

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  
Higher Tier  
June 2012

## Additional Science

Unit Biology B2

**BLY2H**

## Biology

Unit Biology B2

**H**

### 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.



J U N 1 2 B L Y 2 H 0 1

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

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

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

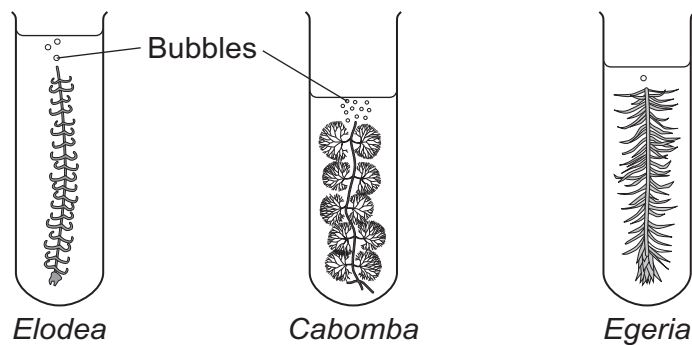
.....  
(1 mark)

**1 (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
<i>Elodea</i>	17
<i>Cabomba</i>	28
<i>Egeria</i>	8



1 (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)

1 (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)

1 (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

Turn over ►



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

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

.....  
(1 mark)

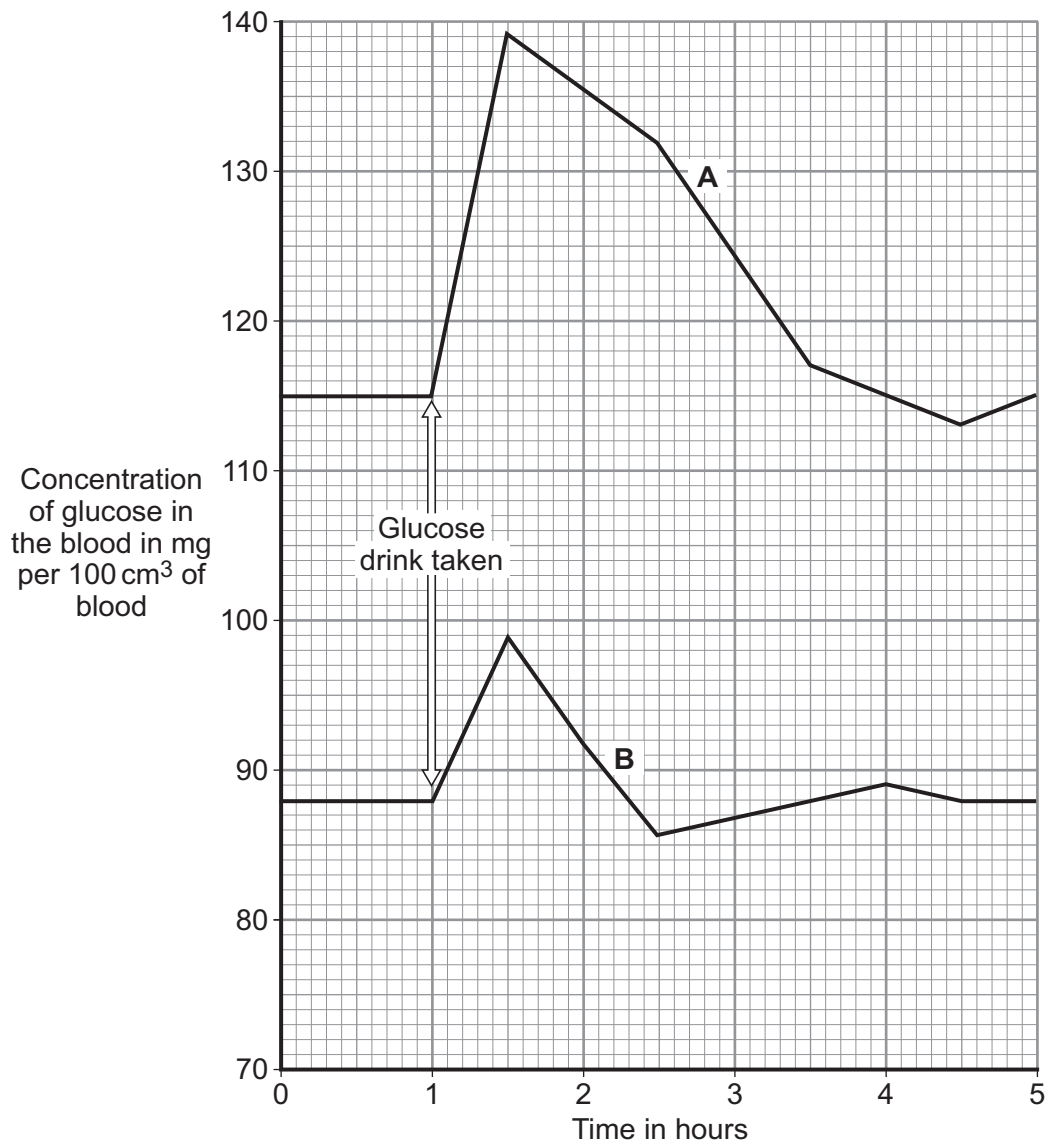
2 (a) (ii) Which organ produces this hormone?

.....  
(1 mark)

2 (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.



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

..... mg per 100 cm<sup>3</sup> of blood  
(1 mark)

2 (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)

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

.....

(1 mark)

6

Turn over for the next question

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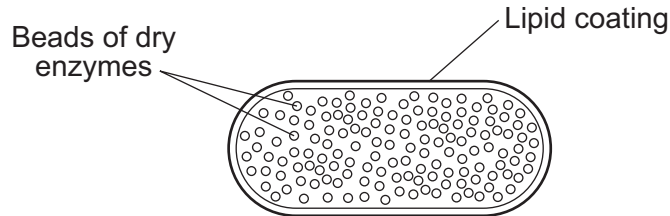




4 A patient has a disease. The disease damages his pancreas.

A doctor prescribes a course of treatment for the patient:  
*'Take one capsule with each meal.'*

Each capsule contains hundreds of small, dry beads.  
The beads are made of enzymes. The pancreas normally produces these enzymes.  
The outer coating of the capsule is made of lipid.



4 (a) One enzyme in the beads is lipase.  
In a healthy person, lipase is made in the pancreas.

Name **two** other enzymes made in the pancreas of a healthy person.

1 .....

2 .....

(2 marks)

4 (b) The lipid coating on the capsule makes sure that the enzymes are not released until the capsule reaches the small intestine.

Explain how.

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.....  
.....  
.....  
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(2 marks)

4 (c) The lipase in the beads does **not** digest the lipid coating around the capsule.

Suggest why.

.....  
.....

(1 mark)

5

Turn over ►







**5 (b)** The cows' waste is mainly faeces and urine.  
In a traditional farm the waste is spread on fields.  
The waste contains carbon compounds.

The carbon in the carbon compounds can be made available for grass plants in the field to use.

Describe how.

Use your knowledge of the carbon cycle to help you.

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(3 marks)

7

**Turn over for the next question**

**Turn over ▶**



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ANSWER IN THE SPACES PROVIDED**



6 One group of scientists is working in a hot desert and another group is working in a tropical rainforest.

The table shows information about the scientists and the conditions in the desert and the rainforest.

Information	Hot desert	Rainforest
Mean core body temperature of scientists in °C	37.3	38.9
Air temperature in °C	36.0	35.5
Mean percentage concentration of moisture in the air	9.0	92.0
Mean wind speed at ground level in metres per second	12.0	3.0

6 (a) Both groups of scientists are doing similar jobs. The jobs cause the scientists to sweat a lot.

Use information from the table to explain the difference in the mean core body temperature of the two groups of scientists.

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(2 marks)

6 (b) Changes to blood vessels in the skin help to decrease body temperature.

Explain how.

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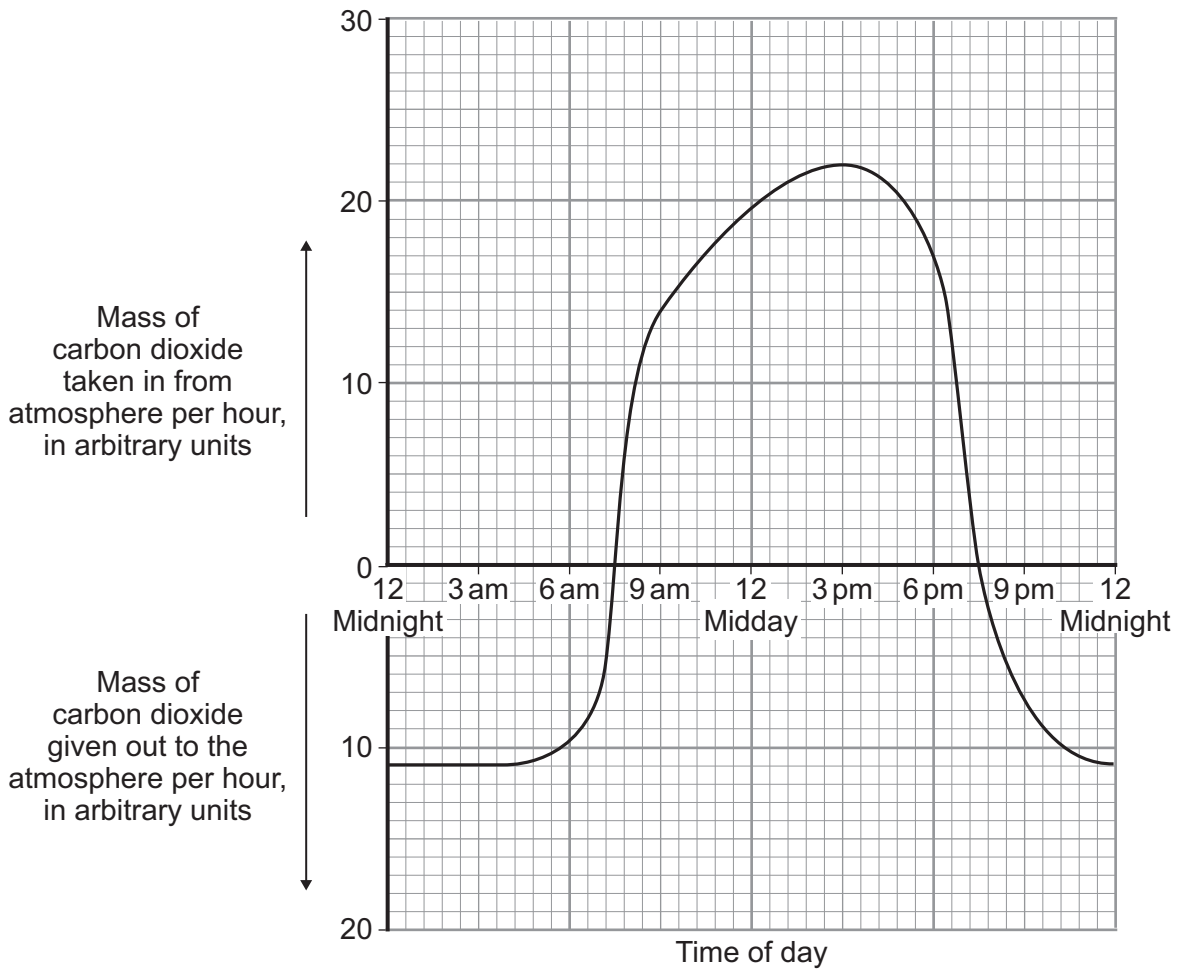
(2 marks)

4

Turn over ►



7 The graph shows the uptake of carbon dioxide and the release of carbon dioxide by a bean plant on a hot summer's day.



7 (a) At which **two** times in the day did the rate of photosynthesis exactly match the rate of respiration in the bean plant?

1 ..... 2 ..... (1 mark)

7 (b) The bean plant respire at the same rate all through the 24 hour period.

7 (b) (i) How much carbon dioxide is released each hour during respiration?

..... arbitrary units (1 mark)

7 (b) (ii) How much carbon dioxide is used by photosynthesis in the hour beginning at 3 pm?

.....  
 .....

Answer = ..... arbitrary units (1 mark)



**7 (c)** Over the 24 hour period, the total amount of carbon dioxide taken in by the bean plant was greater than the total amount of carbon dioxide given out by the bean plant.

Explain, in detail, why this was important for the bean plant.

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(2 marks)

<b>5</b>

**Turn over for the next question**

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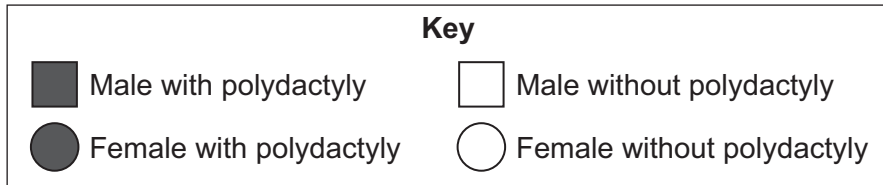
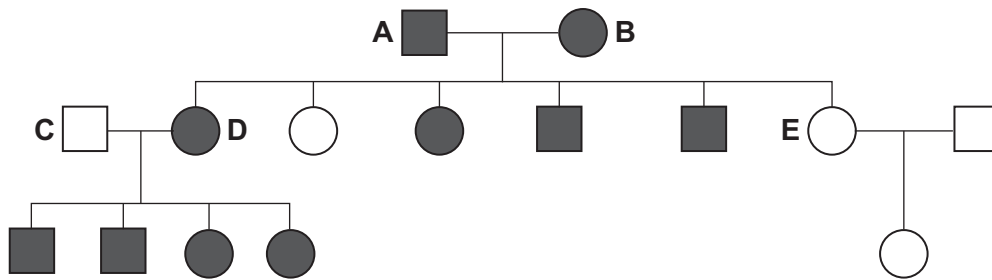


8 Cats normally have four toes on each back paw.

The picture shows the back paw of a cat with an inherited condition called polydactyly.



The family tree shows the inheritance of polydactyly in three generations of cats.



**8 (a)** What combination of alleles did the original parents, **A** and **B**, have?

Explain how you work out your answer.

You may use a genetic diagram in your answer.

Use the symbol **H** to represent the dominant allele.

Use the symbol **h** to represent the recessive allele.

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**A** = ..... **B** = .....  
(4 marks)

**8 (b) (i)** Give **two** possible combinations of alleles for cat **D**.

1 ..... 2 .....  
(1 mark)

**8 (b) (ii)** You cannot be sure which one of these two is the correct combination of alleles for cat **D**.

Why?

.....

.....

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(1 mark)

6
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**END OF QUESTIONS**



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