Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
June 2009

BIOLOGY **BLY3F**
Unit Biology B3

F

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.

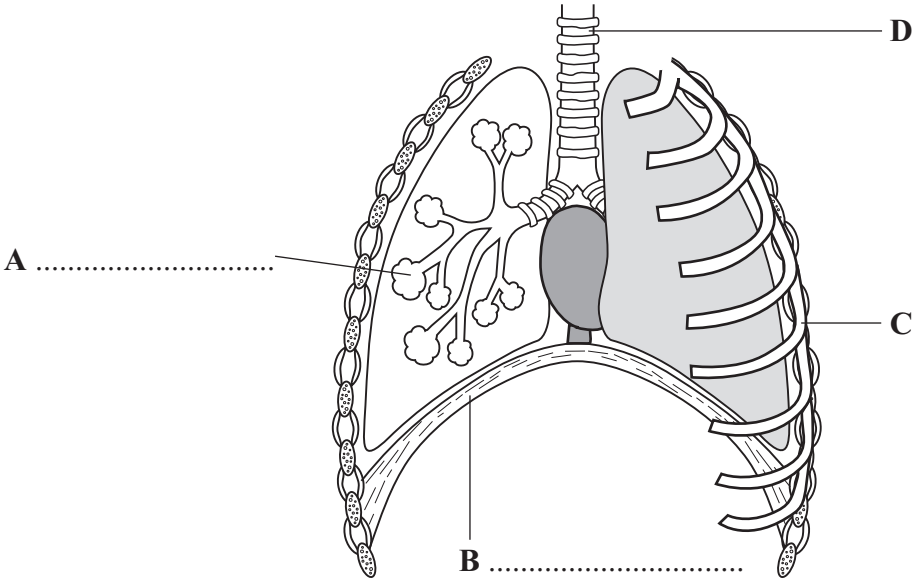
Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

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

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

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

1 The diagram shows the human breathing system.



1 (a) On the diagram, label structures **A** and **B**.

Choose your answers from the words in the box.

alveolus	**capillary**	**diaphragm**	**rib**

(2 marks)

In the lungs, oxygen passes from the air into the blood.
Carbon dioxide passes from the blood into the air.

1 (b) Which letter, **A**, **B**, **C** or **D**, shows where oxygen enters the blood? ☐

(1 mark)

1 (c) When oxygen enters the blood it combines with haemoglobin.

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

1 (c) (i) Haemoglobin is found in the

plasma

red blood cells

white blood cells

.

(1 mark)

1 (c) (ii) Most of the carbon dioxide is carried by the

plasma

red blood cells

white blood cells

.

(1 mark)

5

Turn over for the next question

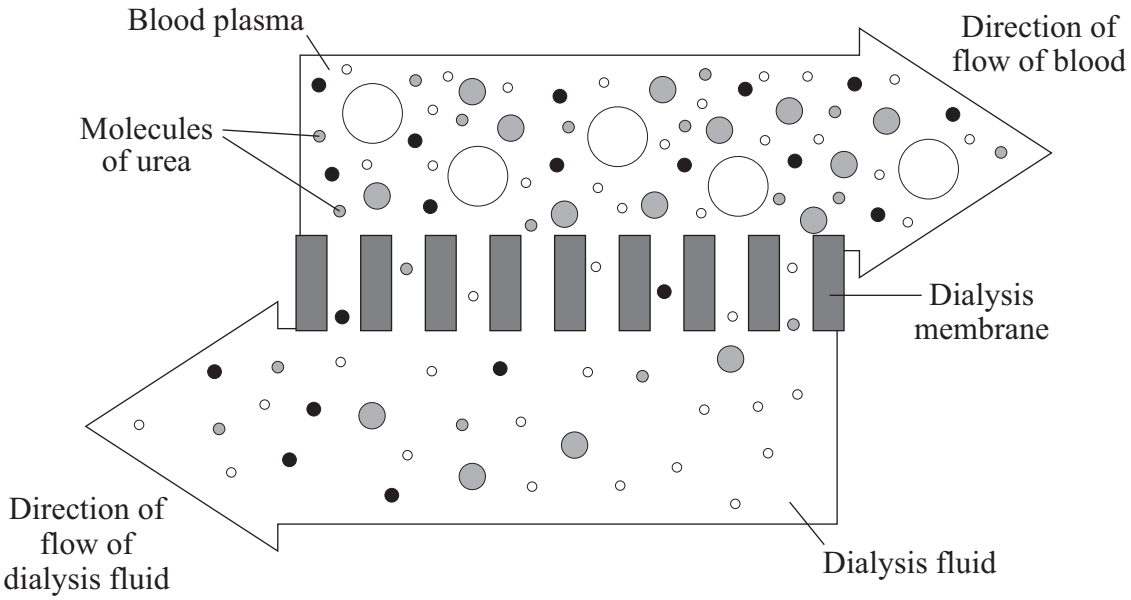
2 (a) Which **two** of the following substances are found in the urine of a healthy person?

Tick (✓) **two** boxes.

Glucose	☐
Mineral ions	☐
Proteins	☐
Water	☐

(2 marks)

2 (b) A person with kidney disease can be treated by dialysis.
The diagram shows how dialysis works.
The circles represent molecules of different substances.



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

2 (b) (i) During dialysis, urea moves out of the

blood cells
blood plasma
dialysis fluid

.

(1 mark)

2 (b) (ii) During dialysis, urea moves into the [blood cells / blood plasma / dialysis fluid] .

(1 mark)

2 (b) (iii) Urea moves by the process of [diffusion / digestion / transpiration] .

(1 mark)

2 (b) (iv) To allow the movement of urea, the dialysis membrane is [impermeable / partially permeable / thick] .

(1 mark)

2 (b) (v) The urea can pass through the membrane because

the urea molecules are [large / round / small] .

(1 mark)

2 (c) For most patients a kidney transplant is better than continued dialysis treatment.

Tick (✓) **one** box to complete the sentence.

One major problem with a kidney transplant is that

drug treatment is needed to suppress the immune system. ☐

hospital visits are needed three times a week. ☐

yearly costs are higher than for dialysis. ☐

(1 mark)

8

3 (a) Microorganisms can be grown on agar jelly in a Petri dish.

List A gives three actions used when growing microorganisms.
List B gives four possible effects of these actions.

Draw a straight line from each action in **List A** to its effect in **List B**.

List A – Action	**List B – Effect**
	To reduce the growth of pathogens
The agar jelly is heated at 120°C for 30 minutes	
	To kill unwanted microorganisms
Make sure the temperature for growing the microorganisms is no higher than 25 °C	
	To prevent microorganisms from the air getting into the Petri dish
The lid of the Petri dish is held on with tape	
	To prevent oxygen entering the Petri dish

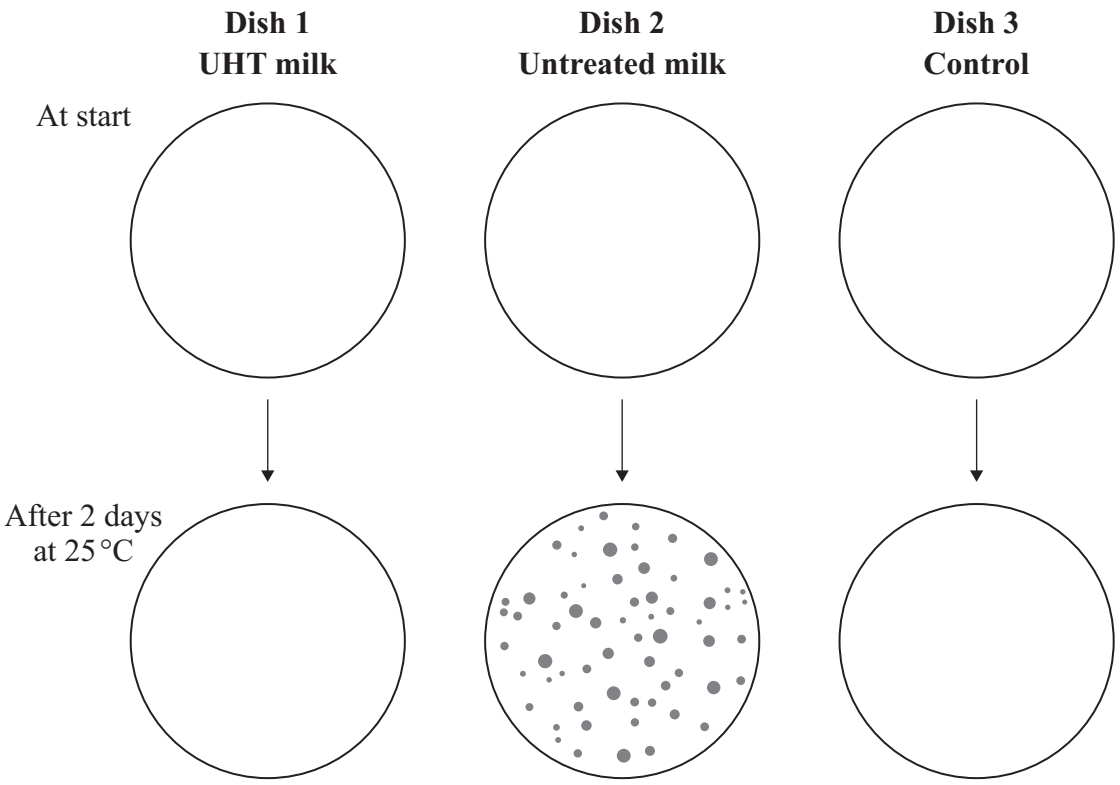
(3 marks)

3 (b) UHT milk is milk that has been heated to 135°C, then cooled.

In an investigation, three sterile Petri dishes containing sterile agar jelly were set up as follows.

- UHT milk was added to dish **1**.
- Untreated milk was added to dish **2**.
- Dish **3** was left unopened as a control.
- The dishes were kept at 25 °C for two days.

The results are shown in the diagram on the opposite page.



3 (b) (i) Describe the difference in appearance between dishes **1** and **2** after two days.

.....

.....

(1 mark)

3 (b) (ii) Give **one** reason for this difference.

.....

.....

(1 mark)

3 (b) (iii) There was no change in the appearance of dish **3** after two days.

Give **one** reason why.

.....

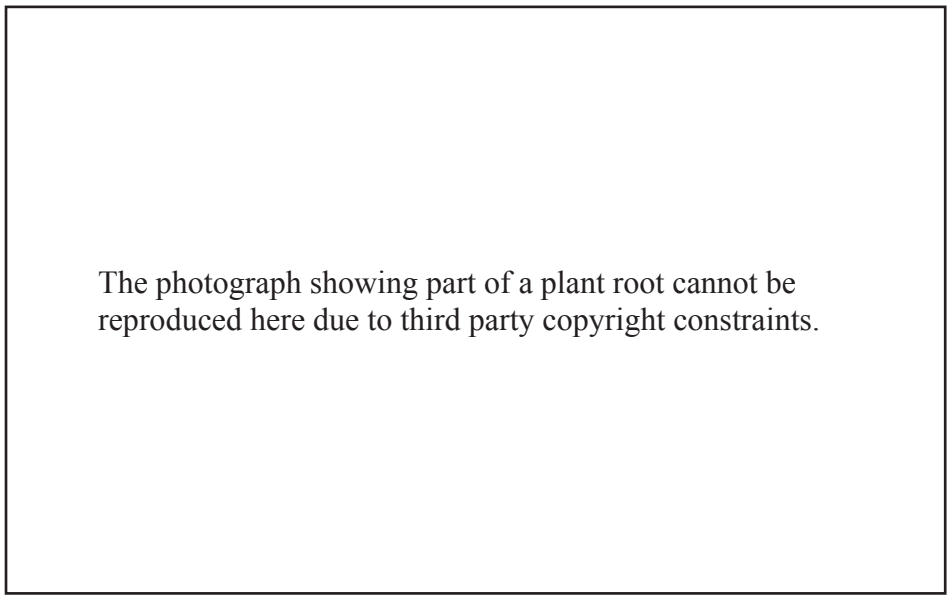
.....

(1 mark)

6

Turn over ▶

4 The photograph shows part of the surface of a plant root. This part of the root is covered with hundreds of structures like the one labelled **X**.



4 (a) What is the name of structure **X**?

Draw a ring around **one** answer.

root hair **stoma** **villus**

(1 mark)

4 (b) (i) Use the scale to measure the length **Y**–**Z** on the photograph.

On the photograph, length **Y**–**Z** = ... mm.

(1 mark)

4 (b) (ii) The photograph shows the root magnified 100 times.

Calculate the actual length **Y**–**Z**.

.....

.....

.....

Actual length **Y**–**Z** = ...mm.

(2 marks)

4 (b) (iii) Structure **X** is very small. There are thousands of structures like **X** on a plant root.

How does this help the plant?

.....

.....

.....

.....

(2 marks)

6

Turn over for the next question

5 The table gives information about the growth of different types of organism.
The figures were obtained during the period of fastest growth for each organism.

Organism	**Time taken to double in mass**
Bacteria	40 minutes
Yeasts	2 hours
Fusarium	4 hours
Algae	5 hours
Soybeans	1 week
Cattle	8 weeks

5 (a) (i) Which type of organism grows the fastest? .....

(1 mark)

5 (a) (ii) How many times faster than cattle do soybeans double in mass?

.....

(1 mark)

5 (a) (iii) *Fusarium* grows at its fastest rate in a fermenter.
Some scientists put **one tonne** of *Fusarium* into a fermenter.

Use data from the table to calculate how much *Fusarium* there would be in the fermenter after 8 hours.

Draw a ring around **one** answer.

2 tonnes **4 tonnes** **8 tonnes**

(1 mark)

5 (b) *Fusarium* is used to make mycoprotein.

Read the information about substances found in mycoprotein.

- Protein – can be used for making cells, enzymes and antibodies.
- Fats – are rich in energy but large amounts in the diet can cause circulatory problems.
- Dietary fibre – helps to reduce the risk of colon cancer.

The table compares the composition of mycoprotein and beef.

Substance	**Percentage of dry mass**	
	Mycoprotein	**Beef**
Protein	47.2	68.3
Fat	13.5	30.1
Dietary fibre	19.2	0.0

Use the information above to answer the questions.

5 (b) (i) Give **two** reasons why it would be better to eat mycoprotein instead of beef.

1 .....

.....

2 .....

.....

(2 marks)

(Extra space) .....

5 (b) (ii) Give **one** reason why it would be better to eat beef instead of mycoprotein.

.....

.....

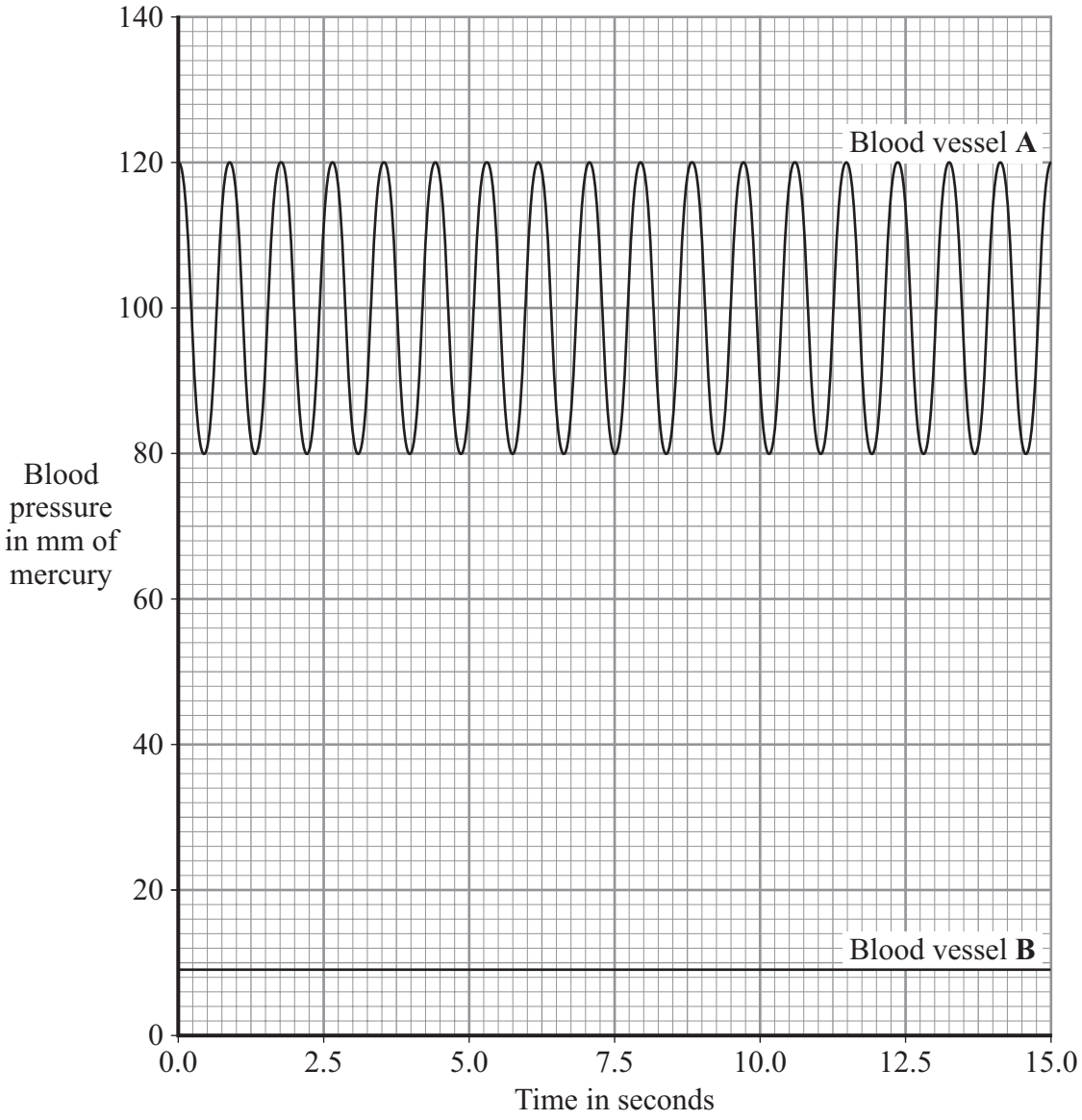
(1 mark)

(Extra space) .....

6

6 The heart pumps blood around the body. This causes blood to leave the heart at high pressure.

The graph shows blood pressure measurements for a person at rest.
The blood pressure was measured in an artery and in a vein.



6 (a) Which blood vessel, **A** or **B**, is the artery?

Blood vessel .....

Give **two** reasons for your answer.

Reason 1 .....

.....

Reason 2 .....

.....

(2 marks)

6 (b) Use information from the graph to answer these questions.

6 (b) (i) How many times did the heart beat in 15 seconds? .....

(1 mark)

6 (b) (ii) Use your answer from part (b)(i) to calculate the person's heart rate per minute.

.....

.....

Heart rate = ... beats per minute

(1 mark)

6 (c) During exercise, the heart rate increases. This supplies useful substances to the muscles and removes waste materials from the muscles at a faster rate.

6 (c) (i) Name **two** useful substances that must be supplied to the muscles at a faster rate during exercise.

1 .....

2 .....

(2 marks)

6 (c) (ii) Name **one** waste substance that must be removed from the muscles at a faster rate during exercise.

.....

(1 mark)

7

Turn over ▶

7 Three students each prepared a flask of yoghurt.

- They used equal volumes of the same type of milk.
- They added equal amounts of a 'yoghurt starter culture' (plain yoghurt which contains living bacteria).
- They then placed the three flasks in a water bath at 25 °C.
- They measured the pH of their yoghurt at 50-minute intervals using a pH meter.

The table shows their pH measurements.

Time in minutes	**pH**			
	Flask 1	**Flask 2**	**Flask 3**	**Mean**
0	6.4	6.4	6.5	6.4
50	6.3	6.4	6.5	6.4
100	5.9	6.1	6.3	6.1
150	5.0	5.5	5.7	5.4
200	4.6	5.8	4.9	5.1
250	4.3	4.6	4.6	4.5

7 (a) (i) Give **two** variables that were controlled in this investigation.

1 .....

2 .....

(2 marks)

7 (a) (ii) Why was it helpful to do the investigation three times and to calculate mean values?

.....

.....

(1 mark)

7 (a) (iii) The students chose to use a pH meter rather than pH indicator papers.

Explain why.

.....

.....

(1 mark)

(Extra space) .....

7 (b) One of the results in the table appears to be anomalous.

Which result is this?

.....

.....

(1 mark)

7 (c) The students noticed that, after 200 minutes, their yoghurts began to thicken.

What caused this?

.....

.....

.....

.....

(2 marks)

(Extra space) .....

7

END OF QUESTIONS

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

ACKNOWLEDGEMENT OF COPYRIGHT-HOLDERS AND PUBLISHERS

Permission to reproduce all copyright material has been applied for. In some cases efforts to contact the copyright-holders have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements in future papers if notified.