Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
January 2008

ADDITIONAL SCIENCE
Unit Biology B2

BLY2F

F

BIOLOGY
Unit Biology B2

Foundation Tier

Tuesday 15 January 2008 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 blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- 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.

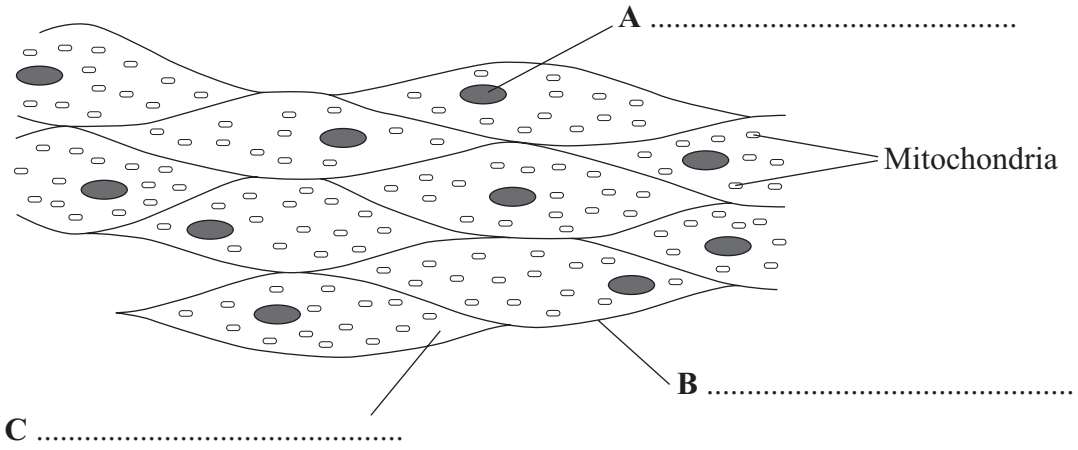
Advice
- In all calculations, show clearly how you work out your answer.

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			

There are no questions printed on this page

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

1 The diagram shows a group of muscle cells from the wall of the intestine.



(a) On the diagram, use words from the box to name the structures labelled **A**, **B** and **C**.

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

(3 marks)

(b) How are these muscle cells adapted to release a lot of energy?

.....

.....

.....

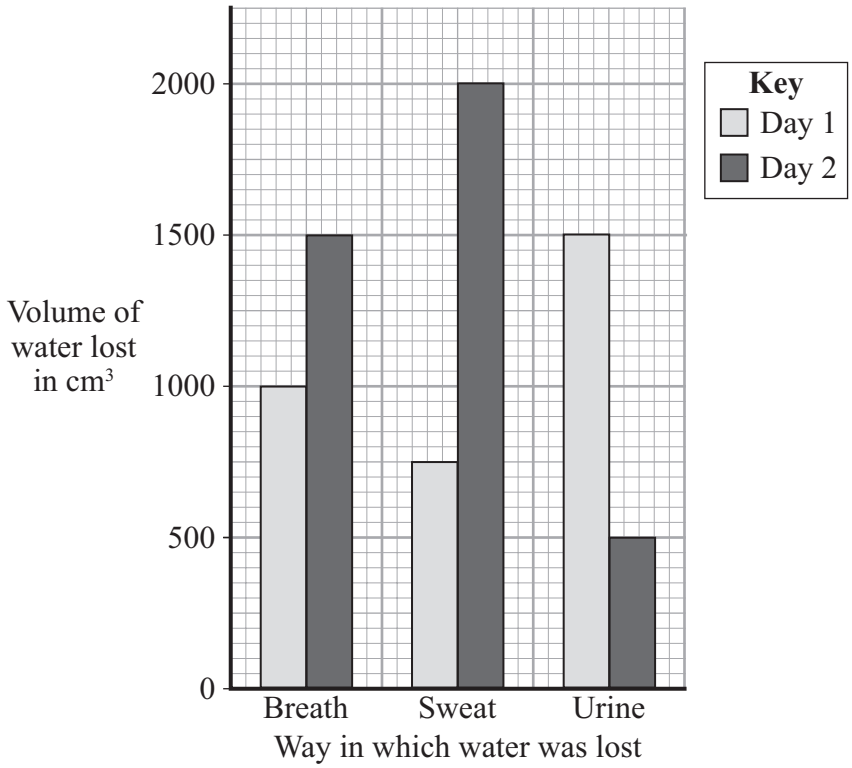
(2 marks)

5

Turn over for the next question

2 The bar chart shows the amount of water lost from the body of a student on two different days.

The student ate the same amount of food and drank the same amount of liquid on the two days. The temperature of the surroundings was similar on the two days.



(a) The total volume of water lost on day 1 was 3250 cm^3.

How much water was lost on day 2? Show all your working.

.....

..... cm^3

(2 marks)

(b) The student did much more exercise on one of the days than on the other.

On which day did he do more exercise? Day .....

Give **two** reasons for your answer.

1 .....

.....

2 .....

.....

(2 marks)

(c) (i) Which **one** of these is a chemical reaction that produces water in the body?

Put a tick (✓) in the box next to your choice.

Breathing ☐

Osmosis ☐

Respiration ☐

Sweating ☐

(1 mark)

(ii) How does sweating help the body?

.....

.....

(1 mark)

(iii) If the body loses more water than it gains, it becomes dehydrated.
The concentration of the solution surrounding the body cells increases.
This causes the cells to lose water.

By which process do cells lose water?

Put a tick (✓) in the box next to your choice.

Breathing ☐

Osmosis ☐

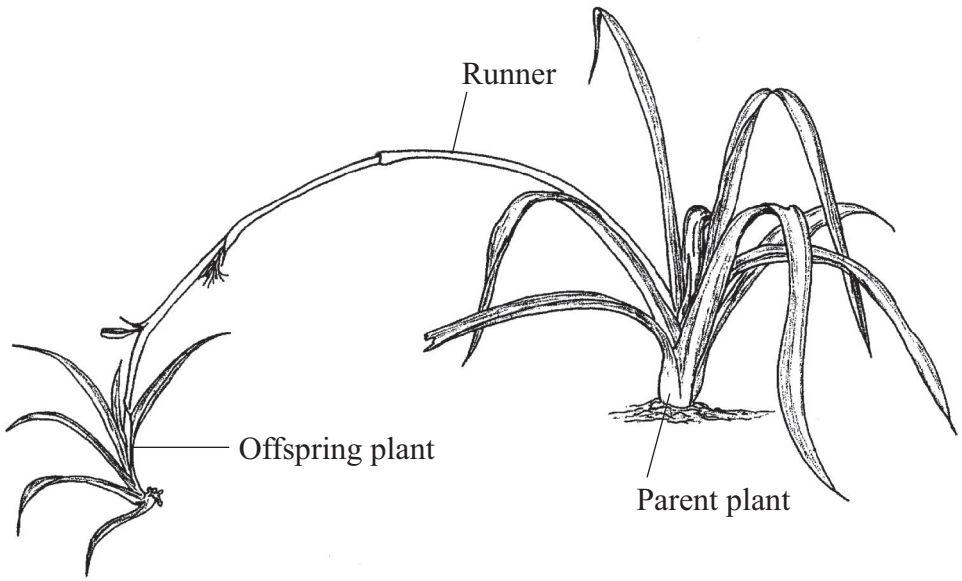
Respiration ☐

Sweating ☐

(1 mark)

7

3 The diagram shows a spider plant during one type of reproduction.



Complete the sentences using words from the box.

asexual	**characteristics**	**chromosomes**
gametes	**genes**	**mitosis**	**sexual**

(a) The colour and shape of the leaves of a spider plant are known as ..... .

(1 mark)

(b) The shape of the leaves is controlled by ..... .

(1 mark)

(c) The thread-like structures inside the nucleus of the cells are called ..... .

(1 mark)

(d) The spider plant produces new cells in the runner by a process called ..... .

(1 mark)

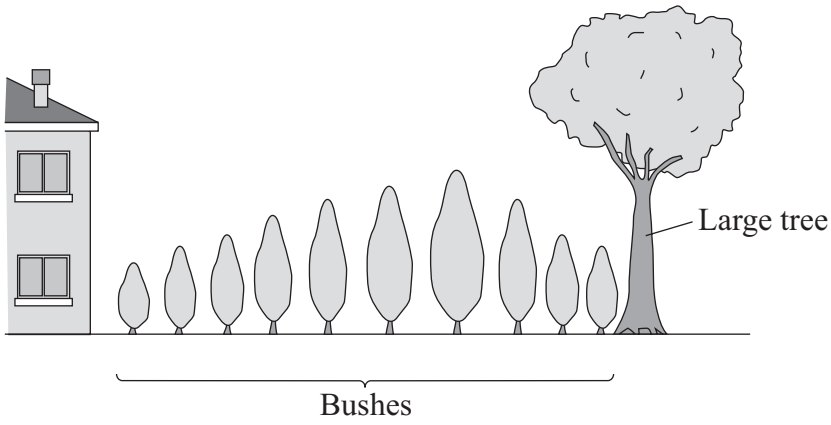
(e) This type of reproduction is called ..... reproduction.

(1 mark)

5

4 The diagram shows bushes in a hedge growing near to a house.

The bushes were the same species and the same age.



(a) (i) The student said, "I have noticed that the short bushes grow next to the house. I think that the more light the bushes get, the faster they will grow."

Draw lines to match each of the student's statements to the correct term.

Draw only **two** lines.

Statement	Term
The short bushes grow next to the house.	A conclusion
Plants will grow faster if they get more light.	A prediction
	An observation

(2 marks)

(ii) Complete the word equation for photosynthesis.

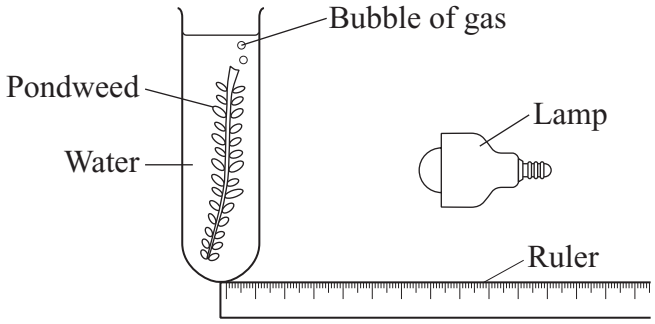
..... + water (+ light energy) → ..... + oxygen

(2 marks)

Question 4 continues on the next page

(b) The student decided to investigate the effect of light intensity on the rate of photosynthesis.

She used the apparatus shown in the diagram.



She measured the rate of photosynthesis by counting the number of gas bubbles given off each minute.

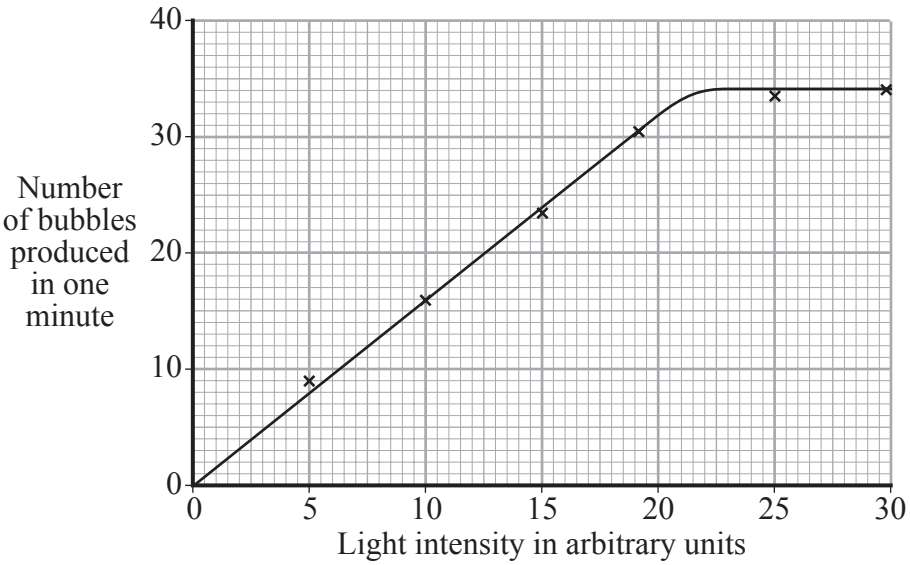
(i) Suggest how the student varied the intensity of the light received by the pondweed.

.....

.....

(1 mark)

(ii) The student's results are shown on the graph.



Describe the pattern shown on the graph.

.....

.....

.....

.....

(2 marks)

(iii) This is what the student wrote for her conclusion.

"Increasing the light intensity increases the rate of photosynthesis of the pondweed."

Why was her conclusion incomplete?

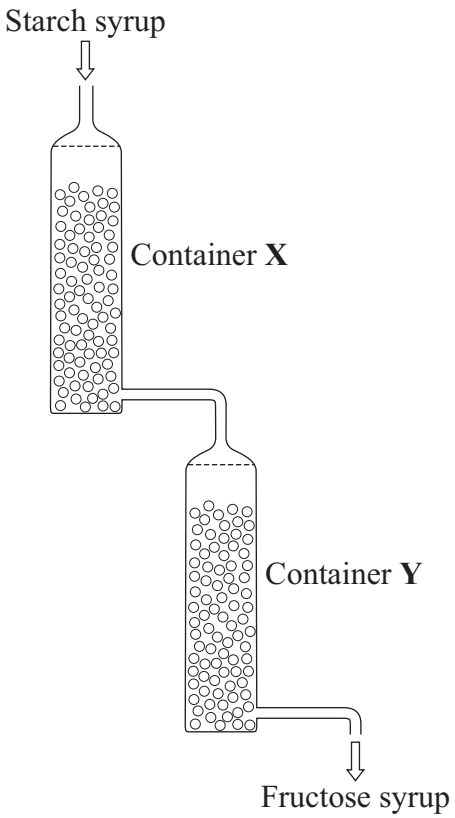
.....

.....

(1 mark)

8

5 The diagram shows an industrial process. Containers **X** and **Y** contain enzymes.



(a) Starch syrup slowly trickles into container **X**.
The enzymes in container **X** convert the starch into glucose (sugar).
The enzymes in container **Y** convert the glucose into fructose.

The equation shows what happens in containers **X** and **Y**.

$$\text{starch} \xrightarrow{\text{Enzyme } \mathbf{A}} \text{glucose} \xrightarrow{\text{Enzyme } \mathbf{B}} \text{fructose}$$

Choose words from the box to name enzyme **A** and enzyme **B**.

carbohydrase	**isomerase**	**lipase**	**protease**

Enzyme **A** .....

Enzyme **B** .....

(2 marks)

(b) Fructose syrup is much sweeter than glucose syrup.

Why do manufacturers of slimming foods use fructose syrup rather than glucose syrup?

.....

.....

(1 mark)

(c) Here are some of the properties of enzymes:

- they all work at atmospheric pressures
- they are easily broken down by high temperature or the wrong pH
- they are soluble in water, so it may be difficult to separate them from products
- they are expensive to buy
- they work well at 25–45 °C.

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

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

1 .....

2 .....

(2 marks)

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

1 .....

2 .....

(2 marks)

7

Turn over for the next question

6 (a) Tuna fish are carnivores. In the wild they feed on smaller fish called herring. Herring feed on plankton. Tuna can be attacked by parasitic worms which feed on their flesh.

(i) In the space below sketch the appearance of a pyramid of biomass for this food chain.

Do not forget to label each section of the pyramid.

(2 marks)

(ii) If a tuna eats 1 kg of herring, it gains about 65 g in mass.

Give **two** reasons why so little of the mass of the herring is converted into mass of the tuna.

1 .....

.....

2 .....

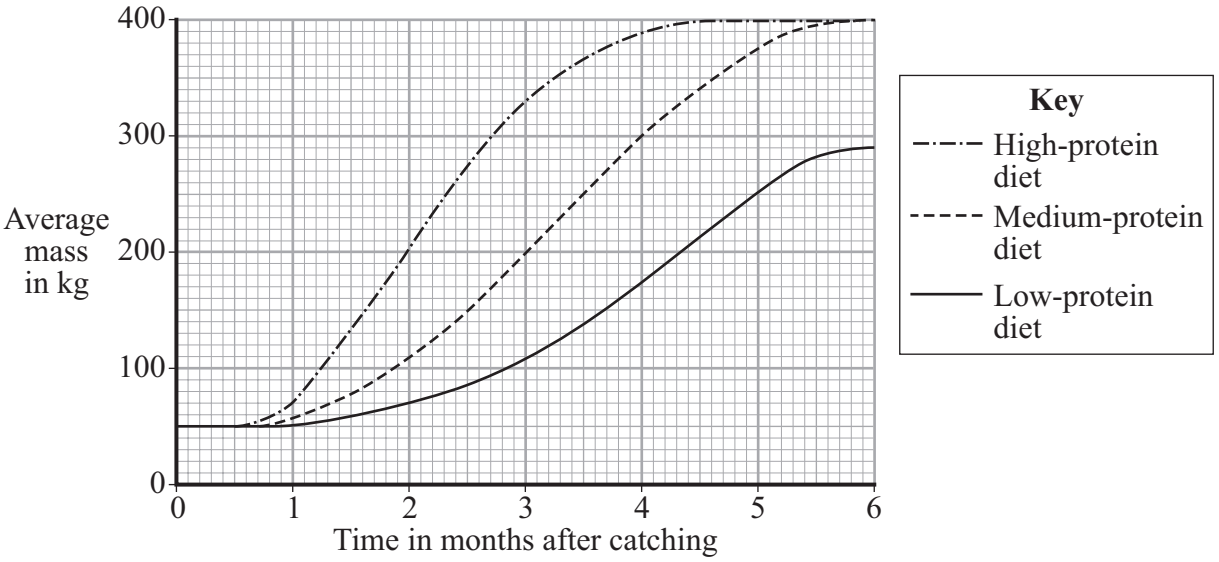
.....

(2 marks)

(b) Young tuna are caught by fish farmers and reared in large pens in the sea.

The fish are fed more food than they would normally catch themselves so they grow quickly. When they reach 400 kg they are sold.

The graph on the opposite page shows the effect of feeding tuna different amounts of protein in their food.



(i) Calculate the average increase in mass per month of the fish fed on the low-protein diet over the six months.

Show clearly how you work out your answer.

.....

.....

Average increase in mass per month ..... kg

(2 marks)

(ii) There is not enough information in the graph to allow the fish farmer to decide whether to use the high-protein diet or the medium-protein diet.

Suggest **one** other piece of information that he needs in order to make this decision.

.....

.....

(1 mark)

(c) Some consumers will not buy tuna grown in this way.

Suggest **one** reason for their decision.

.....

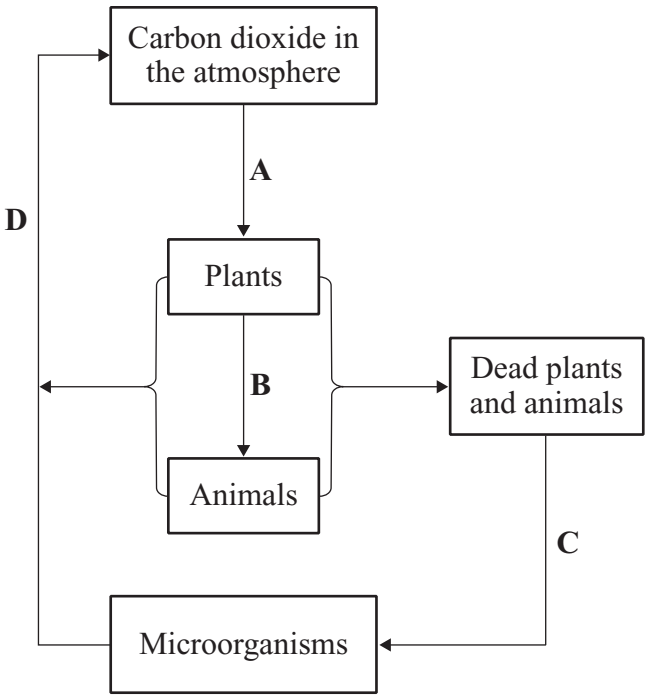
.....

(1 mark)

8

Turn over ▶

7 The diagram shows part of the carbon cycle.



(a) Which letter, **A**, **B**, **C** or **D**, represents:

(i) respiration .....

(1 mark)

(ii) photosynthesis? .....

(1 mark)

(b) Local authorities are encouraging people to recycle vegetable waste by converting it into compost.

Compost is made by mixing the vegetable waste with soil in a large container.

(i) Decay occurs more quickly if the container has holes in the sides.

Explain why.

.....

.....

.....

.....

(2 marks)

(ii) Spreading compost on the soil between plants leads to better growth of the plants.

Explain why.

.....

.....

(1 mark)

5

END OF QUESTIONS

There are no questions printed on this page