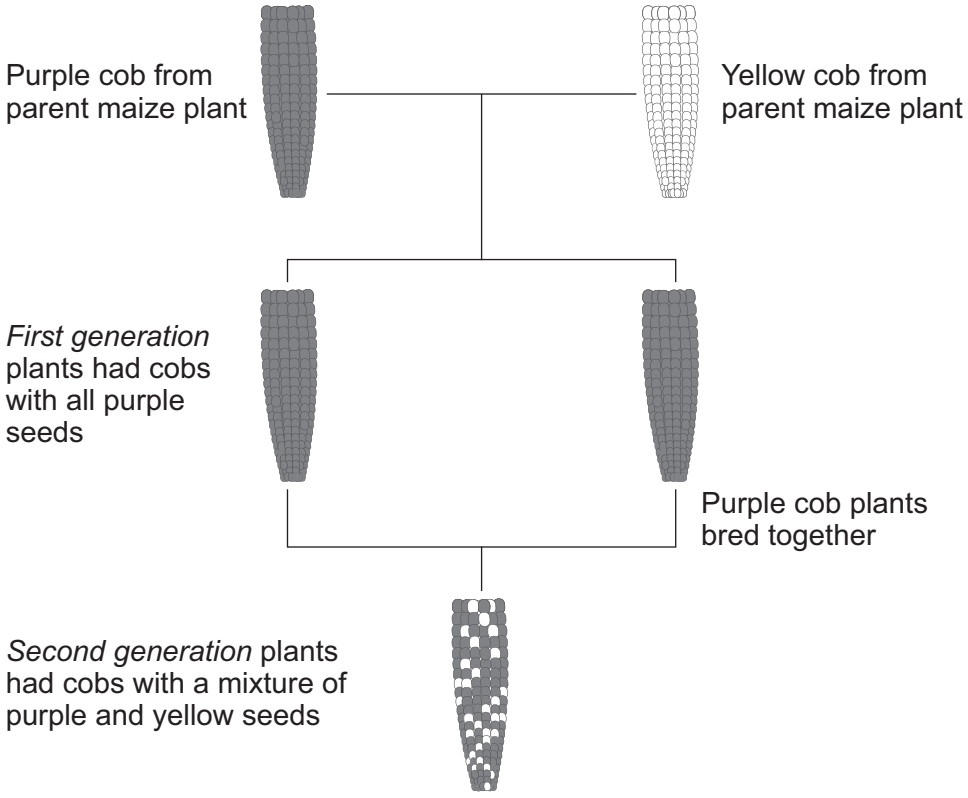
Turn over for the next question

Do not write outside the box

5 Maize plants reproduce sexually to form maize cobs.
Each maize cob has many seeds.

The colour of the seeds is controlled by a gene.
The gene has two alleles, purple and yellow.

The diagram shows the cobs produced by breeding maize plants.



5 (a) Use words from the box to complete the sentences.

dominant	**environmental**	**recessive**

5 (a) (i) The first generation plants show that the purple allele is

..... .

(1 mark)

5 (a) (ii) The second generation plants show that the yellow allele is

..... .

(1 mark)

Do not write outside the box

5 (b) The allele for purple can be represented by the letter **A**.
The allele for yellow can be represented by the letter **a**.

5 (b) (i) What alleles does a yellow seed have?

Draw a ring around **one** answer.

AA **Aa** **aa**

(1 mark)

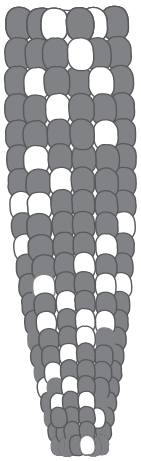
5 (b) (ii) What alleles does a purple seed from a *first generation* plant have?

Draw a ring around **one** answer.

AA **Aa** **aa**

(1 mark)

5 (c) The drawing shows a cob from one of the *second generation* plants.



A student counted 334 purple seeds and 110 yellow seeds on this maize cob.

What is the approximate ratio of purple seeds to yellow seeds on the cob?

Tick (✓) **one** box.

3 purple : 1 yellow ☐

1 purple : 3 yellow ☐

1 purple : 1 yellow ☐

(1 mark)

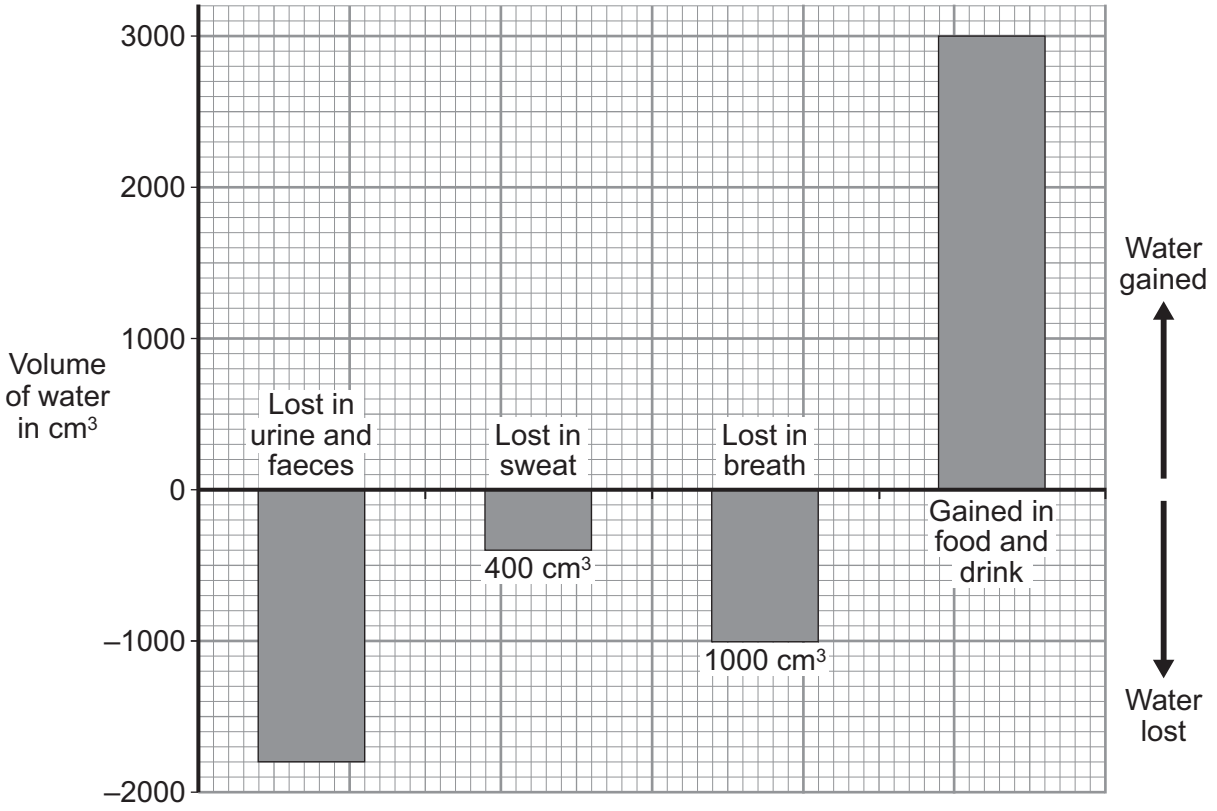
5

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Do not write outside the box

6 The bar chart shows different ways in which water is lost from and gained by the body on one day.

The volumes of water lost in the sweat and in the breath are labelled on the bars.



6 (a) How much water was lost in the urine and faeces? ..... cm^3

(1 mark)

6 (b) Water is lost from the body in urine, faeces, sweat and breath.

What was the total volume of water lost from the body on this day?

Show clearly how you work out your answer.

.....

.....

Answer = ... cm^3

(2 marks)

Do not write outside the box

6 (c) The volume of water lost should balance the volume of water gained.

What should the person do to balance the water gained with the water lost?

.....

.....

.....

.....

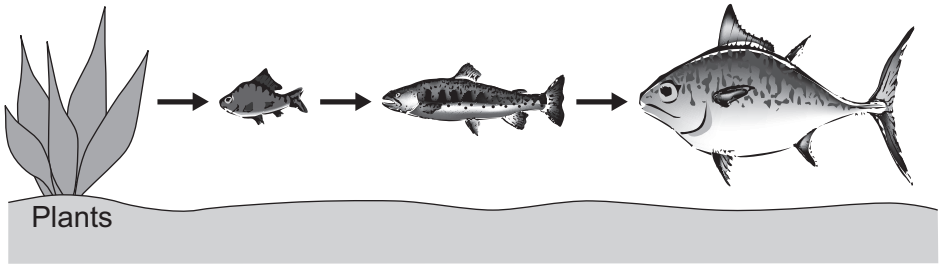
(2 marks)

5

Turn over for the next question

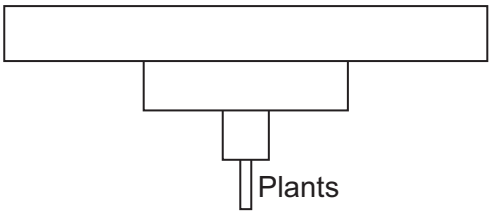
Do not write outside the box

7 The picture shows a food chain.

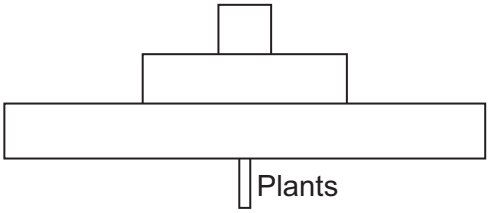


7 (a) Which diagram shows a pyramid of biomass for the food chain in the picture?

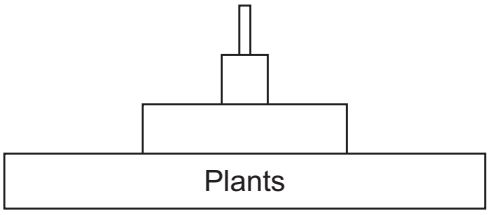
Tick (✓) **one** box.



☐



☐



☐

(1 mark)

7 (b) The plants at the start of the food chain absorb energy.

Where does this energy come from?

Draw a ring around **one** answer.

the water **the sun** **minerals**

(1 mark)

Do not write outside the box

7 (c) Some energy is lost at each stage of the food chain.

Give **two** ways in which energy may be lost from the food chain.

1 .....

.....

2 .....

.....

(2 marks)

4

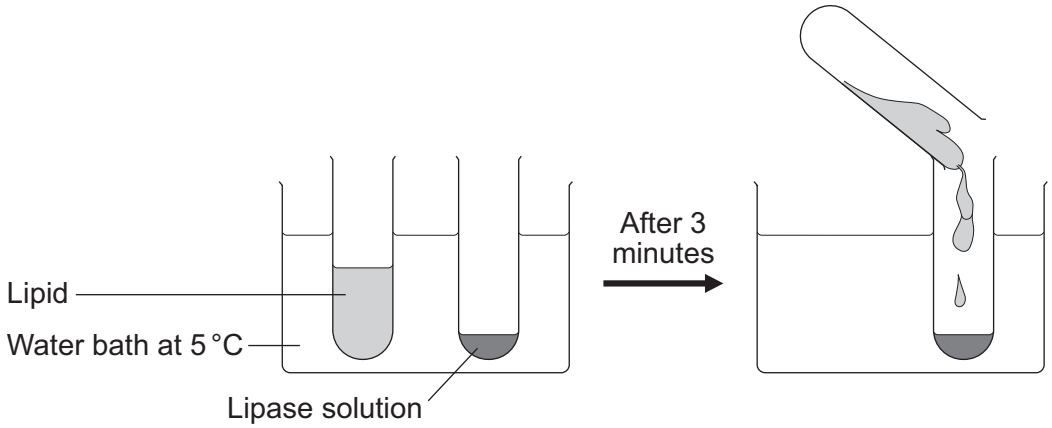
Turn over for the next question

Do not write outside the box

8 A group of students investigated the effect of temperature on the action of the enzyme lipase.

The students:

- put 1 cm^3 of lipase solution into a test tube
- put 5 cm^3 of lipid into a different test tube
- put both tubes in a water bath at 5°C for 3 minutes
- mixed the lipid with the lipase solution.



Every five minutes the students tested a sample of the mixture for lipid, until no lipid remained.
The students repeated the experiment at different temperatures.

8 (a) To make their investigation fair the students needed to control some variables.

Give **one** variable the students controlled in their investigation.

.....

(1 mark)

8 (b) The tubes of lipase solution and lipid were kept separately in the water bath for 3 minutes before mixing. Why?

Tick (✓) **one** box.

So that the lipase broke down the lipid quickly ☐

So that the lipase and the lipid reached the right temperature ☐

To give enough time for the lipase to break down the lipid ☐

To give enough time for the water bath to heat up ☐

(1 mark)

Do not write outside the box

The table shows the students' results.

Temperature in °C	Time taken until no lipid remained in minutes
5	40
20	15
35	5
50	30
95	lipid still there after 120 minutes

8 (c) Describe the effect on the breakdown of the lipid of increasing the temperature from 5°C to 50°C.

.....

.....

.....

.....

(2 marks)

8 (d) Suggest **two** ways in which the students could have improved their investigation.

Use information from the students' method and the results table to help you.

1 .....

.....

.....

2 .....

.....

.....

(2 marks)

Question 8 continues on the next page

Do not write outside the box

8 (e) (i) The lipase did **not** break down the lipid at 95°C.

Why?

.....

.....

(1 mark)

8 (e) (ii) At 35°C the lipase broke down the lipid after 5 minutes.

What new substances will be in the tube?

Draw a ring around **one** answer.

amino acids **fatty acids and glycerol** **sugars**

(1 mark)

8

Do not write outside the box

9 Cells contain a solution of salts and sugars.

A student is investigating how cells change when they are put into water.

9 (a) The student:

- looks at a plant cell using a microscope
- adds water to the cell.

The plant cell swells up.

Explain why, as fully as you can.

.....

.....

.....

.....

.....

.....

(3 marks)

9 (b) When **animal** cells are put in water, they swell up, and then burst.
When **plant** cells are put in water, they swell up, but do **not** burst.

How does the structure of plant cells prevent them from bursting?

.....

.....

(1 mark)

4

END OF QUESTIONS

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Version: 04/08/2011



General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

Mark Scheme

2011 examination – June series

STEMUP.CO.UK

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

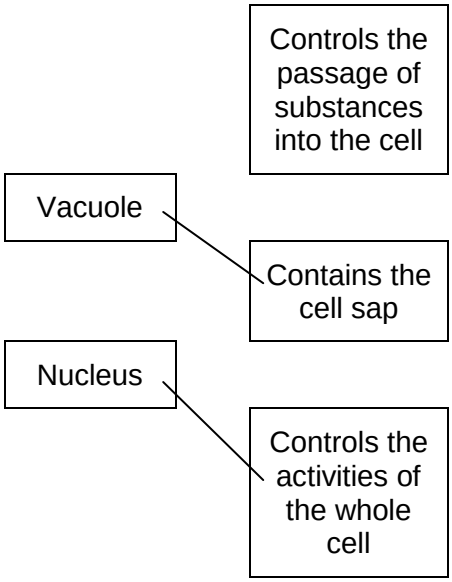
3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY2F

Question 1

question	answers	extra information	mark
1(a)(i)	tissue	extra box ticked cancels the mark	1
1(a)(ii)	organ	extra ring drawn cancels the mark	1
1(b)(i)	Layer B Layer C	each extra box ticked cancels **1** mark	1 1
1(b)(ii)	(contain) chloroplasts / chlorophyll	other parts disqualify	1
1(c)		two correct = **2** marks one correct = **1** mark extra line from a part of a cell cancels the mark	2
Total			**7**

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BLY2F

Question 2

question	answers	extra information	mark
2(a)	add mineral ions to the soil	extra box ticked cancels the mark	1
2(b)	increasing the temperature turning lights on at night	each extra box ticked cancels **1** mark	1 1
Total			**3**

BLY2F

Question 3

question	answers	extra information	mark
3(a)	insulin	extra ring drawn cancels the mark	1
3(b)	pancreas	extra ring drawn cancels the mark	1
3(c)	diabetes	extra ring drawn cancels the mark	1
Total			**3**

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BLY2F

Question 4

question	answers	extra information	mark
4(a)(i)	carbohydrase	extra ring drawn cancels the mark	1
4(a)(ii)	fructose is sweeter than glucose so can be used in smaller amounts	extra box ticked cancels the mark	1
4(b)(i)	(enzymes) work at low temperatures (enzymes) can be re-used / used many times	ignore references to specific temperatures ignore correct answers which are unrelated to the information	1 1
4(b)(ii)	any **two** from: • workers have to use face masks when working with enzymes • (enzymes) work in a narrow range of pH values • (enzymes) are easily broken down by high temperature • (enzymes) are expensive (to buy)	it is not necessary for the complete statement to be written out in each case ignore effects on the body ignore correct answers which are unrelated to the information. ignore reference to specific pHs ignore reference to specific temperatures	2
Total			**6**

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BLY2F

Question 5

question	answers	extra information	mark
5(a)(i)	dominant	allow clear indication	1
5(a)(ii)	recessive	allow clear indication	1
5(b)(i)	aa	extra ring drawn cancels the mark	1
5(b)(ii)	Aa	extra ring drawn cancels the mark	1
5(c)	3 purple : 1 yellow	extra box ticked cancels the mark	1
Total			**5**

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BLY2F

Question 6

question	answers	extra information	mark
6(a)	1800	allow – / minus 1800	1
6(b)	3200	award both marks for correct answer irrespective of working allow – / minus 3200 award **2** marks for 200 or –200 irrespective of working allow ecf from part (a) for both routes to 2 marks if no answer **or** incorrect answer then indication of addition of 1800 **or** their (a), 1000 and 400 gains **1** mark	2
6(c)	drink more / take in more from food & drink 200 (cm^3)	allow ecf from (b), ie if answer to (b) is less than 3000 then accept drink less if answer to (b) is exactly 3000 accept do nothing accept ecf from (b) answer should be difference between (b) and 3000 if answer to (b) is 3000 accept they are the same **NB** drink / take in 3200 (cm^3) of water = **1** mark drink / take in 200 (cm^3) of water = **2** marks ignore references to exercise / sweat	1 1
Total			**5**

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BLY2F

Question 7

question	answers	extra information	mark
7(a)	bottom / third pyramid ticked	extra box ticked cancels the mark	1
7(b)	the sun	extra ring drawn cancels the mark	1
7(c)	any **two** from: • heat • movement / named example internal or external • respiration • faeces / not all digested • excretion/ urine • not all of animal / all parts eaten	 ignore keeping warm ignore digestion do **not** allow <u>for</u> respiration allow waste for **1** mark if neither faeces nor excretion given (ie waste + movement = **2** marks waste + faeces = **1** mark do **not** accept growth / reproduction	2
Total			**4**

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BLY2F

Question 8

question	answers	extra information	mark
8(a)	any **one** from: • (same) volume / amount / 1 cm^3 lipase • (same) volume / amount / 5 cm^3 lipid • mixed after 3 minutes / same time before mixing	ignore reference to recording results every 5 minutes **or** concentrations of lipid / lipase allow amount of solution allow keep same volumes in the test tubes do **not** accept temperature	1
8(b)	so that the lipase and the lipid reached the right temperature		1
8(c)	any **two** from • decrease in time **or** faster (breakdown) • <u>then</u> increase in time **or** <u>then</u> slower (breakdown) • fastest / least time / optimum at 35°C	ignore explanations	2
8(d)	any **two** from: • test more regularly eg test every minute • test at smaller temperature intervals • test between 50 (^{o}C) and 95 (^{o}C) • repeat at same temperatures **or** repeat the investigation **or** compare results with others	ignore 'test at more temperatures' unqualified any interval < 5min any value <15°C allow test more temperatures in the range any value in range, eg test at 70 allow do **it** again	2

Question 8 continues on the next page

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Question 8 continued

question	answers	extra information	mark
8(e)(i)	(lipase / it) denatured / destroyed / changed shape	allow damaged / deformed do **not** accept killed ignore broken (down)	1
8(e)(ii)	fatty acids and glycerol		1
Total			**8**

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BLY2F

Question 9

question	answers	extra information	mark
9(a) **E**	because water enters (the cell / it / named cell)	do **not** accept salt / sugar / solution entering	1
	by osmosis / diffusion	if osmosis / diffusion not given accept concentration inside cell greater than outside cell assume concentration refers to solute concentration unless answer indicates otherwise allow water goes <u>up</u> the concentration gradient allow water goes <u>down its</u> concentration gradient do **not** accept if diffusion of salt / sugar	1
	through a partially permeable membrane	allow semi / selectively permeable membrane **or** description	1
9(b) **E**	(plant cells) have (cell) <u>wall</u>	accept animal cells have no (cell) <u>wall</u> ignore reference to cell membrane do **not** accept reference to other organelles **or** any implication that animal cells have a cell wall eg plant cells have a thicker cell wall	1
Total			**4**

The AQA UMS Conversion Calculator is available on the Results statistics page of the AQA Website

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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	
TOTAL	

AQA

General Certificate of Secondary Education
Foundation Tier
January 2011

Additional Science BLY2F
Unit Biology B2

Biology F
Unit Biology B2

Written Paper

Thursday 13 January 2011 9.00am 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.

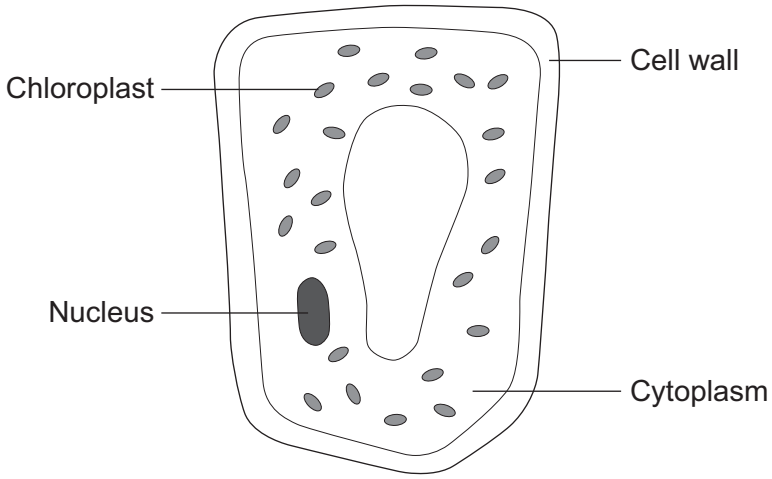
Advice
- In all calculations, show clearly how you work out your answer.

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Do not write outside the box

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

1 The diagram shows a plant cell from a leaf.



1 (a) **List A** gives the names of three parts of the cell.
List B gives the functions of parts of the cell.

Draw a line from each part of the cell in **List A** to its function in **List B**.

List A **Parts of the cell**	**List B** **Functions**
	Where most of the chemical reactions take place
Nucleus	
	Absorbs light energy to make food
Cytoplasm	
	Strengthens the cell
Chloroplast	
	Controls the activities of the cell

(3 marks)

Do not write outside the box

1 (b) Respiration takes place in the cell.

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

All cells use respiration to release

energy.
oxygen.
sugar.

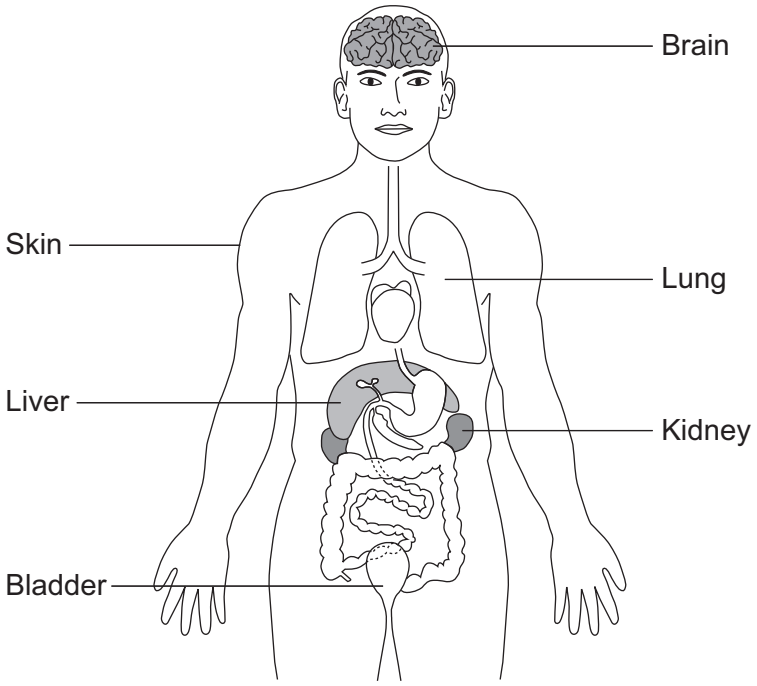
(1 mark)

4

Turn over for the next question

Do not write outside the box

2 (a) The diagram shows organs which help to control conditions inside the body.



Draw a ring around the correct answer to complete each sentence.

2 (a) (i) Carbon dioxide is removed from the body by the

kidney.
lung.
skin.

(1 mark)

2 (a) (ii) Urine is made in the

kidney.
lung.
skin.

(1 mark)

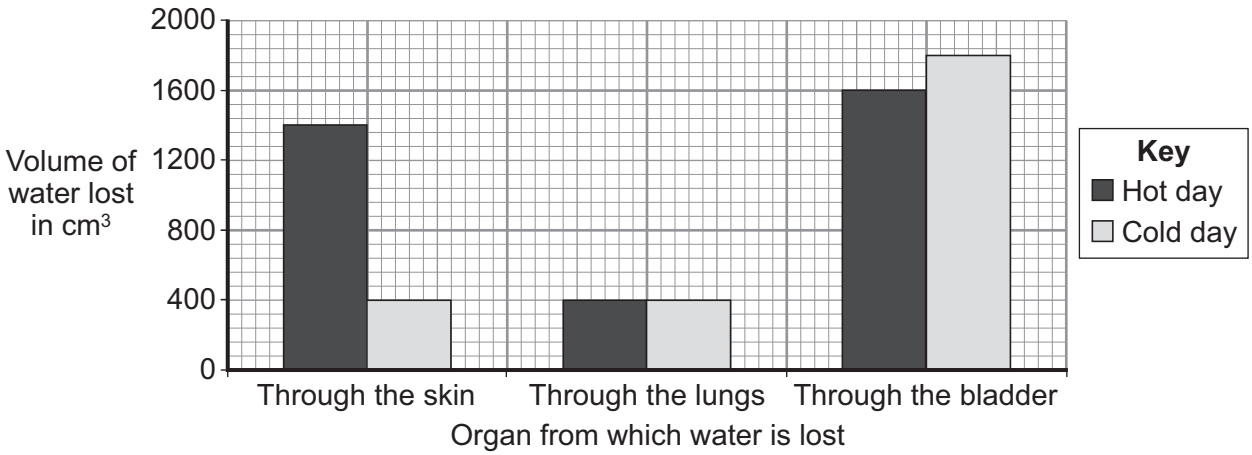
2 (a) (iii) Urine is stored in the

bladder.
liver.
skin.

(1 mark)

Do not write outside the box

2 (b) The bar chart shows the volume of water lost from different organs of the body. The information is shown for a hot day and for a cold day.



2 (b) (i) Look at the bar chart.

How does the volume of water lost on the hot day compare with the volume of water lost on the cold day for each organ?

Complete the table using words from the box.

the same	**less**	**more**

Organ	Volume of water lost on a hot day compared with volume of water lost on a cold day
Skin	
Lungs	
Bladder	

(3 marks)

2 (b) (ii) In total, more water is lost on the hot day than on the cold day.

How does the increase in the volume of water lost on the hot day help to control the body temperature?

.....

.....

(1 mark)

7

Do not write outside the box

3 The amount of carbon dioxide in the atmosphere is increasing.

The table shows the estimated mass of carbon dioxide exchanged with the atmosphere in one year.

	Mass of carbon dioxide exchanged with the atmosphere in millions of tonnes	
	Passed out into the atmosphere	**Taken in from the atmosphere**
Plants	30	64
Animals	10	0
Microorganisms	24	0
Combustion	6	0

3 (a) (i) Calculate the total mass of carbon dioxide passed out into the atmosphere in one year.

Show clearly how you work out your answer.

.....

.....

Answer ..... million tonnes
(2 marks)

3 (a) (ii) Calculate the increase in the mass of carbon dioxide in the atmosphere in one year.

You should use your answer to part (a)(i) in your calculation.

Show clearly how you work out your answer.

.....

.....

Answer ..... million tonnes
(2 marks)

Do not write outside the box

3 (b) Draw a ring around the correct answer to complete the sentence.

Plants use carbon dioxide in the process of

decomposition.
photosynthesis.
respiration.

(1 mark)

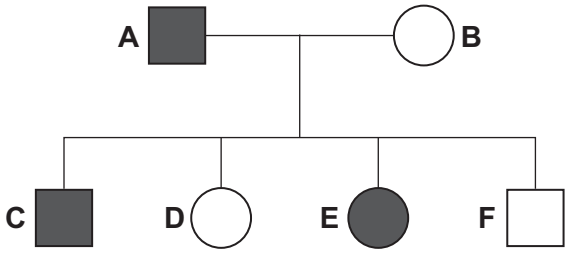
5

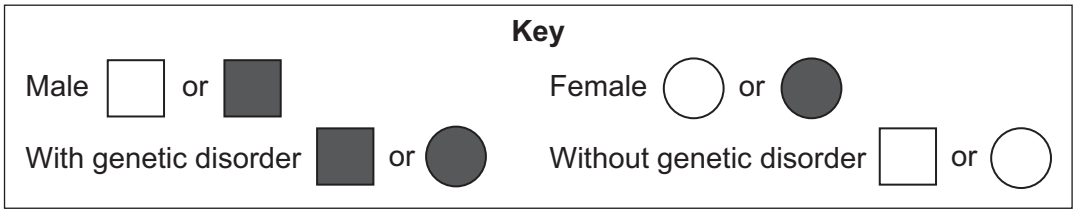
Turn over for the next question

Do not write outside the box

4 The diagram shows the family tree of a pair of pigs, **A** and **B**.
Pigs **A** and **B** have four offspring, **C**, **D**, **E** and **F**.

Some of the pigs have a genetic disorder.





4 (a) Which pig, **A**, **B**, **C**, **D**, **E** or **F**, is:

4 (a) (i) a male pig with the genetic disorder ☐

(1 mark)

4 (a) (ii) a female pig without the genetic disorder? ☐

(1 mark)

4 (b) Draw a ring around the correct answer to complete the sentences.

Pig **C** has the genetic disorder.

4 (b) (i) Pig **C** inherited the genetic disorder from

pig **A**.
pig **B**.
pig **E**.

(1 mark)

4 (b) (ii) The gene for the genetic disorder was passed on in

an embryo.
an enzyme.
a gamete.

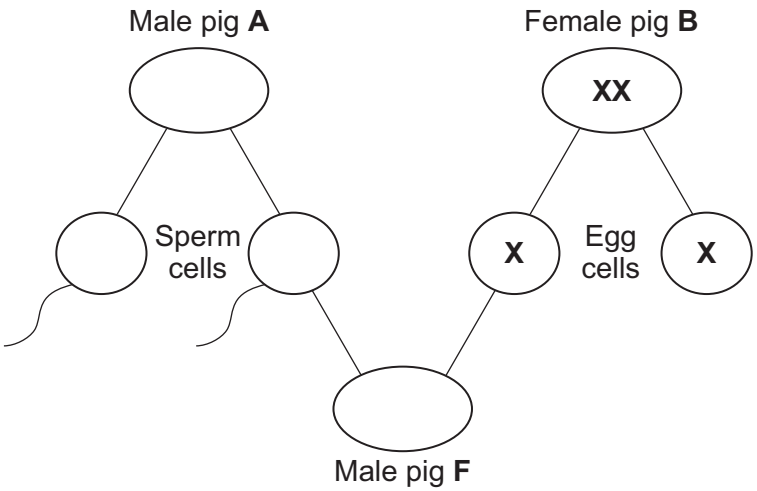
(1 mark)

Do not write outside the box

4 (c) Pig **F** is a male.

Complete the diagram to show how the sex of pig **F** depends on the inheritance of the sex chromosomes **X** and **Y**.

The sex chromosomes of pig **B** and the egg cells have been completed for you.



(3 marks)

7

Turn over for the next question

Do not write outside the box

5 Denim jeans can be coloured with blue dye. The dye joins on to the fibres of the material. Some people like their denim jeans to look faded. This is called 'stonewashed'. There are two different ways to make denim material look faded.

Traditional stone washing

- Denim material is put in a slowly spinning container with large stones.
- Very hot water is added.
- Washing takes up to five hours.
- Washing breaks some of the denim fibres and lets the dye come out from the fibres.
- Washing will work with any dye.

Bio-stonewashing

- Denim material is washed with enzymes in warm water.
- Washing takes half an hour.
- The enzymes let the dye come out from the fibres.
- Different enzymes are needed for different dyes.
- The enzymes are expensive.
- After the treatment the enzymes have to be removed from the denim.

5 (a) Use **only** the information above to answer this question.

5 (a) (i) Suggest **two advantages** of using the bio-stonewashing method instead of the traditional stonewashing method.

1 .....

.....

2 .....

.....

(2 marks)

5 (a) (ii) Suggest **two disadvantages** of using the bio-stonewashing method instead of the traditional stonewashing method.

1 .....

.....

2 .....

.....

(2 marks)

Do not write outside the box

5 (b) Some blue dyes are made of protein.

What type of enzyme would be used to remove these blue dyes from denim?

Draw a ring around **one** answer.

carbohydrase **lipase** **protease**

(1 mark)

5

Turn over for the next question

Do not write outside the box

6 Substances can move into and out of cells.

6 (a) (i) How does oxygen move into and out of cells?

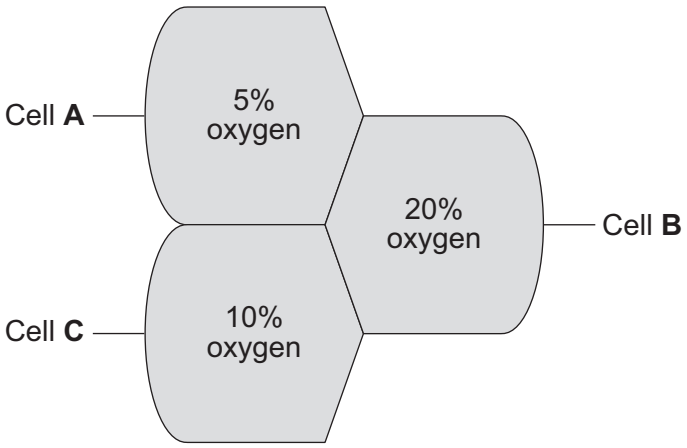
Draw a ring around **one** answer.

diffusion **digestion** **photosynthesis**

(1 mark)

6 (a) (ii) **Diagram 1** shows the percentage concentration of oxygen in three cells, **A**, **B** and **C**.

Diagram 1



Oxygen can move from cell to cell.

Into which cell, **A**, **B** or **C**, will oxygen move the fastest? ☐

(1 mark)

Do not write outside the box

6 (b) (i) How does water move into and out of cells?

Draw a ring around **one** answer.

breathing **osmosis** **respiration**

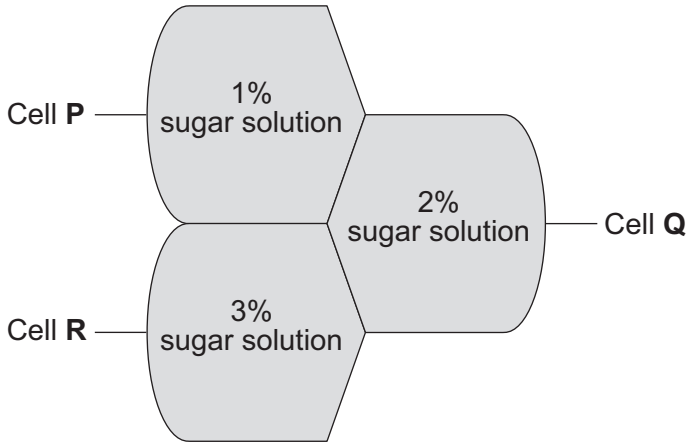
(1 mark)

6 (b) (ii) Differences in the concentration of sugars in cells cause water to move into or out of cells at different rates.

Diagram 2 shows three different cells, **P**, **Q** and **R**.

The information shows the percentage concentration of sugar solution in cells **P**, **Q** and **R**.

Diagram 2



Water can move from cell to cell.

Into which cell, **P**, **Q** or **R**, will water move the fastest? ☐

(1 mark)

4

Turn over for the next question

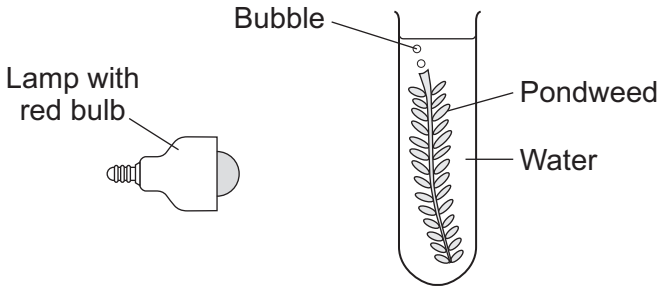
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7 A group of pupils investigated the way in which the colour of light affects photosynthesis.

The pupils:

- put a piece of pondweed into a test tube of water
- shone light from a lamp with a red light bulb onto the pondweed
- counted the bubbles of gas produced by the pondweed every minute for three minutes.

The diagram shows the experiment.



The pupils repeated their experiment using a yellow light bulb, a green light bulb and a blue light bulb.

7 (a) (i) What was the independent variable in the investigation?

.....

(1 mark)

7 (a) (ii) To make the investigation fair the pupils needed to control some variables.

Suggest **one** variable that the pupils should have controlled during their investigation.

.....

(1 mark)

7 (a) (iii) It is better to count the bubbles every minute for three minutes than to count all the bubbles in three minutes.

Why?

.....

.....

(1 mark)

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Do not write outside the box

7 (b) The table shows the pupils' results.

Colour of bulb	Number of bubbles produced in one minute			
	1st minute	2nd minute	3rd minute	Mean
Red	24	19	21	21
Yellow	18	14	15	16
Green	6	4	3	4
Blue	32	34	32	33

Algae are tiny organisms that photosynthesise.
In natural light algae grow very quickly on the sides of a fish tank.
The algae make it difficult to see the fish.

7 (b) (i) What would be the best colour of light bulb to illuminate the fish tank to reduce the growth of algae?

Use the results in the table to help you to decide.

Draw a ring around **one** answer.

red **yellow** **green** **blue**

(1 mark)

7 (b) (ii) Explain why the colour you have chosen is the best.

.....

.....

.....

.....

(2 marks)

6

Turn over for the next question

Do not write outside the box

8 A group of students investigated a food chain in a garden.

The table shows the estimates of the population and biomass of some of the organisms the students found.

Organism	Number in the garden	Mean mass of each one in g	Biomass of population in g
Hedgehog	1	200	200
Slug	600	2	1200
Lettuce	20	300	

8 (a) (i) Calculate the biomass of the lettuce population.

Show clearly how you work out your answer.

.....

.....

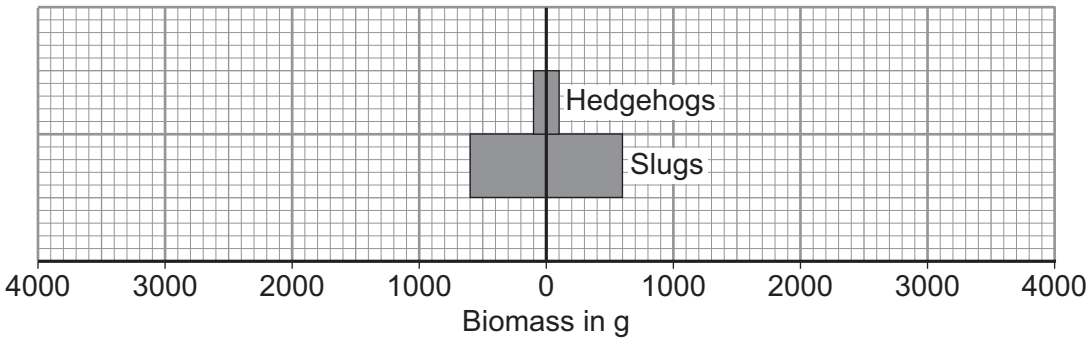
.....

Biomass = ... g

(2 marks)

8 (a) (ii) Use your answer to part (a)(i) to complete the pyramid of biomass.

Show the biomass of the lettuces in the garden.



(2 marks)

Do not write outside the box

8 (b) Hedgehogs eat slugs.

The biomass of the hedgehog population is much less than the biomass of the slug population.

Explain why as fully as you can.

.....

.....

.....

.....

.....

.....

.....

(3 marks)

7

END OF QUESTIONS

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Version : 28/02/2011



General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

Mark Scheme

2011 examination – January series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

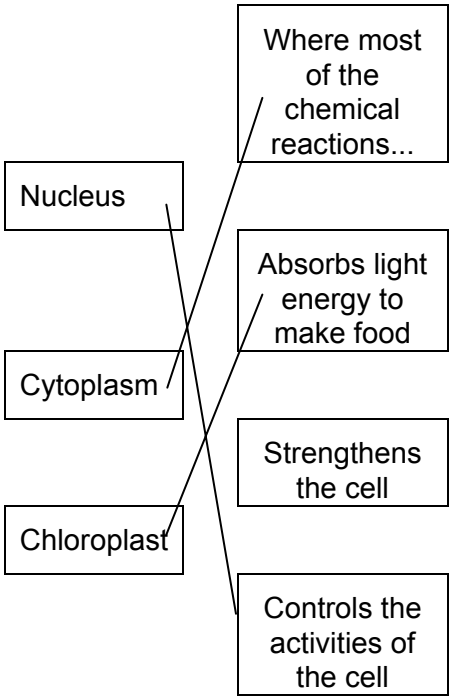
3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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Question 1

question	answers	extra information	mark
1(a)		**1** mark for each correct line mark each line from left hand box two lines from left hand box cancels mark for that box	3
1(b)	energy		1
Total			**4**

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BLY2F

Question 2

question	answers	extra information	mark
2(a)(i)	lung		1
2(a)(ii)	kidney		1
2(a)(iii)	bladder		1
2(b)(i)	more the same less	allow synonyms	1 1 1
2(b)(ii)	cools / reduces temperature **or** prevent overheating	ignore reference to sweat	1
Total			**7**

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BLY2F

Question 3

question	answers	extra information	mark
3(a)(i)	70	award **2** marks for correct answer irrespective of working allow **1** mark for 30 + 10 + 24 +6 (with wrong answer or no answer), do **not** award this sum if other figure(s) are included in the addition	2
3(a)(ii)	6	award **2** marks for correct answer irrespective of working award **2** marks for correct answer to (a)(i) – 64 (ecf) award **1** mark either for 70 – 64 or answer to (a)(i) – 64 with no answer or incorrect answer	2
3(b)	photosynthesis		1
Total			**5**

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BLY2F

Question 4

question	answers	extra information	mark
4(a)(i)	any **one** from: • A • C		1
4(a)(ii)	any **one** from: • B • D		1
4(b)(i)	pig A		1
4(b)(ii)	a gamete		1
4(c)	XY **or** YX X Y XY **or** YX	 in this order only 	1 1 1
Total			**7**

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Question 5

question	answers	extra information	mark
5(a)(i)	any **two** from: • fibres not damaged • machines last longer / machines not damaged by stones • shorter time **or** quicker • lower temperature	allow cheaper / uses less energy as an alternative to shorter time / lower temperature, if these not given	2
5(a)(ii)	any **two** from: • different enzymes (for different dyes) • enzymes expensive • enzymes have to be removed (from denim material) (after washing / treatment)	no mark for expensive alone	2
5(b)	protease		1
Total			**5**

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BLY2F

Question 6

question	answers	extra information	mark
6(a)(i)	diffusion		1
6(a)(ii)	A		1
6(b)(i)	osmosis		1
6(b)(ii)	R		1
Total			**4**

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BLY2F

Question 7

question	answers	extra information	mark
7(a)(i)	colour of light / bulb / lamp	allow wavelength for colour allow bulb alone do **not** accept light / colour unqualified	1
7(a)(ii)	any **one** from eg • temperature • light intensity **or** distance between lamp and plant / tube • carbon dioxide • other light in room • mass / size / amount / age / type of pondweed • volume / amount of water	 allow heat allow amount / brightness of light ignore light unqualified allow symbols allow use a dark room allow same piece of pondweed ignore pondweed unqualified ignore reference to time	1
7(a)(iii)	improved reliability **or** can spot anomalies / changes	allow for reliability **or** less likely to lose count allow reference to calculating a mean / average ignore reference to accuracy / precision / fair	1
7(b)(i)	green		1

Question 7 continues on the next page

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BLY2F

Question 7 continued

question	answers	extra information	mark
7(b)(ii)	any **two** from: • least / less bubbles / gas / oxygen / mean • least / less photosynthesis • least / less glucose / sugar / carbohydrate / food made	ignore references to colour reference to least / less needed only once, in context, for **2** marks only penalise no once, ie no bubbles = **0** mark no bubbles so no photosynthesis = **1** mark allow most / more green light reflected (by chloroplasts)	2
Total			**6**

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BLY2F

Question 8

question	answers	extra information	mark
8(a)(i)	6000	award **2** marks for correct answer irrespective of working allow **1** mark for 20 x 300 with incorrect or no answer allow answer in table if answer line blank	2
8(a)(ii)	bar width 6000 **or** to match answer to (a)(i) drawn below slugs	anywhere on scale ignore depth / height of bar label **not** required	1 1
8(b)	any **three** from: • respiration (by hedgehog) • (results in) loss of CO_2 • faeces (of hedgehog) **or** not digested • excreted / urine / urea (by hedgehog) • not all slug(s) are eaten (by hedgehogs) **or** some slugs eaten by other things	ignore reference to size / mass / number of organisms assume reference is to / of hedgehog unless stated otherwise do **not** accept idea that respiration uses / produces energy accept waste for **1** mark if neither faeces nor excretion point made ignore sweat alone ignore some slugs die ignore reference to movement / heat / growth allow references to energy losses by these methods, rather than biomass losses	3
Total			**7**

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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	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
June 2010

Additional Science
Unit Biology B2

BLY2F

F

Biology
Unit Biology B2

Written Paper

Friday 21 May 2010 9.00 am to 9.45 am

You will need no other materials.
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.

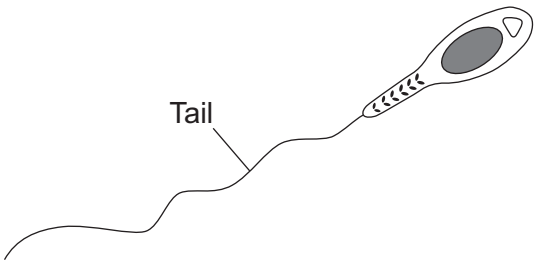
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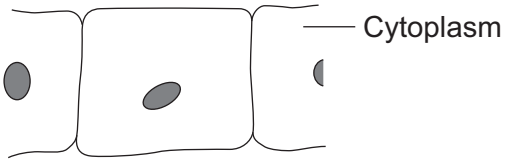
Answer **all** questions in the spaces provided.

1 The diagrams show four types of cell, **A**, **B**, **C** and **D**.
Two of the cells are plant cells and two are animal cells.

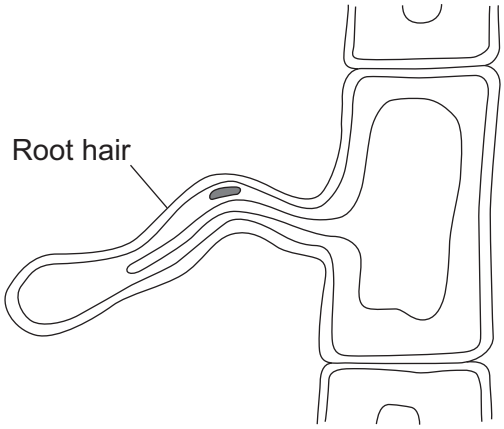
A



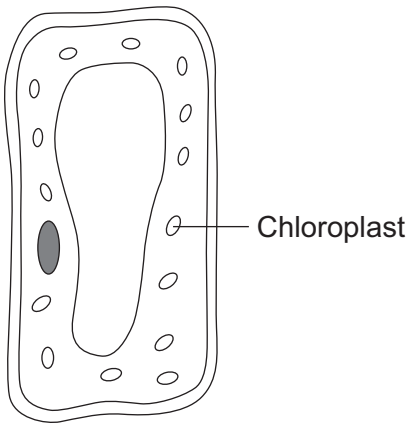
B



C



D



1 (a) (i) Which **two** of the cells are plant cells?

Tick (✓) **one** box.

A and **B** ☐

A and **D** ☐

C and **D** ☐

(1 mark)

Do not write outside the box

1 (a) (ii) Which part is found **only** in plant cells?

Draw a ring around **one** answer.

cell membrane **cell wall** **nucleus**

(1 mark)

1 (b) (i) Which cell, **A**, **B**, **C** or **D**, is adapted for swimming? ☐

(1 mark)

1 (b) (ii) Which cell, **A**, **B**, **C** or **D**, can produce glucose by photosynthesis? ☐

(1 mark)

1 (c) Cells **A**, **B**, **C** and **D** all use oxygen.

For what process do cells use oxygen?

Draw a ring around **one** answer.

osmosis **photosynthesis** **respiration**

(1 mark)

5

Turn over for the next question

Do not write outside the box

2 This question is about what happens during decay.

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

2 (a) After living things die, they are decayed by

animals.
microorganisms.
plants.

(1 mark)

2 (b) Decay happens faster when there is plenty of oxygen and conditions are

cold.
dry.
moist.

(1 mark)

2 (c) During decay carbon dioxide is produced by

osmosis.
respiration.
photosynthesis.

(1 mark)

2 (d) Decay releases mineral salts into the soil.

These mineral salts are absorbed by plant

leaves.
roots.
stems.

(1 mark)

4

Do not write outside the box

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

Do not write outside the box

3 The body uses enzymes to digest (break down) large food molecules into smaller molecules.

3 (a) (i) Draw **one** line from **each** large food molecule to the enzyme that acts on it.

Large food molecule	**Enzyme**
starch	amylase
fat	protease
protein	lipase
	isomerase

(3 marks)

Do not write outside the box

3 (a) (ii) Draw a ring around the correct answer to complete each sentence.

Starch is broken down into

amino acids.

fatty acids and glycerol.

sugars.

Fat is broken down into

amino acids.

fatty acids and glycerol.

fructose.

Protein is broken down into

amino acids.

fructose.

sugars.

(3 marks)

3 (b) Bile helps digestion.

Where is bile produced?

Draw a ring around **one** answer.

liver **mouth** **stomach**

(1 mark)

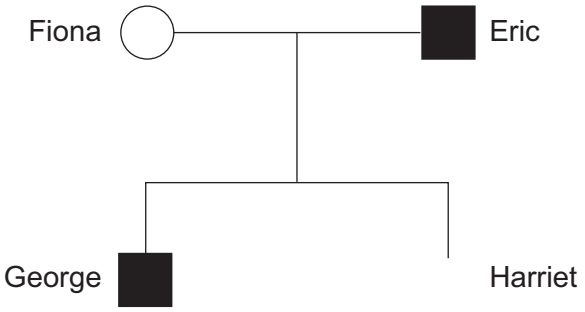
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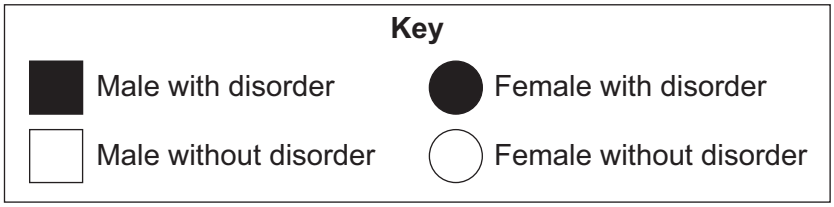
Turn over for the next question

Do not write outside the box

4 The family tree shows the inheritance of a disorder caused by a dominant allele.

Fiona and Eric have two children George and Harriet.





4 (a) The son, George, has the disorder.

The daughter, Harriet, does **not** have the disorder.

4 (a) (i) Use the key to draw the symbol for Harriet next to her name **on the family tree**.

(2 marks)

4 (a) (ii) The symbol **D** represents the dominant allele for the disorder.
The symbol **d** represents the recessive allele.

Fiona has the pair of alleles **dd**.

Write the correct pairs of alleles in the boxes.

Harriet has the pair of alleles ☐ .

A person with the disorder could have

the pair of alleles ☐ or the pair of alleles ☐ .

(3 marks)

Do not write outside the box

4 (b) Before Harriet was born, a doctor suggested that Fiona should have the embryo 'screened'.

4 (b) (i) Give **one** reason why the doctor suggested screening.

Tick (✓) **one** box.

To check for the **D** allele ☐

To check the sex of the embryo ☐

To cure the disorder ☐

(1 mark)

4 (b) (ii) Why do some people believe that embryos should **not** be screened?

.....

.....

(1 mark)

7

Turn over for the next question

Do not write outside the box

5 Diabetes is a disease in which the concentration of glucose in a person's blood may rise to fatally high levels.
Insulin controls the concentration of glucose in the blood.

5 (a) Where is insulin produced?

Draw a ring around **one** answer.

gall bladder **liver** **pancreas**

(1 mark)

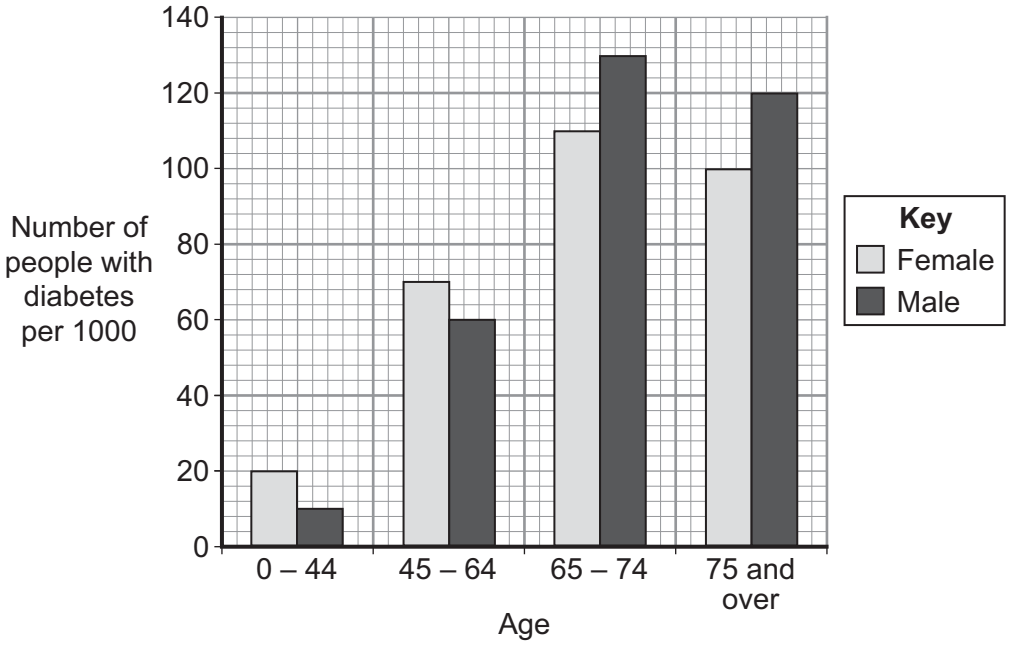
5 (b) Diabetics may control their blood glucose by injecting insulin.

Apart from using insulin, give **one** other way diabetics may reduce their blood glucose.

.....

(1 mark)

5 (c) The bar chart shows the number of people with diabetes in different age groups in the UK.



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Do not write outside the box

5 (c) (i) Describe how the number of males with diabetes changes between the ages of 0–44 and 75 and over.

.....

.....

.....

.....

.....

.....

(3 marks)

5 (c) (ii) Compare the number of males and females with diabetes:

between the ages of 0 and 64 years

.....

.....

over the age of 65.

.....

.....

(2 marks)

7

Turn over for the next question

Do not write outside the box

6 This question is about photosynthesis.

6 (a) Plants make glucose during photosynthesis. Some of the glucose is changed into insoluble starch.

What happens to this starch?

Tick (✓) **one** box.

The starch is converted into oxygen. ☐

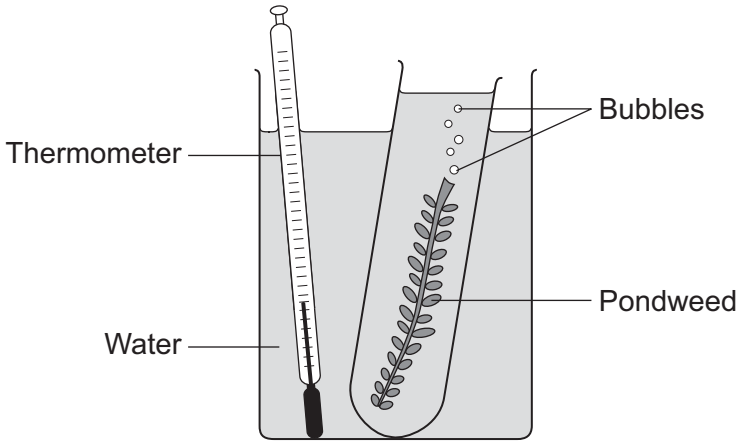
The starch is stored for later use. ☐

The starch is used to make the leaf green. ☐

(1 mark)

6 (b) A student investigated the effect of temperature on the rate of photosynthesis in pondweed.

The diagram shows the way the experiment was set up.



6 (b) (i) The student needed to control some variables to make the investigation fair.

State **two** of these variables.

1 .....

2 .....

(2 marks)

Do not write outside the box

6 (b) (ii) The bubbles of gas are produced only while photosynthesis is taking place.

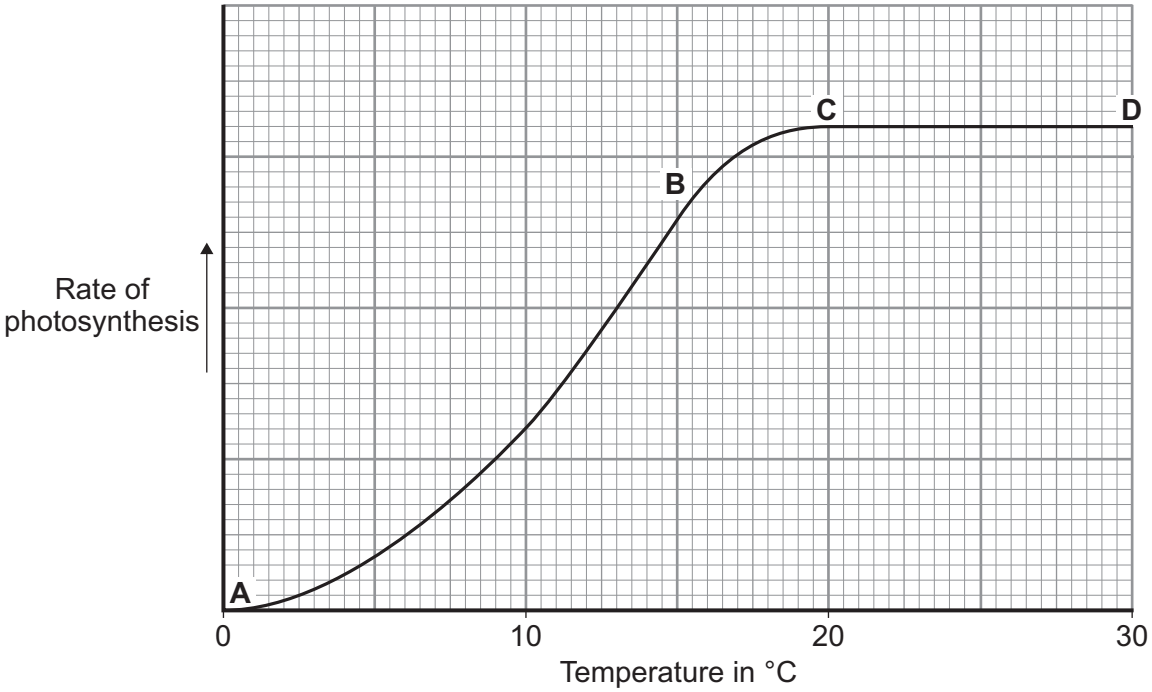
What **two** measurements would the student make to calculate the rate of photosynthesis?

1 .....

2 .....

(2 marks)

6 (c) The graph shows the effect of temperature on the rate of photosynthesis.



6 (c) (i) Name the factor that limits the rate of photosynthesis between the points labelled **A** and **B** on the graph.

.....

(1 mark)

6 (c) (ii) Suggest which factor, carbon dioxide, oxygen or water, might limit the rate of photosynthesis between the points labelled **C** and **D** on the graph.

.....

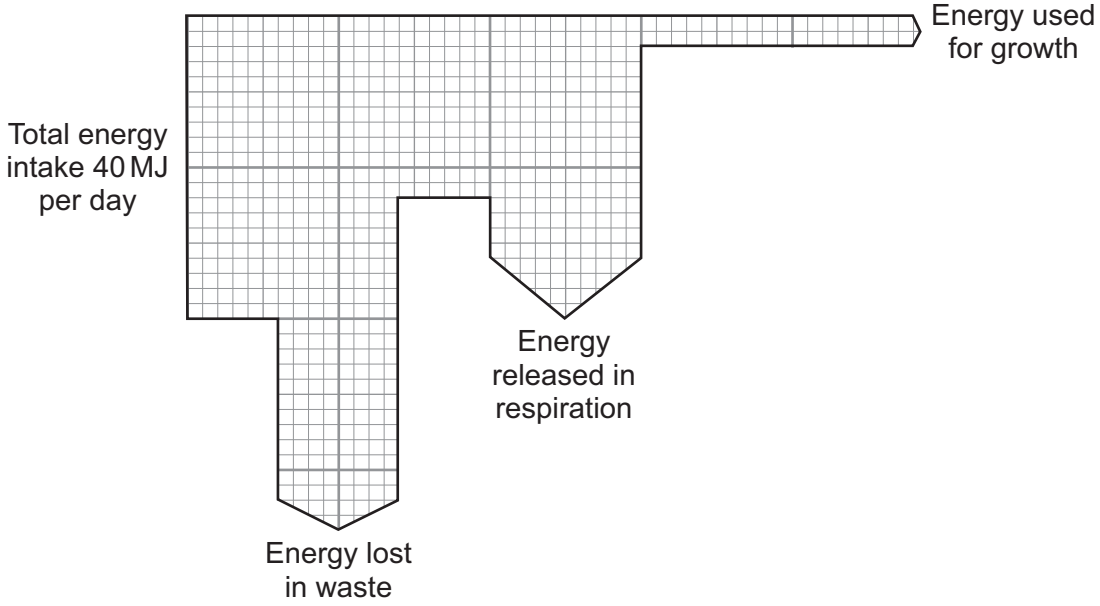
(1 mark)

7

Do not write outside the box

7 (a) **Diagram 1** represents what happens to the energy in the food eaten by a herbivore (an animal that eats plants).

Diagram 1



7 (a) (i) How much energy is released in respiration by the herbivore?

.....

.....

Answer ..... MJ per day
(1 mark)

7 (a) (ii) What proportion of the total energy intake of the herbivore is used for growth?

Show clearly how you work out your answer.

.....

.....

.....

Proportion .....
(2 marks)

7 (b) Give **two** ways in which the energy, released in respiration, is used by a herbivore.

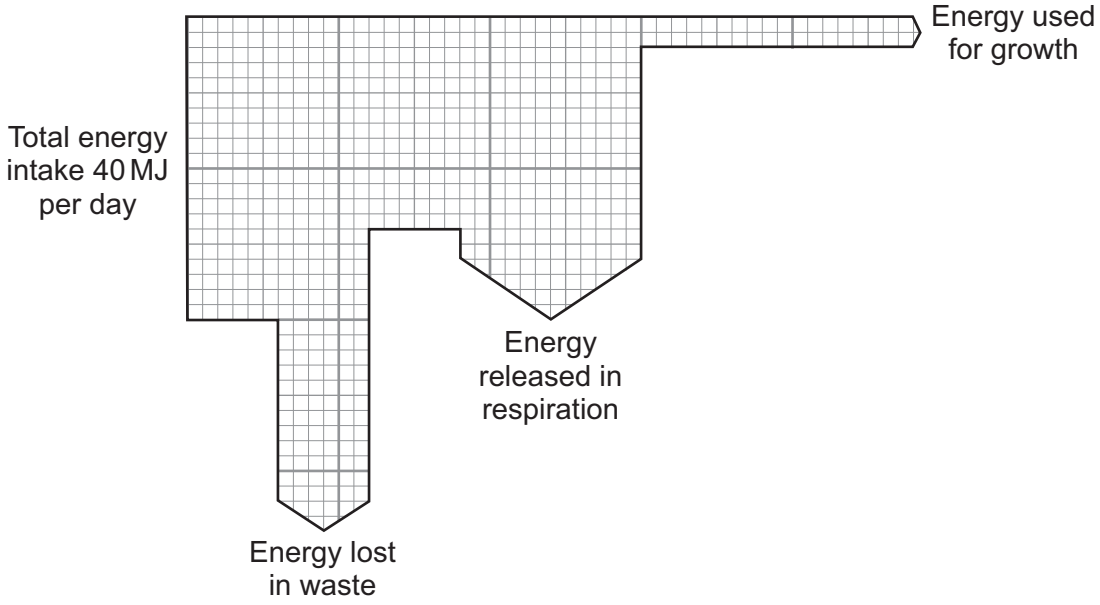
1 .....

2 .....
(2 marks)

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7 (c) **Diagram 2** represents what happens to the energy in the food eaten by a carnivore (an animal that eats other animals).

Diagram 2



The carnivore releases a greater proportion of energy in respiration than the herbivore.

Suggest **one** reason for this.

.....

.....

(1 mark)

7 (d) Some farmers keep their animals outdoors. Other farmers keep their animals indoors.

Keeping farm animals indoors increases the proportion of energy in their food that is converted into growth.

Give **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

8

END OF QUESTIONS

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Version: 09/08/2010

General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

Mark Scheme

2010 Examination – June Series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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Marking Guidance for Examiners

GCSE Science Papers

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example:

where consequential marking needs to be considered in a calculation;

or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct

substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY2F

Question 1

question	answers	extra information	mark
1(a)(i)	C and D		1
1(a)(ii)	cell wall		1
1(b)(i)	A		1
1(b)(ii)	D		1
1(c)	respiration		1
Total			**5**

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BLY2F

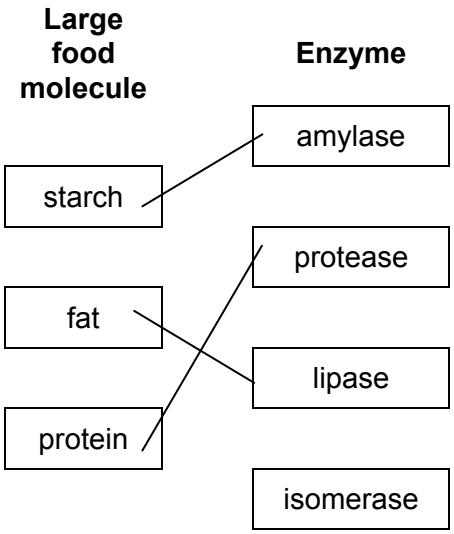
Question 2

question	answers	extra information	mark
2(a)	microorganisms		1
2(b)	moist		1
2(c)	respiration		1
2(d)	roots		1
Total			**4**

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BLY2F

Question 3

question	answers	extra information	mark
3(a)(i)		all three correct = **3** marks two correct = **2** marks one correct = **1** mark extra line from a large food molecule cancels the mark	3
3(a)(ii)	sugars fatty acids and glycerol amino acids	must be in this order	1 1 1
3(b)	liver		1
Total			**7**

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BLY2F

Question 4

question	answers	extra information	mark
4(a)(i)	circle unshaded	mark independently could be in body of script	1 1
4(a)(ii)	(Harriet) dd DD Dd	in first box if another letter is chosen it must be used throughout and upper or lower case must be clear	1 1 1
4(b)(i)	to check for the D allele.		1
4(b)(ii)	any **one** from*:* • may harm / kill foetus / embryo / baby / mother • immoral / unethical / religion	allow could affect the baby ignore playing God ignore references to unnatural ignore wrong unqualified ignore expense / prejudice unqualified ignore lack of permission ignore results are unreliable	1
Total			**7**

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BLY2F

Question 5

question	answers	extra information	mark
5(a)	pancreas		1
5(b)	any **one** from • (controlling / changing) diet • exercise • pancreas transplant	 accept descriptions as to how diet could be changed eg eat less sugar(y foods) ignore reference to fat / protein accept example eg go for a run accept named drug eg metformin	1
5(c)(i)	increase then fall relevant data quote (for male)	ignore reference to women max at ages 65 – 74 eg starts at 10 (per thousand) **or** max at 130 (per thousand) **or** ends at 120 (per thousand) accept a difference between any pairs of numbers in data set quoting of scale or per thousand but not 'thousands' accuracy ± 2	1 1 1

Question 5 continues on the next page

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BLY2F

Question 5 continued

question	answers	extra information	mark
5(c)(ii)	(between 0 and 64) more females (than males) / less males (over 65) more males (than females) / less females	ignore numbers allow eg females more diabetic than males	1 1
Total			**7**

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Question 6

question	answers	extra information	mark
6(a)	the starch is stored for later use.		1
6(b)(i)	any **two** from: • carbon dioxide (concentration) • light intensity • light colour / wavelength • pH • size / amount plant • same / species / type plant • amount of water in the tube	do **not** accept temperature – apply list principle ignore reference to time allow **one** mark for light if neither intensity or colour are awarded allow 'the plant' ignore amount of water alone	2
6(b)(ii)	number / amount of bubbles **or** amount of gas / oxygen (relevant reference to) time / named time interval	allow volume of bubbles (together) ignore 'the bubbles' unqualified allow how long it bubbles for do **not** accept time bubbles start / stop ignore speed / rate bubbles ignore instruments do **not** accept other factors eg temperature accept how many bubbles per minute for **2** marks	1 1
6(c)(i)	temperature	allow heat / °C / cold	1
6(c)(ii)	carbon dioxide / CO_2	allow CO2 / CO^2 / Co_2 / Co^2 / co_2 / co^2 do **not** accept CO / 2CO	1
Total			**7**

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BLY2F

Question 7

question	answers	extra information	mark
7(a)(i)	20		1
7(a)(ii)	one tenth / 0.1 / 10% / 1:9 / 1 in 10 / 1 out of 10 / $\frac{1}{10}$	for correct answer irrespective of working **2** marks ignore any units accept equivalent fractions eg $\frac{4}{40}$ / $\frac{2}{20}$ do **not** allow eg 1:10 / 1 to 10 if answer is incorrect clear selection of 2 **and** 20, **or** equivalent **or** 1:4:5 / 1:5:4 gains **1** mark	2
7(b)	any **two f**rom: • (body) heat / maintaining body temperature • movement (max 2) • growth / cell division / repair / reproduction / building molecules • accept active transport	do **not** accept sweating / cooling / excretion allow keep warm allow **2 different** examples of movement, internally and / or externally eg breathing / exercise / eating / circulation allow muscle contraction if no other muscle action is credited movement + breathing = 1 mark allow examples eg making proteins (from amino acids) ignore 'chemical reactions' / digestion	2

Question 7 continues on the next page

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BLY2F

Question 7 continued

question	answers	extra information	mark
7(c)	more movement / have to hunt / catch food	allow converse if stated for herbivore eg herbivores food is all around ignore reference to size **or** predator unqualified	1
7(d)	any **two** from • less movement • less heat loss • less respiration	ignore reference to food allow no movement allow less space to move ignore less space unqualified allow no heat loss **or** they are kept warm	2
Total			**8**

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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	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
January 2010

Additional Science BLY2F

Biology F

Unit Biology B2

Written Paper

Thursday 14 January 2010 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. Answers written in margins or on blank pages will not be marked.
- 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.

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Areas outside the box will not be scanned for marking

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

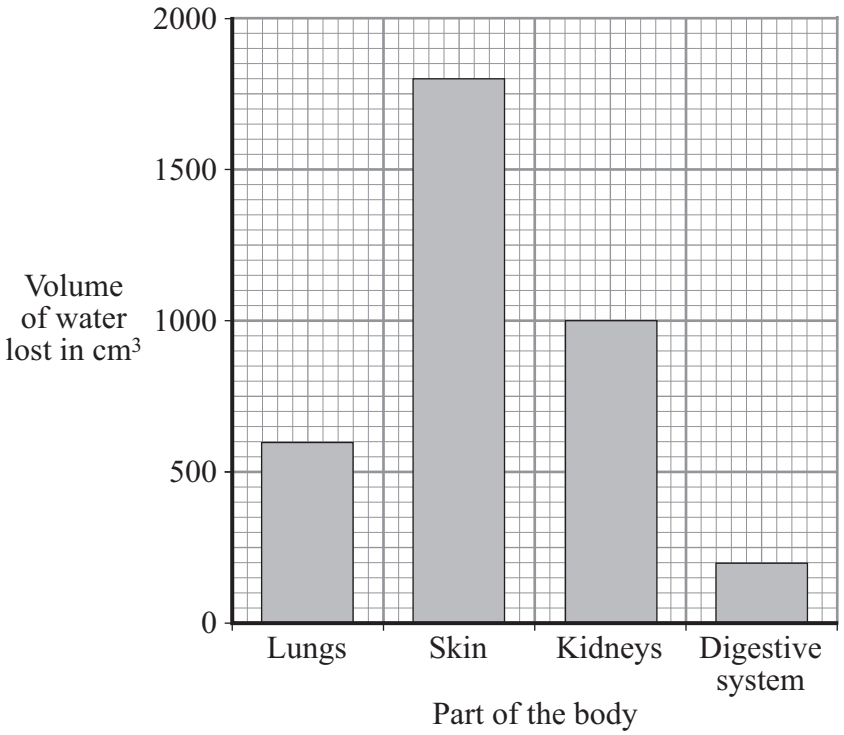
1 Water is lost from several parts of the body.

1 (a) Draw **one** line from each body part to the substance in which water is lost.

Body Part	**Substance**
	Urine
Kidneys	
	Faeces
Lungs	
	Sweat
Skin	
	Breath

(3 marks)

1 (b) The bar chart shows the volume of water a person lost from different parts of the body during a warm day.



Areas outside the box will not be scanned for marking

1 (b) (i) What volume of water was lost through the skin on the warm day?

Tick (✓) **one** box.

600 cm^3 ☐

1600 cm^3 ☐

1800 cm^3 ☐

(1 mark)

1 (b) (ii) What effect would colder weather have on the amount of water lost through the skin?

Draw a ring around your answer.

decreases **increases** **stays the same**

(1 mark)

1 (b) (iii) Give a reason for your answer.

.....

.....

(1 mark)

1 (c) What effect does cold weather generally have on the amount of urine produced?

Draw a ring around your answer.

decreases **increases** **stays the same**

(1 mark)

7

Turn over for the next question

Areas outside the box will not be scanned for marking

2 Humans reproduce sexually.

Draw a ring around the correct answer to complete each sentence.

2 (a) (i) At fertilisation [chromosomes / genes / sex cells] join together.

(1 mark)

2 (a) (ii) At fertilisation a single cell forms, which has new pairs of [chromosomes. / nuclei. / sex cells.]

(1 mark)

2 (b) Cystic fibrosis can be inherited by children whose parents do not have it.

2 (b) (i) A person who has cystic fibrosis has [two / three / four] copies of the cystic fibrosis allele.

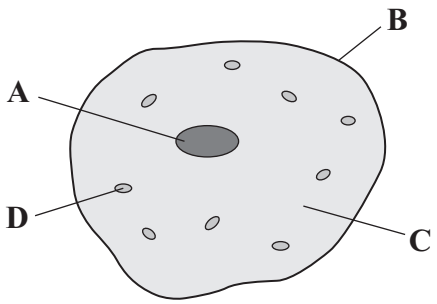
(1 mark)

2 (b) (ii) The cystic fibrosis allele is [large. / recessive. / strong.]

(1 mark)

Areas outside the box will not be scanned for marking

2 (c) The diagram shows a human body cell.



Choose the correct answer from the box to complete each sentence.

cell membrane	**cell wall**	**cytoplasm**	**nucleus**

2 (c) (i) The part of the cell labelled **B** is the ..... .

(1 mark)

2 (c) (ii) The part of the cell labelled **C** is the ..... .

(1 mark)

2 (d) Which part of the cell, **A**, **B**, **C** or **D**:

2 (d) (i) contains the allele for cystic fibrosis ☐

(1 mark)

2 (d) (ii) is affected by cystic fibrosis? ☐

(1 mark)

8

Turn over for the next question

Areas outside the box will not be scanned for marking

3 Diabetes is a disease in which blood glucose (sugar) concentration may rise more than normal.

3 (a) Which organ in the body monitors this rise in blood sugar?

Draw a ring around your answer.

liver **pancreas** **stomach**

(1 mark)

3 (b) One way of treating diabetes is by careful attention to diet.

Chart 1 shows the recommended diet for a person with diabetes.
Chart 2 shows a diet for a person without diabetes.

Chart 1 Person with diabetes

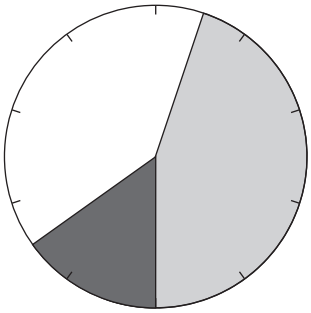
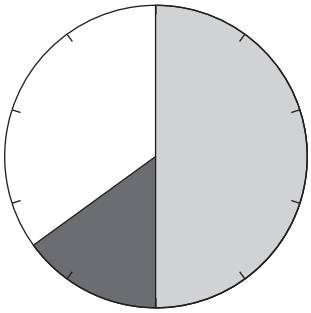


Chart 2 Person without diabetes



Key

Energy from: Carbohydrate Protein Fat

How is the recommended diet of a person with diabetes different from the diet of a person without diabetes?

Use information from the charts.

Tick (✓) **two** boxes.

The diabetic should get more energy from fat. ☐

The diabetic should get more energy from protein. ☐

The diabetic should get less energy from carbohydrate. ☐

The diabetic should get less energy from protein. ☐

(2 marks)

Areas outside the box will not be scanned for marking

3 (c) Other than diet, give **one** way in which diabetes may be treated.

.....

.....

(1 mark)

4

Turn over for the next question

Areas outside the box will not be scanned for marking

4 Plants need mineral ions for healthy growth.

4 (a) Which part of a plant takes in mineral ions?

Tick (✓) **one** box.

Flower ☐

Leaf ☐

Root ☐

(1 mark)

4 (b) Leaves are usually green.

4 (b) (i) What is the green substance in leaves?

Draw a ring around your answer.

chlorophyll **glucose** **starch**

(1 mark)

4 (b) (ii) The green substance in leaves is important to plants.

Explain why.

.....

.....

.....

.....

(2 marks)

Areas outside the box will not be scanned for marking

4 (c) A shortage of mineral ions can affect a plant.

Draw **one** line from each mineral ion to the effect of its shortage.

Mineral ion	**Effect of its shortage**
Magnesium	Yellow leaves
Nitrate	Stunted growth
	White flowers

(2 marks)

6

Turn over for the next question

Areas outside the box will not be scanned for marking

5 A group of pupils investigated the digestion of fat by the enzyme lipase.

5 (a) What **two** substances are produced when fats are digested?

Tick (✓) **two** boxes.

Glucose ☐

Fatty acids ☐

Glycerol ☐

Amino acids ☐

(2 marks)

In the investigation:

- the pupils set up five test tubes
- each tube contained 1 cm^3 of fat and 10 cm^3 of lipase solution
- each tube was kept at a different temperature for 24 hours.

5 (b) (i) Give **one** control variable in this investigation.

.....

(1 mark)

5 (b) (ii) What was the independent variable being investigated?

.....

(1 mark)

5 (c) The pH of the solution in each tube was tested at the beginning of the investigation and after 24 hours.

The results of the pupils' investigation are shown in the table.

Tube	Temperature in °C	pH at the beginning	pH after 24 hours
1	0	Neutral	Neutral
2	20	Neutral	'Weak' acid
3	40	Neutral	'Strong' acid
4	60	Neutral	'Weak' acid
5	80	Neutral	Neutral

Areas outside the box will not be scanned for marking

One pupil said, "We might **not** have found the best temperature for the lipase to work".

What more could they do to find the best temperature?

.....

.....

.....

.....

.....

(2 marks)

5 (d) The pupils then placed **Tube 1** into a water-bath kept at 40 °C.
The tube was left in the water-bath for 24 hours.

5 (d) (i) What pH would you expect the contents of the tube to be after the extra 24 hours?

Tick (✓) **one** box.

Neutral ☐

'Strong' acid ☐

'Weak' acid ☐

(1 mark)

5 (d) (ii) Give the reason for your answer.

.....

.....

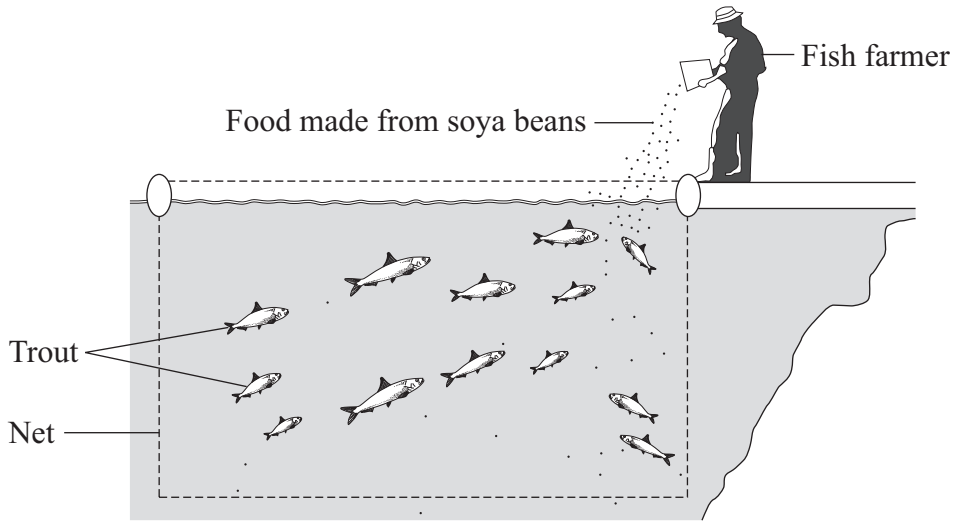
(1 mark)

8

Turn over for the next question

Areas outside the box will not be scanned for marking

6 A fish farmer keeps trout in a large net in a lake.



The fish farmer feeds the trout on food made from soya beans.

When the trout are large enough the farmer sells them for food for people.

6 (a) Draw a pyramid of biomass for the three organisms in this food chain.

Label the pyramid.

(2 marks)

Areas outside the box will not be scanned for marking

6 (b) It would be more energy efficient if people ate the soya beans rather than eating the trout.

Which **two** of the following are reasons for this?

Tick (✓) **two** boxes.

Some people do not like eating animals such as trout. ☐

The trout release energy when they respire. ☐

Soya bean plants release energy when they respire. ☐

Some energy will be lost in waste from the trout. ☐

Soya bean plants absorb energy during photosynthesis. ☐

(2 marks)

6 (c) Suggest **one** advantage to the fish farmer of keeping the trout in a large net instead of letting them swim freely in the lake.

.....

.....

(1 mark)

6 (d) Some trout die before they are large enough to be sold.
The dead trout contain carbon.

Use your knowledge of the carbon cycle to describe how this carbon is returned to the atmosphere after the trout die.

.....

.....

.....

.....

.....

(2 marks)

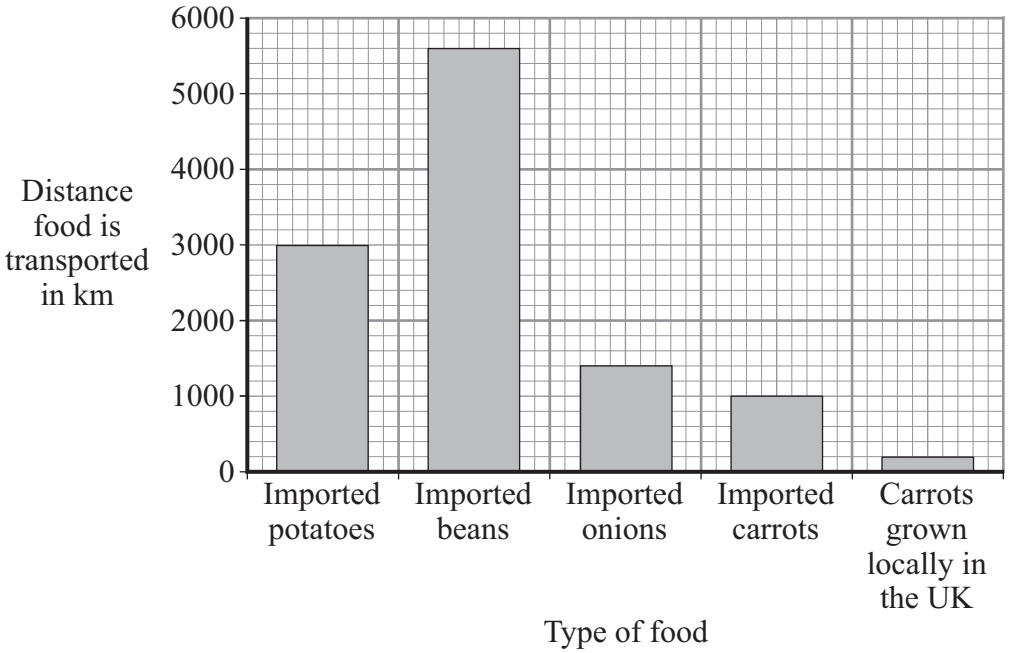
7

Turn over for the next question

Areas outside the box will not be scanned for marking

7 Some people are concerned about the distance that food is transported between the grower and the supermarket.

The bar chart shows the distances for some foods.



7 (a) Both imported carrots and carrots grown locally in the UK can be bought in supermarkets all year round.

How many times further are imported carrots transported than carrots grown locally in the UK?

Show clearly how you work out your answer.

.....

.....

..... times

(1 mark)

Areas outside the box will not be scanned for marking

7 (b) Many of the beans sold in supermarkets in the UK are grown in Kenya, a tropical country in Africa.

Beans grow faster in Kenya than they do in the UK.

Suggest and explain **one** reason why.

Reason .....

.....

Explanation .....

.....

(2 marks)

7 (c) Many people believe that we should buy locally produced food instead of food imported from abroad.

Explain how this would help the environment.

.....

.....

.....

.....

.....

(2 marks)

5

END OF QUESTIONS

There are no questions printed on this page

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Version : 09/03/2010



General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

Mark Scheme

2010 examination – January series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

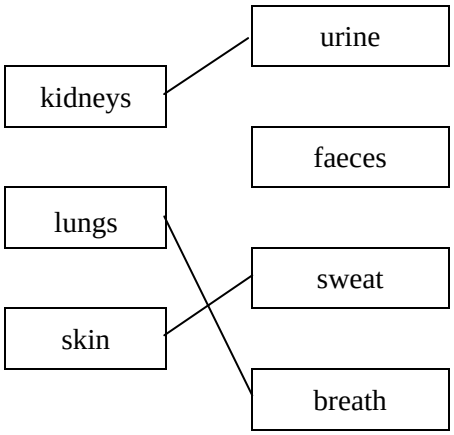
3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY2F

Question 1

question	answers	extra information	mark
1(a)	**Body part** / **Substance**  	**1** mark per correct line extra line from a body part cancels the mark	3
1(b)(i)	1800 cm ^{3}		1
1(b)(ii)	decreases		1
1(b)(iii)	any **one** from: • less / no sweat • less / no cooling *(*needed*)* • less / reduce / no heat loss / keep warm		1
1(c)	increases		1
Total			**7**

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BLY2F

Question 2

question	answers	extra information	mark
2(a)(i)	sex cells		1
2(a)(ii)	chromosomes		1
2(b)(i)	two		1
2(b)(ii)	recessive		1
2(c)(i)	cell membrane	allow membrane	1
2(c)(ii)	cytoplasm		1
2(d)(i)	A		1
2(d)(ii)	B		1
Total			**8**

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BLY2F

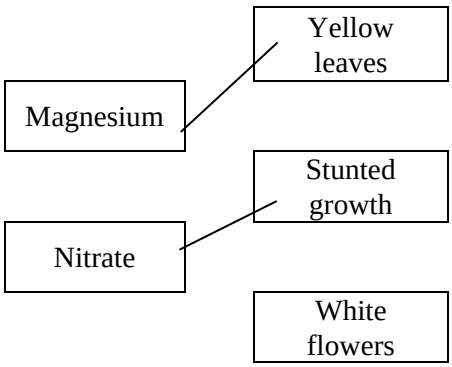
Question 3

question	answers	extra information	mark
3(a)	pancreas		1
3(b)	the diabetic should get more energy from fat the diabetic should get less energy from carbohydrate		1 1
3(c)	(use) insulin	allow pancreas / stem cell transplant do **not** allow injection / transplant / stem cells / tablets alone ignore exercise	1
Total			**4**

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BLY2F

Question 4

question	answers	extra information	mark
4(a)	root		1
4(b)(i)	chlorophyll		1
4(b)(ii)	absorbs / traps / takes in light (for) photosynthesis	do **not** accept attracts / solar energy / sunshine / sun accept to make food / glucose / sugar / biomass	1 1
4(c)	**Mineral ion** / **Effect of its shortage**  	**1** mark per correct line extra line from a mineral ion cancels the mark	2
Total			**6**

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BLY2F

Question 5

question	answers	extra information	mark
5(a)	fatty acids glycerol		1 1
5(b)(i)	any **one** from: • (same) amount / 1cm^3 fat • (same) amount / 10cm^3 lipase / enzyme • (kept for) 24 hours **or** (same length of) time		1
5(b)(ii)	temperature	allow heat / warmth	1
5(c)	(carry out experiments) using more temperatures / smaller intervals between 20 and 60 ºC / around 40 ºC	ignore repeat unqualified do not accept longer time accept extra single temperature in range 20 ºC – 60 ºC but cannot be 20 ºC, 40 ºC or 60 ºC	1 1
5(d)(i)	'strong' acid		1
5(d)(ii)	enzyme works / not destroyed / not denatured / not damaged	do **not** accept enzyme not killed accept any indication that the fat is digested accept same as tube 3 / tube at 40 ºC accept optimum temperature / at or near body temperature	1
Total			**8**

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Question 6

question	answers	extra information	mark
6(a)	three layer triangular pyramid soya / beans / food – trout / fish – people / human (in sequence)	either way up (as blocks or triangle) ignore reference to producers / herbivores / consumers award **1** mark only for a correct food chain with 2 correct arrows showing energy flow	1 1
6(b)	the trout release energy when they respire some energy will be lost in waste from the trout		1 1
6(c)	any **one** from eg • easy / easier to catch / more caught • easy / easier to feed • no / less predation • less energy loss • less movement	 allow easy / easier to monitor allow control food allow less fishing / poaching allow grow faster ignore less space to move do **not** allow easier to farm	1
6(d)	any **two** from: • microorganisms / bacteria / decomposers / microbes / fungi / detritus feeders • decay / rot / decompose / digest / break down • (microorganisms) respire • turned into fossil fuels / named fossil fuels • carbon dioxide / CO_2 released	 ignore biodegrade do **not** award this mark if response implies the trout respire	2
Total			**7**

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Question 7

question	answers	extra information	mark
7(a)	5		1
7(b)	any **one** from: • more light • warm(er) / hot • more water / lot of rain increased / more photosynthesis	allow in either section allow more sun / sunnier allow in either section allow more biomass / carbohydrate / named (made) do **not** allow food allow enzymes / metabolism faster **NB** for **2** marks this must be linked to heat to gain **2** marks more / increased must be mentioned at least once	1 1
7(c)	less pollution / named pollutant eg carbon dioxide / 'fumes' / emissions less fuel used / less transport / named transport	allow examples of effect of less pollution eg less global warming / less acid rain allow any relevant environmental effect eg imported diseases ignore 'less distance' / importing allow 'less distance travelled' / 'less travel' allow smaller carbon footprint once only for either mark	1 1
Total			**5**

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Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

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General Certificate of Secondary Education
June 2009

ADDITIONAL SCIENCE
Unit Biology B2

BLY2F

F

BIOLOGY
Unit Biology B2

Foundation Tier

Wednesday 20 May 2009 1.30 pm to 2.15 pm

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. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- 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.

For Examiner's Use			
Question	Mark	Question	Mark
1		7	
2		8	
3			
4			
5			
6			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

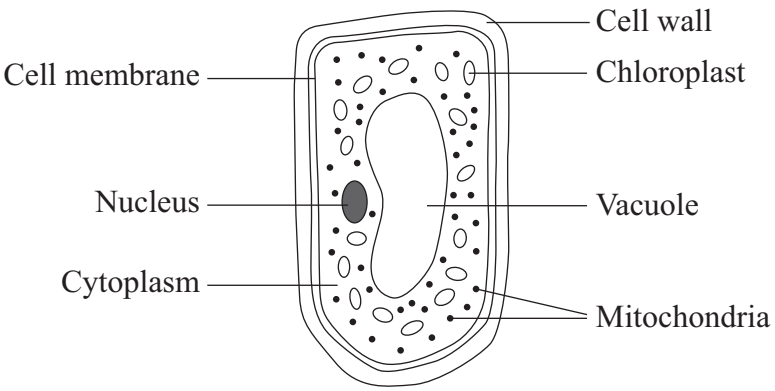
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Areas outside the box will not be scanned for marking

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

1 **Diagram 1** shows a cell from a leaf.

Diagram 1



1 (a) How is the leaf cell specialised to carry out photosynthesis?

Tick (✓) **one** box.

It has a permanent vacuole. ☐

It has many chloroplasts. ☐

It has cytoplasm. ☐

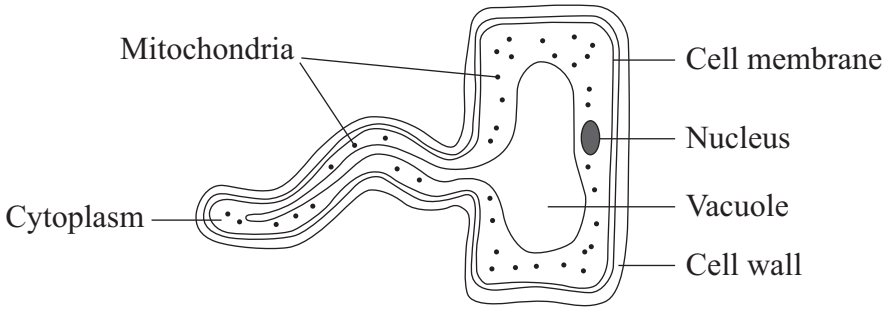
It has many mitochondria. ☐

(1 mark)

Areas outside the box will not be scanned for marking

1 (b) **Diagram 2** shows another type of plant cell.

Diagram 2



Give **two** ways in which this cell is different from an animal cell.

1 .....

.....

2 .....

.....

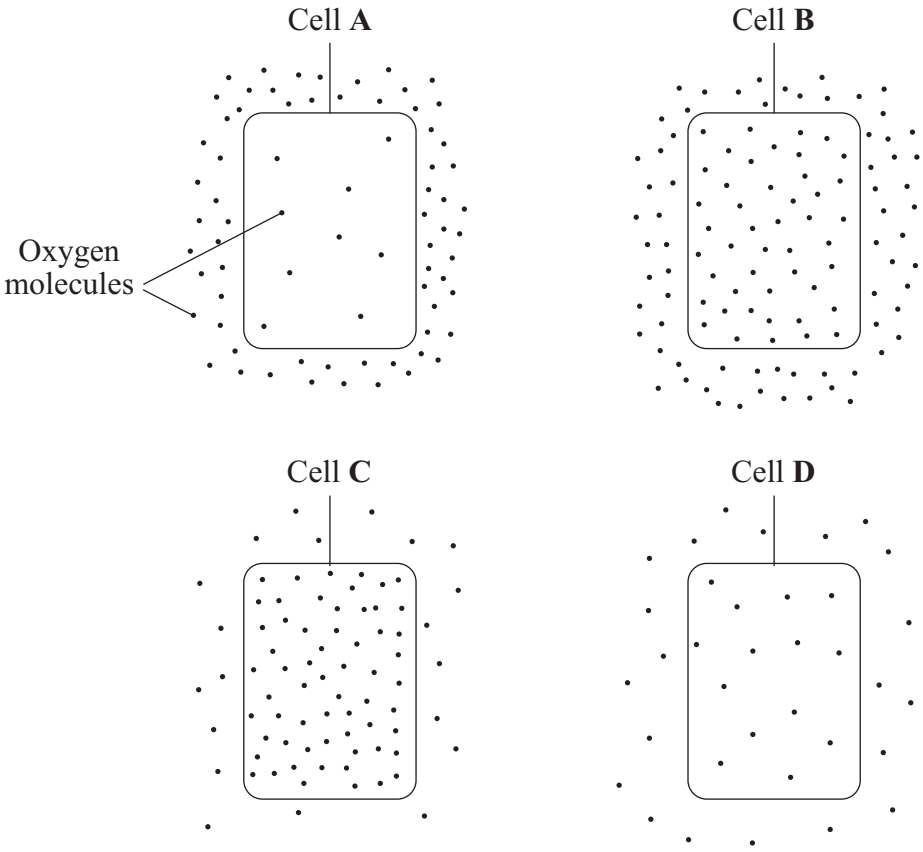
(2 marks)

3

Turn over for the next question

Areas outside the box will not be scanned for marking

2 (a) The diagrams show cells containing and surrounded by oxygen molecules. Oxygen can move into cells or out of cells.



Into which cell, **A**, **B**, **C** or **D**, will oxygen move the fastest?

Write your answer, **A**, **B**, **C** or **D**, in the box.

(1 mark)

Areas outside the box will not be scanned for marking

2 (b) Draw a ring around the correct word to complete each sentence.

2 (b) (i) Oxygen is taken into cells by the process of

diffusion
osmosis
respiration

.

(1 mark)

2 (b) (ii) Cells need oxygen for

breathing
photosynthesis
respiration

.

(1 mark)

2 (b) (iii) The parts of cells that use up the most oxygen are the

membranes
mitochondria
nuclei

.

(1 mark)

2 (b) (iv) Some cells produce oxygen in the process of

diffusion
photosynthesis
respiration

.

(1 mark)

5

Turn over ▶

Areas outside the box will not be scanned for marking

3 Water can be lost from the body in several ways.
The table shows the volume of water lost by a man on a cold day.

Way in which water is lost	**Volume of water lost in cm^3**
In urine	2000
Through skin	600
Breathed out	300
In faeces	100
Total	**3000**

3 (a) Calculate the proportion of water that the man lost through his skin.

Show clearly how you work out your answer.

.....

.....

Proportion = ...

(2 marks)

3 (b) More water is lost through the skin on a hot day than on a cold day.

3 (b) (i) Explain why.

.....

.....

(1 mark)

Areas outside the box will not be scanned for marking

3 (b) (ii) To maintain water balance in the body, the total volume of water taken in must equal the total volume of water lost.

Give **two** ways this is achieved on a hot day, when compared to a cold day.

Tick (✓) **two** boxes.

The volume of water in the urine decreases. ☐

The volume of water in the faeces increases. ☐

The volume of water taken as food or drink increases. ☐

The volume of water breathed out decreases. ☐

(2 marks)

3 (c) Use words from the box to complete the sentences.

bladder	**kidney**	**liver**	**stomach**

The body cannot store amino acids.

The body converts the amino acids it cannot use into urea.

3 (c) (i) Urea is made in the.....

(1 mark)

3 (c) (ii) Urea is removed from the blood by the .....

(1 mark)

3 (c) (iii) Urine is stored in the .....

(1 mark)

8

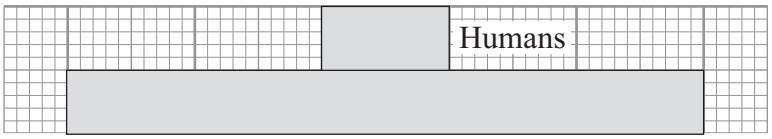
Turn over for the next question

Areas outside the box will not be scanned for marking

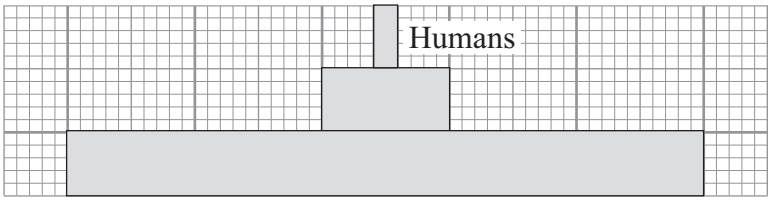
4 (a) The diagrams show three pyramids of biomass.

4 (a) (i) Which pyramid would be the most efficient in providing food for humans?

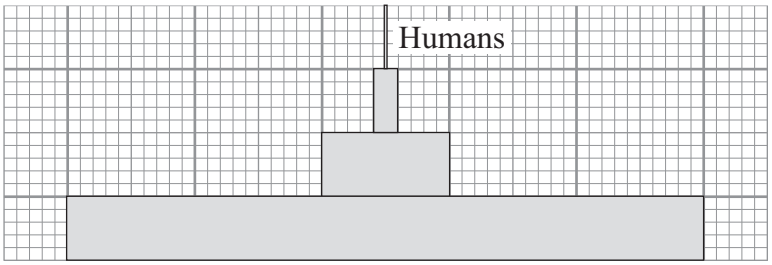
Tick (✓) **one** box.



☐



☐



☐

(1 mark)

4 (a) (ii) Give **one** reason for your choice.

.....

.....

(1 mark)

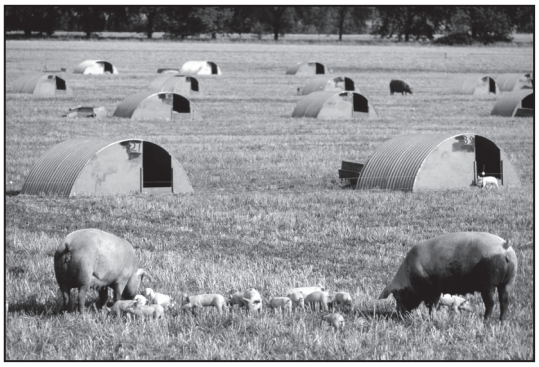
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4 (b) Pigs may be kept indoors or outdoors.

Pigs kept indoors

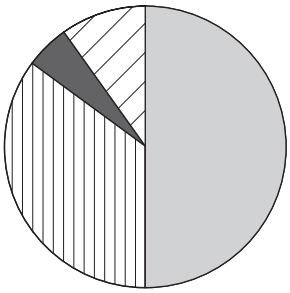


Pigs kept outdoors

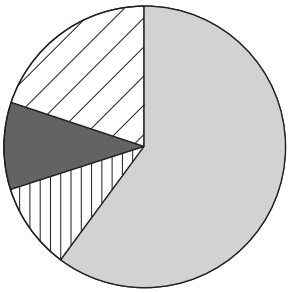


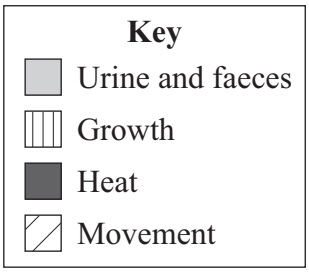
The pie charts show what happens to the energy in the food eaten by pigs kept indoors and pigs kept outdoors.

Pigs kept indoors



Pigs kept outdoors





4 (b) (i) Farmers make more profit from keeping pigs indoors than from keeping pigs outdoors.

Use information from the pie charts to explain why.

.....

.....

.....

.....

(2 marks)

4 (b) (ii) Meat from pigs kept outdoors may cost more than meat from pigs kept indoors.

Some people prefer to buy meat from animals that have been kept outdoors.

Suggest **one** reason why.

.....

.....

(1 mark)

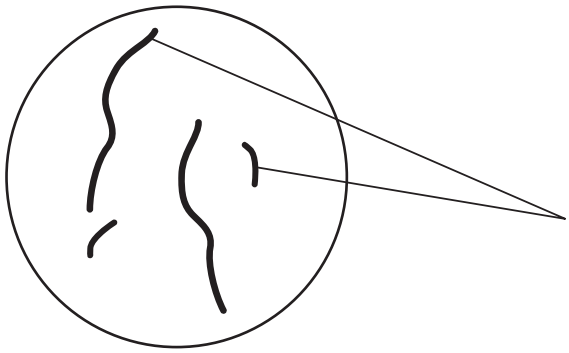
5

Turn over ▶

Areas outside the box will not be scanned for marking

5 **Diagram 1** shows the nucleus of a body cell as it begins to divide by mitosis.

Diagram 1



.....

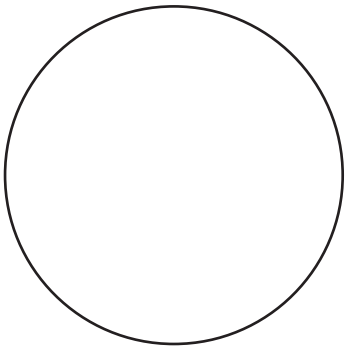
5 (a) Use a word from the box to label **Diagram 1**.

alleles	**chromosomes**	**gametes**

(1 mark)

5 (b) Complete **Diagram 2** to show what the nucleus of one of the cells produced by this mitosis would look like.

Diagram 2



(1 mark)

Areas outside the box will not be scanned for marking

5 (c) Stem cells from a recently dead embryo can be grown in special solutions.

Some facts about stem cells are given below.

- Stem cells from an embryo can grow into any type of tissue.
- Stem cells may grow out of control, to form cancers.
- Large numbers of stem cells can be grown in the laboratory.
- Stem cells may be used in medical research or to treat some human diseases.
- Patients treated with stem cells need to take drugs for the rest of their life to prevent rejection.
- Collecting and growing stem cells is expensive.

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

5 (c) (i) Give **two** advantages of using stem cells.

1 .....

.....

2 .....

.....

(2 marks)

5 (c) (ii) Give **two** disadvantages of using stem cells.

1 .....

.....

2 .....

.....

(2 mark)

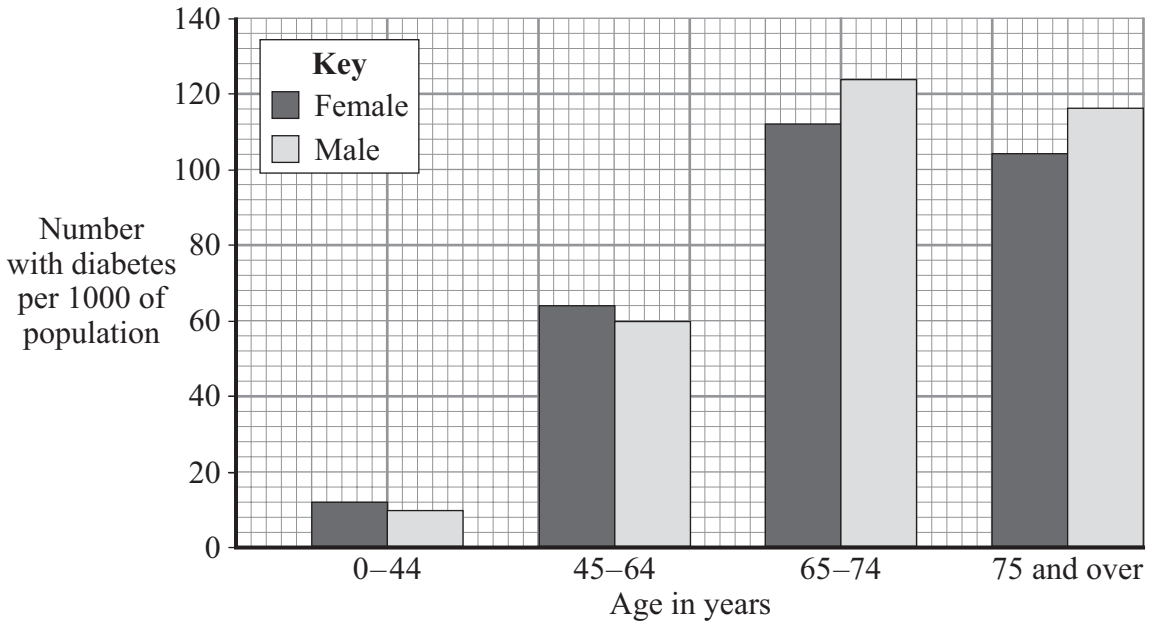
6

Turn over ▶

Areas outside the box will not be scanned for marking

6 Diabetes is caused when the body does not produce enough insulin.

6 (a) The bar graph shows the number of people with diabetes per 1000 of population.



6 (a) (i) How many more males aged between 45 and 64 years of age have diabetes than males under 45 years of age?

Show clearly how you work out your answer.

.....

.....

Answer ..... per 1000 of population

(2 marks)

6 (a) (ii) Describe the way in which the number of females with diabetes changes with age.

.....

.....

.....

.....

.....

(2 marks)

Areas outside the box will not be scanned for marking

6 (b) One way of treating diabetes is by injecting insulin.

Insulin is a protein.

6 (b) (i) If insulin is taken by mouth, it is broken down in the digestive system.

Where in the digestive system would insulin be broken down?

Draw a ring around your answer.

liver **mouth** **stomach**

(1 mark)

6 (b) (ii) Give **one** way of treating diabetes instead of using insulin.

.....

.....

(1 mark)

6

Turn over for the next question

Areas outside the box will not be scanned for marking

7 (a) (i) Complete the word equation for photosynthesis.

carbon dioxide + ... (+ light energy) → glucose + ...

(2 marks)

7 (a) (ii) Most of the carbon dioxide that a plant uses during photosynthesis is absorbed from the air.

Give **one** other source of carbon dioxide for a plant.

Draw a ring around your answer.

the soil **respiration in the plant** **osmosis in the plant** **water**

(1 mark)

A student investigated the conditions that plants need for photosynthesis.
The leaves of the plant he used had green and white parts.

Diagram 1 shows how part of one leaf was covered in black (opaque) card.
The plant was placed in a warm, sunny area and was watered well.
Eight hours later the leaf was removed from the plant and was tested for starch.

The results of the test are shown in **Diagram 2**, the shaded parts show where starch was present.

Diagram 1

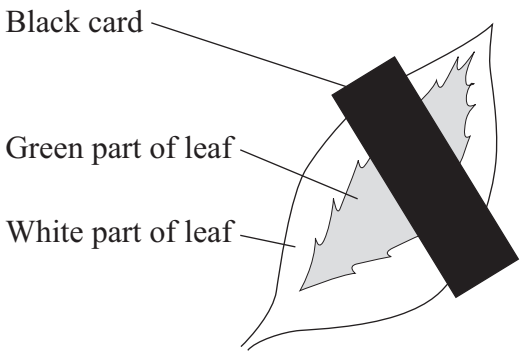
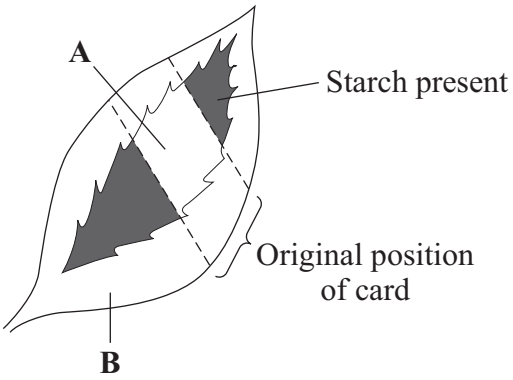


Diagram 2



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Areas outside the box will not be scanned for marking

7 (b) Name the **two** independent variables in this investigation.

1 .....

.....

2 .....

.....

(2 marks)

7 (c) Why was no starch found in:

7 (c) (i) the part of the leaf labelled **A**

.....

.....

(1 mark)

7 (c) (ii) the part of the leaf labelled **B**?

.....

.....

(1 mark)

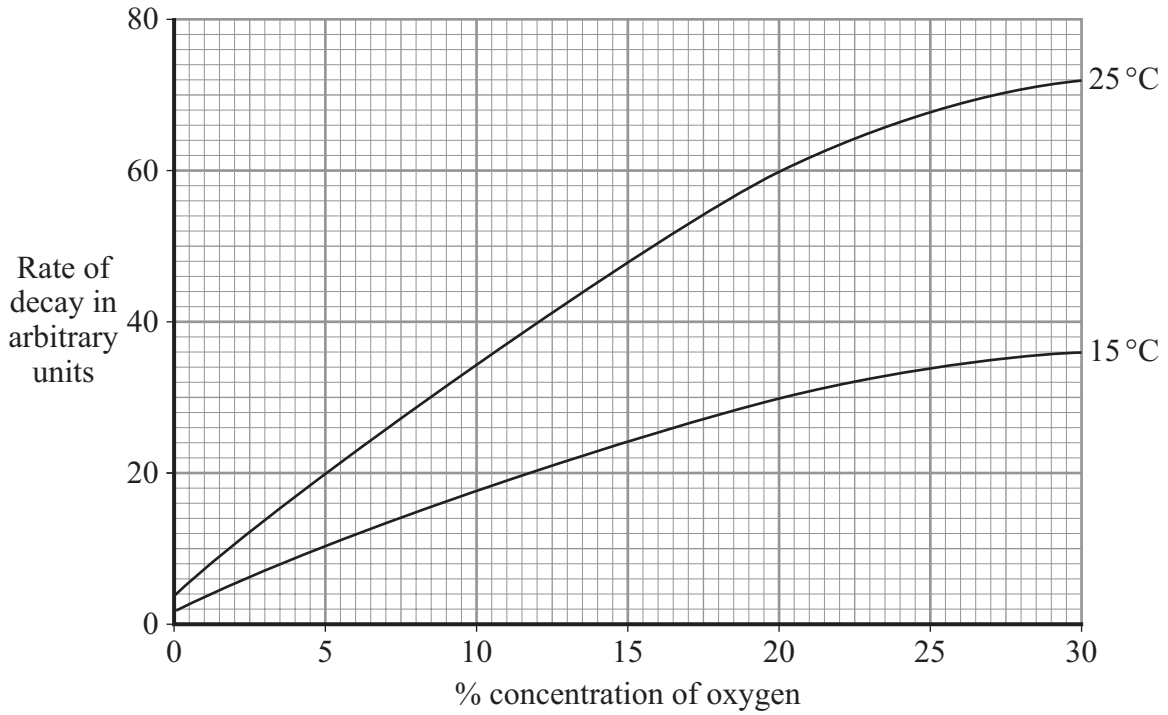
7

Turn over for the next question

Areas outside the box will not be scanned for marking

8 Gardeners often put waste materials onto compost heaps.

The graph shows how the conditions in a compost heap affect how quickly waste materials in the heap decay.



8 (a) (i) Describe the effect of increasing the temperature from 15 °C to 25 °C on the rate of decay at 20 % oxygen concentration.

.....

.....

.....

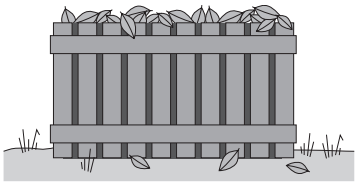
.....

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(2 marks)

Areas outside the box will not be scanned for marking

8 (a) (ii) Gardeners are advised to put waste materials into special compost bins.
These bins have holes in their sides.



Holes in the sides of the compost bin help the waste materials to decay faster.

Explain why.

.....

.....

.....

.....

.....

(2 marks)

8 (b) A gardener noticed that some of his plants were growing poorly.

He put some decayed compost onto the soil, around the plants.
Six months later the plants were growing well.

Explain why.

.....

.....

(1 mark)

5

END OF QUESTIONS

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ANSWER IN THE SPACES PROVIDED

There are no questions printed on this page

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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit 2 Biology

Mark Scheme

2009 examination – June series

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Dr Michael Cresswell Director General

MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

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Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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BLY2F

Question 1

question	answers	extra information	mark
1(a)	it has many chloroplasts.		1
1(b)	(has) cell wall	assume plant cell throughout accept converse for animal cell	1
	(has) vacuole **or** large / permanent vacuole	do **not** allow chloroplasts	1
Total			**3**

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BLY2F

Question 2

question	answers	extra information	mark
2(a)	A		1
2(b)(i)	diffusion		1
2(b)(ii)	respiration		1
2(b)(iii)	mitochondria		1
2(b)(iv)	photosynthesis		1
Total			**5**

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BLY2F

Question 3

question	answers	extra information	mark
3(a)	$\frac{1}{5}$ / 20% / 1 in 5 / 1 : 4 / 0.2 /	any correct proportion ignore working do **not** allow 1 : 5	2
	$\frac{600}{3000}$ / 600 : 2400 / 600 in 3000	award **1** mark for selection of 3000 **and** 600	
3(b)(i)	sweat / sweating / perspiring	allow cooling / for cooling / to lose heat / to cool	1
3(b)(ii)	the volume of water in the urine decreases.		1
	the volume of water taken as food or drink increases.		1
3(c)(i)	liver	apply list principle	1
3(c)(ii)	kidney	apply list principle	1
3(c)(iii)	bladder	apply list principle	1
Total			**8**

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BLY2F

Question 4

question	answers	extra information	mark
4(a)(i)	tick in box of FIRST pyramid		1
4(a)(ii)	any **one** from: • less energy / biomass lost / wasted • greatest biomass / energy for humans • shortest food chain **or** less stages **or** least number of different organisms **or** only one predator **or** only 2 boxes tall **or** least boxes	 ignore human box is bigger ignore 'food' for humans allow only one stage	1
4(b)(i)	any **two** from: • quicker / more growth **or** grow fatter • less urine **or** less faeces • less heat (lost) • less movement	assume for pigs indoors allow converse if clear for pigs outdoors do **not** allow no for less ignore less space	2
4(b)(ii)	any **one** from: • less cruelty **or** more ethical **or** better animal welfare • better flavour / quality (of meat) • less pollution / etc / less fossil fuel used for heating	assume for pigs outdoors allow converse if clear for pigs indoors ignore more natural ignore ideas referring to against God's will ignore pig health **or** free range / organic ignore quality of life	1
Total			**5**

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BLY2F

Question 5

question	answers	extra information	mark
5(a)	chromosomes		1
5(b)	diagram showing four separate chromosomes two long and two short (as in diagram 1)	allow each chromosome shown as two joined chromatids do **not** allow if chromosomes touching each other	1
5(c)(i)	any **two** from: • can grow into any type of tissue / named tissue • used in medical research • used to treat human diseases • large numbers can be grown		2
5(c)(ii)	any **two** from: • expensive • grow out of control / ref cancers • may be rejected • need for drugs (for rest of life)		2
Total			**6**

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BLY2F

Question 6

question	answers	extra information	mark
6(a)(i)	50	award **2** marks for correct answer irrespective of working award **1** mark for selection of 60 **and** 10	2
6(a)(ii)	any **two** from: • increases • (then) decreases • highest at 65 – 74 (years old) **or** maximum 112 (per thousand)	ignore comparisons with men allow peaks at 65 - 74	2
6(b)(i)	stomach		1
6(b)(ii)	any sensible reference to diet **or** carbohydrate intake **or** pancreas / stem cell transplant	eg eat less / no sugary food **or** eat more fibre **or** go on a diet **or** watch what you eat ignore eat more protein do **not** accept reduce salt	1
Total			**6**

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Question 7

question	answers	extra information	mark
7(a)(i)		answers must be in this order	1
	water / H_2O	allow hydrogen oxide	1
	oxygen / O_2 / O	allow upper and lower case symbols and superscripts	
7(a)(ii)	respiration in the plant	allow clear indication of correct response	1
7(b)	light (: no light) / light intensity	ignore references to the card / covered / uncovered	1
	chlorophyll (: no chlorophyll) / chloroplast	allow leaf colour **or** both green **and** white given	1
7(c)(i)	no light (received) **or** it's dark	allow no photosynthesis do **not** allow little light / photosynthesis ignore sun apply list principle for other factors	1
7(c)(ii)	no chlorophyll / chloroplasts (present)	allow no / little photosynthesis allow white **or** not green **or** little chlorophyll / few chloroplasts apply list principle for other factors	1
Total			**7**

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Question 8

question	answers	extra information	mark
8(a)(i)	increase / higher / faster / quicker numerical comparison eg from 30 to 60 / by 30 **or** it is 30 at 15°C and 60 at 25°C	 award **2** marks for doubles / goes twice as fast or 30 units <u>more</u>	1 1
8(a)(ii)	any **two** from: • oxygen / air (in) • for microorganisms / bacteria / microbes / fungi / decomposers • (for aerobic) respiration • let heat out • heat kills microorganisms	 do **not** accept lets oxygen / air out ignore reference to other substances / light passing in or out ignore microorganisms passing in ignore worms / germs / bugs ignore heat in	2
8(b)	compost contains minerals / nutrients / elements / ions / named	allow improve moisture / drainage allow nitrogen ignore CO_2 / food / goodness / fertilisers do **not** accept vitamins / glucose etc	1
Total			**5**

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Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
January 2009

ADDITIONAL SCIENCE
Unit Biology B2

BLY2F

F

BIOLOGY
Unit Biology B2

Foundation Tier

Monday 12 January 2009 9.00 am to 9.45 am

For this paper you must have:
- a pencil and 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. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- 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.

For Examiner's Use			
Question	Mark	Question	Mark
1		6	
2		7	
3			
4			
5			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

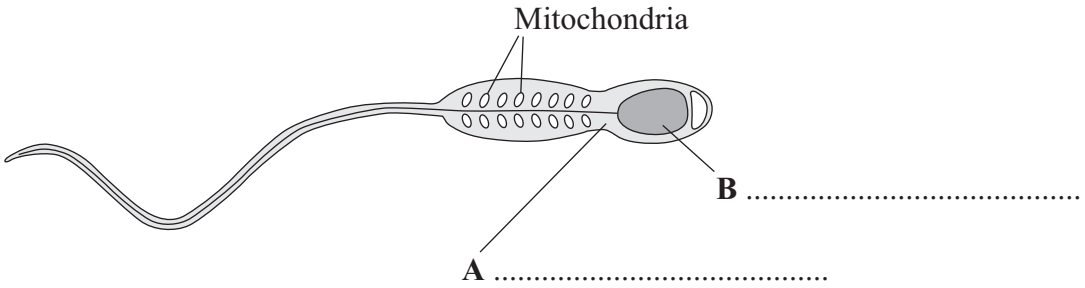
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Areas outside the box will not be scanned for marking

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

1 This question is about cells.

1 (a) (i) The diagram shows a sperm cell.

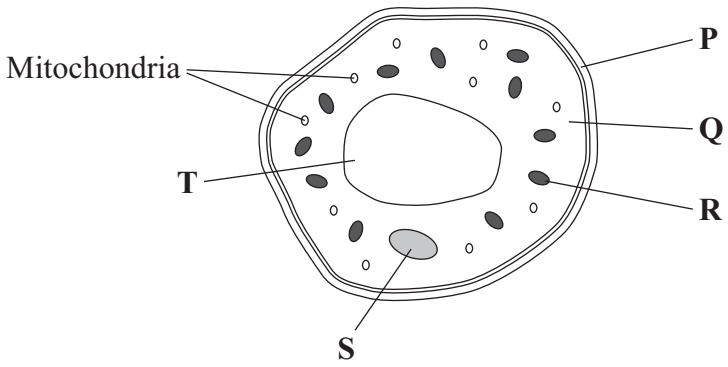


Use words from the box to label parts **A** and **B**.

cell membrane	**cytoplasm**	**nucleus**

(2 marks)

1 (a) (ii) The diagram shows a cell from a leaf.



Give the letters of **two** parts of the leaf cell which would **not** be found in a sperm cell. ☐ and ☐

(1 mark)

Areas outside the box will not be scanned for marking

1 (b) Sperm cells have many mitochondria.

Why do sperm cells need many mitochondria?

Tick (✓) **one** box.

Sperm cells are involved in fertilisation. ☐

Sperm cells are produced in very large numbers. ☐

Sperm cells need a lot of energy to swim. ☐

(1 mark)

4

Turn over for the next question

Areas outside the box will not be scanned for marking

2 Enzymes have many uses in the home and in industry.

2 (a) Which type of organism is used to produce these enzymes?

Tick (✓) **one** box.

Mammals ☐

Microorganisms ☐

Plants ☐

(1 mark)

2 (b) Babies may have difficulty digesting proteins in their food. Baby food manufacturers use enzymes to 'pre-digest' the protein in baby food to overcome this difficulty.

Use words from the box to complete the sentences.

amino acids	**amylases**	**proteases**	**sugars**

2 (b) (i) Proteins are 'pre-digested' using enzymes called .....

(1 mark)

2 (b) (ii) This pre-digestion produces .....

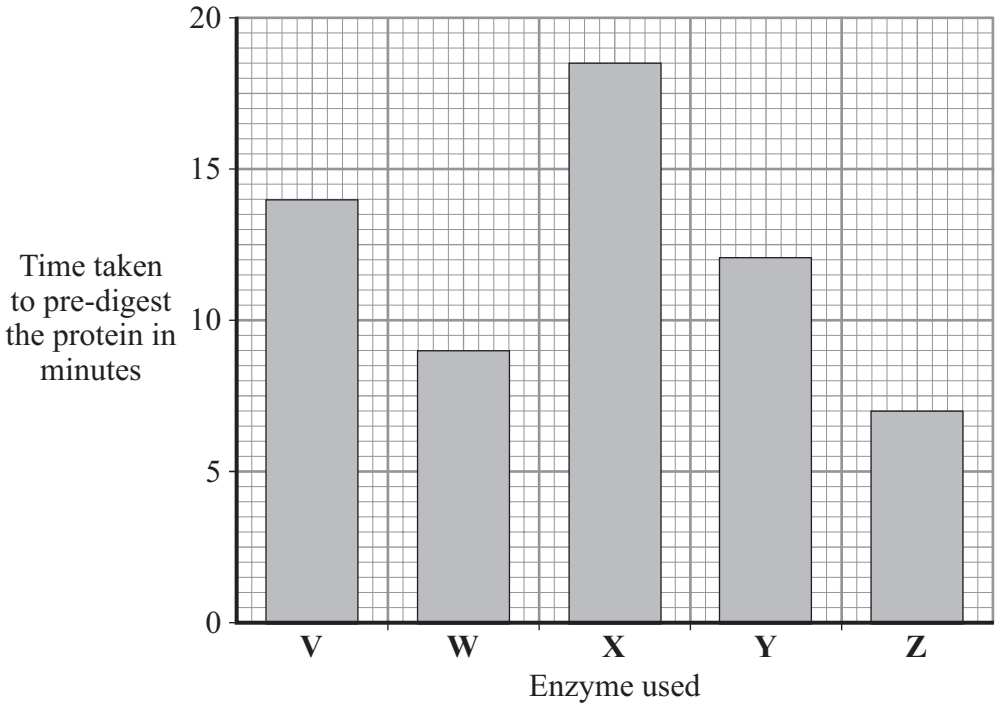
(1 mark)

2 (c) A baby food manufacturer uses enzyme **V** to pre-digest protein.
He tries four new enzymes, **W**, **X**, **Y** and **Z**, to see if he can reduce the time taken to pre-digest the protein.

The graph shows the time taken for the enzymes to completely pre-digest the protein.

The manufacturer uses the same concentration of enzyme and the same mass of protein in each experiment.

Areas outside the box will not be scanned for marking



2 (c) (i) How long did it take enzyme **V** to pre-digest the protein? ☐ minutes

(1 mark)

2 (c) (ii) Which enzyme would you advise the baby food manufacturer to use?

Draw a ring around your answer.

enzyme V **enzyme W** **enzyme X** **enzyme Y** **enzyme Z**

Give a reason for your answer.

.....

.....

(2 marks)

2 (c) (iii) Give **two** factors which should be controlled in the baby food manufacturer's investigations.

Tick (✓) **two** boxes.

Oxygen concentration ☐

Temperature ☐

Light intensity ☐

pH ☐

(2 marks)

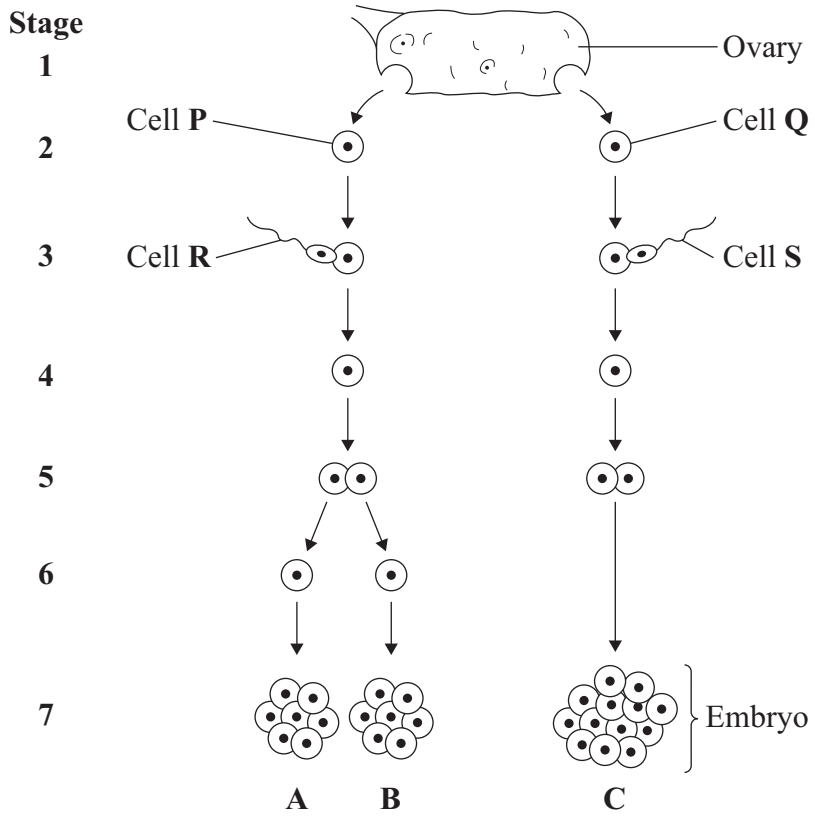
8

Turn over ▶

Areas outside the box will not be scanned for marking

3 A woman gives birth to triplets.
Two of the triplets are boys and the third is a girl.
The triplets developed from two egg cells released from the ovary at the same time.

The diagram shows how triplets **A**, **B** and **C** developed.



3 (a) Which stages on the diagram show gametes?

Draw a ring around your answer.

1 and 2 **2 and 3** **3 and 7** **1 and 7**

(1 mark)

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Areas outside the box will not be scanned for marking

3 (b) Embryo **B** is male.

Which of the following explains why embryo **B** is male?

Tick (✓) **one** box.

Cell **P** has an X chromosome; cell **R** has an X chromosome. ☐

Cell **P** has a Y chromosome; cell **R** has an X chromosome. ☐

Cell **P** has an X chromosome; cell **R** has a Y chromosome. ☐

(1 mark)

3 (c) The children that develop from embryos **A** and **C** will **not** be identical.

Explain why.

You may use words from the box in your answer.

egg	**genes**	**sperm**

.....

.....

.....

.....

.....

(2 marks)

Question 3 continues on the next page

Areas outside the box will not be scanned for marking

3 (d) Single cells from an embryo at **Stage 7** can be separated and grown in a special solution.

3 (d) (i) What term describes cells that are grown in this way?

Draw a ring around your answer.

alleles **screened cells** **stem cells**

(1 mark)

3 (d) (ii) What happens when the cells are placed in the special solution?

Tick (✓) **two** boxes.

The cells divide ☐

The cells fertilise ☐

The cells differentiate ☐

The cells separate ☐

(2 marks)

3 (d) (iii) Give **one** use of cells grown in this way.

.....

.....

(1 mark)

3 (d) (iv) Some people might object to using cells from embryos in this way.

Give **one** reason why.

.....

.....

.....

(1 mark)

9

Areas outside the box will not be scanned for marking

4 Waste products, such as carbon dioxide and urea, have to be removed from the body.

Draw a ring around the correct answer to complete each sentence.

4 (a) Carbon dioxide is produced by [breathing / diffusion / respiration] .

(1 mark)

4 (b) Most carbon dioxide leaves the body through the [kidneys / lungs / skin] .

(1 mark)

4 (c) Urea is produced in the [kidneys / liver / lungs] .

(1 mark)

4 (d) Urea is produced from the breakdown of [amino acids / glucose / urine] .

(1 mark)

4

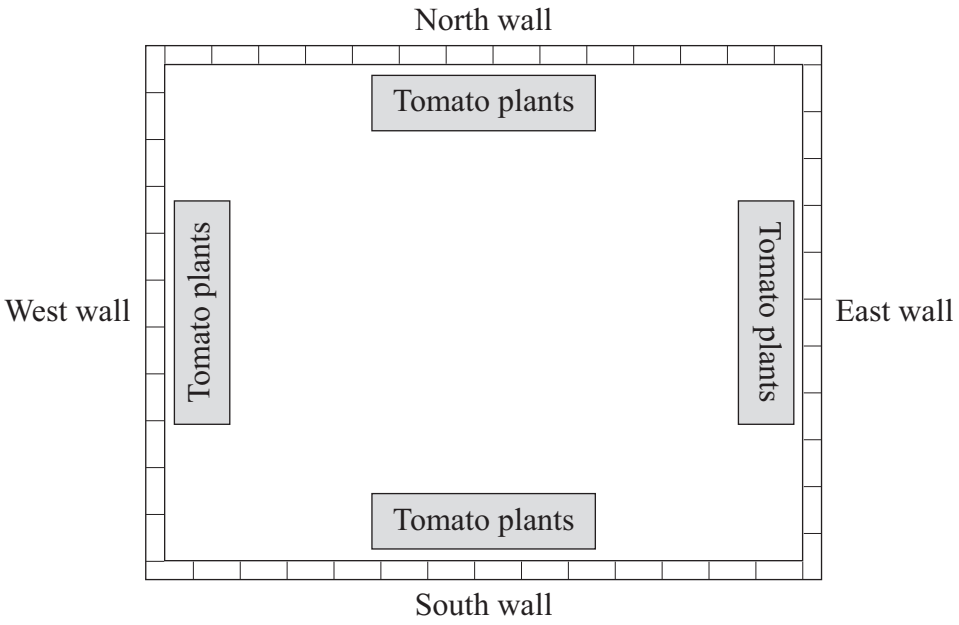
Turn over for the next question

Areas outside the box will not be scanned for marking

5 A gardener grows tomatoes.

He wants to find out how to get the biggest mass of tomatoes.

He plants different varieties of tomato against different walls in his garden.



5 (a) The gardener wants his test to be fair.

Name **one** condition which he should keep the same for all his tomato plants.

.....

.....

(1 mark)

Areas outside the box will not be scanned for marking

5 (b) The table shows the gardener's results.

Variety of tomato plant	**Sungold**	**Sungold**	**Sungold**	**Sungold**	**Nugget**	**Champion**
Wall they were planted against	North	West	South	East	East	East
Mean mass of tomatoes produced in kilograms per plant	3.5	3.0	1.2	2.5	3.2	2.7

Use these results to answer the questions.

5 (b) (i) To obtain the biggest mass of tomatoes, against which wall is it best to grow the tomato plants?

Tick (✓) **one** box.

North wall ☐

South wall ☐

East wall ☐

West wall ☐

(1 mark)

5 (b) (ii) To obtain the biggest mass of tomatoes, which variety of tomato plant would it be best to grow?

.....

(1 mark)

5 (c) From the information in the table, the gardener's test was **not** fair.

Give **one** way in which the test was **not** fair.

.....

.....

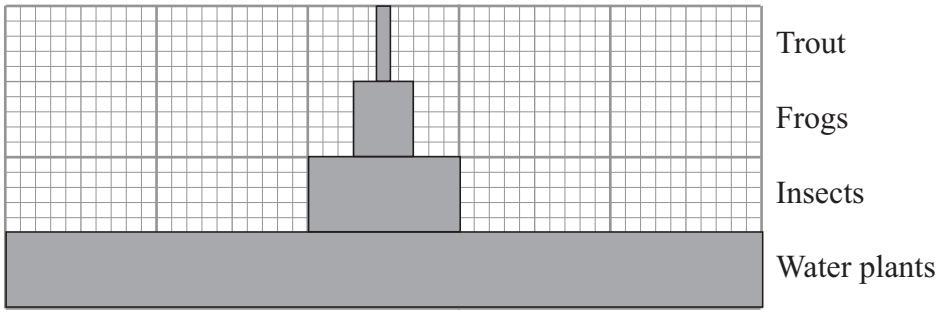
(1 mark)

4

Turn over ▶

Areas outside the box will not be scanned for marking

6 The diagram shows a pyramid of biomass drawn to scale.



6 (a) What is the source of energy for the water plants?

.....

(1 mark)

6 (b) The ratio of the biomass of water plants to the biomass of insects is 5 : 1.

Calculate the ratio of the biomass of insects to the biomass of frogs.

Show clearly how you work out your answer.

.....

.....

ratio = ... : 1

(2 marks)

6 (c) Give **two** reasons why the biomass of the frog population is smaller than the biomass of the insect population.

1 .....

.....

2 .....

.....

(2 marks)

Areas outside the box will not be scanned for marking

6 (d) Some insects die.

Describe how the carbon in the dead insect bodies may be recycled.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

9

Turn over for the next question

Areas outside the box will not be scanned for marking

7 Diabetes is a disease in which a person's blood glucose concentration rises to higher levels than normal.
Diabetes is caused by insufficient insulin being produced.

7 (a) (i) Which organ monitors blood glucose concentration?

.....

(1 mark)

7 (a) (ii) Insulin reduces the concentration of glucose in the blood.

Describe how insulin does this.

.....

.....

(1 mark)

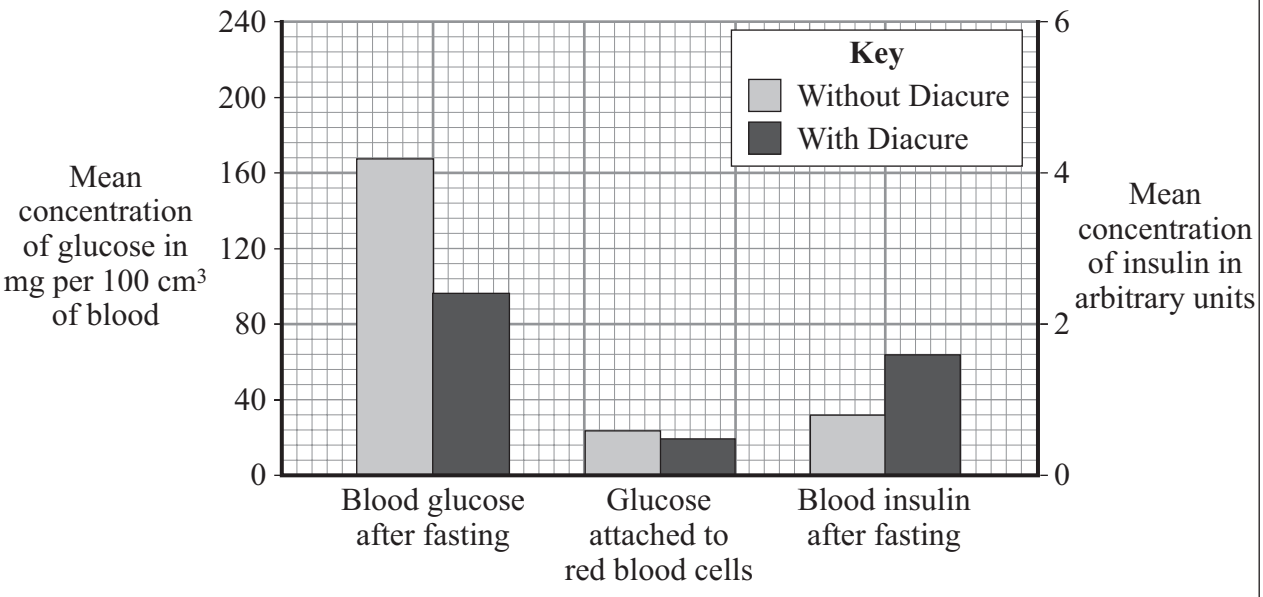
7 (b) A person with diabetes can be monitored in three ways:

- measuring the blood glucose concentration after fasting (going without food for 12 hours)
- measuring the amount of glucose attached to red blood cells: this is a measure of the average blood glucose concentration over the previous three months
- measuring the concentration of insulin in the blood after fasting

The manufacturer of a new treatment for diabetes, called Diacure, publishes the following two claims.

1. 98.6% of all people who used Diacure reported an improvement in their condition.

2. An independent study of 30 diabetic patients showed a significant reduction in blood glucose concentrations and a significant increase in insulin production, as shown by the graph.



Areas outside the box will not be scanned for marking

7 (b) (i) Which of the manufacturer's claims is **not** based on scientific evidence?

.....

.....

(1 mark)

7 (b) (ii) Why might the data in this study be unreliable?

.....

.....

.....

(1 mark)

7 (b) (iii) The manufacturer did **not** draw attention to the data for the amount of glucose attached to red blood cells.

Suggest an explanation for this.

.....

.....

.....

.....

.....

(2 marks)

7 (b) (iv) The study of diabetic patients was carried out by an independent company.

Why is it important that the study should be independent?

.....

.....

.....

(1 mark)

7

END OF QUESTIONS

There are no questions printed on this page

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Version 1: 0109

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

Mark Scheme

2009 examination – January series

STEMUP.CO.UK

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Dr Michael Cresswell Director General

MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example:
where consequential marking needs to be considered in a calculation;
or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
1(a)(i)	A cytoplasm B nucleus	accept clear indications	1 1
1(a)(ii)	any **two** from: • P • R • T	**two** required for **1** mark accept lower case letters	1
1(b)	sperm cells need a lot of energy to swim		1
Total			**4**

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
2(a)	microorganisms		1
2(b)(i)	proteases	clear indications of correct answer	1
2(b)(ii)	amino acids (both words)	clear indications of correct answer	1
2(c)(i)	14		1
2(c)(ii)	 enzyme Z takes least time (to pre-digest protein) / works fastest	mark independently clear indication of correct answer allow only 7 minutes / less time / faster do **not** allow works best	 1 1
2(c)(iii)	temperature pH		1 1
Total			**8**

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
3(a)	2 and 3		1
3(b)	cell **P** has an X chromosome; cell **R** has a Y chromosome		1
3(c)	any **two** from: • (formed from) different egg / 2 eggs • (formed from) different sperm / 2 sperm • have different genes / alleles / chromosomes / DNA	 allow genetics	2
3(d)(i)	stem cells		1
3(d)(ii)	the cells divide the cells differentiate		1 1
3(d)(iii)	(medical) research / named eg growing organs **or** medical / patient treatment	allow (embryo) cloning do **not** allow designer babies / more babies	1

Question 3 continued on next page…

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

Question 3 continued…

question	answers	extra information	mark
3(d)(iv)	any **one** from: • ethical / moral / religious objections • potential harm to embryo	ignore cruel / not natural / playing God allow deformed ignore harm to mother	1
Total			**9**

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
4(a)	respiration	clear indication eg tick, underlining, others crossed out	1
4(b)	lungs		1
4(c)	liver		1
4(d)	amino acids		1
Total			**4**

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
5(a)	any **one** from: • (type of / amount of) soil / minerals / nutrients / pH • amount of water / time of watering • space between plants / plants and wall • time for growth	list principle ignore carbon dioxide / same number of plants / food do **not** allow temperature / light / exposure to wind	1
5(b)(i)	North wall		1
5(b)(ii)	nugget	list principle	1
5(c)	has not tested all varieties / nugget / champion against all walls	do **not** allow repeat experiment	1
Total			**4**

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
6(a)	the sun / light / sunshine / solar	allow radiation from the sun ignore photosynthesis / respiration apply list principle do **not** allow water / minerals / heat	1
6(b)	2.5 (:1)	correct answer with or without working ignore rounding with correct working do **not** allow other equivalent ratios for both marks evidence of selection of 10(insects) **and** 4(frogs) **or** 50 **and** 20 **or** 1 **and** 0.4 for **1** mark if no other working allow **1** mark for 0.4:(1) on answer line	2
6(c)	any **two** from: • some parts indigestible / faeces • waste / examples of waste eg urea / nitrogenous compounds / urine / excretion • movement / eg of movement • heat • not all eaten / eg of not all eaten • respiration	allow for insects **or** frogs allow energy for biomass allow keeping warm do not accept energy for respiration	2

Question 6 continued on next page…

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

Question 6 continued…

question	answers	extra information	mark
6(d)	any **four** from: • (bodies) consumed by animals / named / scavengers / detritus feeders • microorganisms / bacteria / fungi / decomposers • reference to enzymes • decay / <u>breakdown</u> / decompose / rot • respiration • carbon dioxide produced • photosynthesis • sugar / glucose produced • fossilisation / fossil fuels / named • combustion / burning • (burning) produces carbon dioxide	ignore digest(ion) accept other organic molecules must be linked with fossilisation / fossil fuels allow carbon dioxide produced once only	4
Total			**9**

COMPONENT NUMBER: BLY2F

COMPONENT NAME: Additional Science / Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
7(a)(i)	pancreas	allow phonetic spelling	1
7(a)(ii)	glucose into cells / liver / muscles	allow any named organ / cell allow turned into / stored as glycogen **but** do **not** allow hybrid spellings for glycogen allow increases respiration allow stored as / turned into fat	1
7(b)(i)	reference to "98.6% of all people who used Diacure reported an improvement in their condition."	allow claim **1** / **1** / the first one	1
7(b)(ii)	(only) 30 patients **or** not enough / not many patients	allow only one trial **or** only done once **or** not repeated ignore bias	1
7(b)(iii)	little effect / difference suggest drug is not effective (in long term)	allow no effect allow only drops by 4 (±1) allow wouldn't persuade people to take it	1 1
7(b)(iv)	avoid bias / owtte	eg company could change / ignore results / might lie ignore fair / accurate / reliable / valid	1
Total			**7**