

Candidate Name	Centre Number	Candidate Number
		2



## GCE AS/A level

312/01

## BIOLOGY – BI2

A.M. TUESDAY, 3 June 2008

1½ hour

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	3	
2.	12	
3.	12	
4.	15	
5.	11	
6.	7	
7.	10	
<b>TOTAL MARK</b>		

### INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

### INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.

1. The following statements refer to the movement of molecules. Name the type of transport described in **each** case.

(i) Movement of gases through the air spaces of a leaf. [1]

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(ii) Movement of water molecules into a root hair cell. [1]

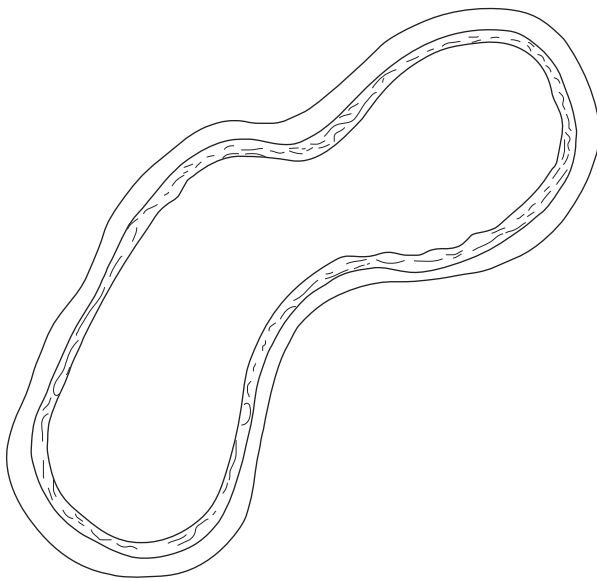
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(iii) Uptake of minerals by a root hair cell. [1]

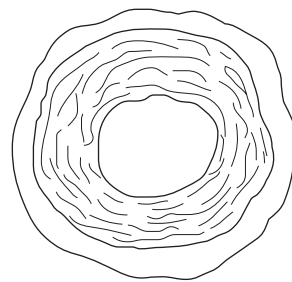
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**(Total 3 marks)**

2. (a) The diagrams show transverse sections of a vein and an artery (not drawn to the same scale).



Vein



Artery

State **three** differences between the artery and the vein that can be seen in the diagrams. [3]

1 .....

.....

2 .....

.....

3 .....

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(b) Veins also possess valves to prevent the backflow of blood.

(i) Explain how a valve in a vein stops the backflow of blood. [2]

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(ii) Veins located in the head of a human do not have valves. Suggest a reason for this lack of valves. [1]

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(iii) Veins carry blood back to the heart. Explain how blood is forced towards the heart in veins found in the legs. [2]

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(c) One of the functions of red blood cells is to transport oxygen from the lungs to respiring tissues.

(i) Explain how red blood cells are adapted to carry out this function. [3]

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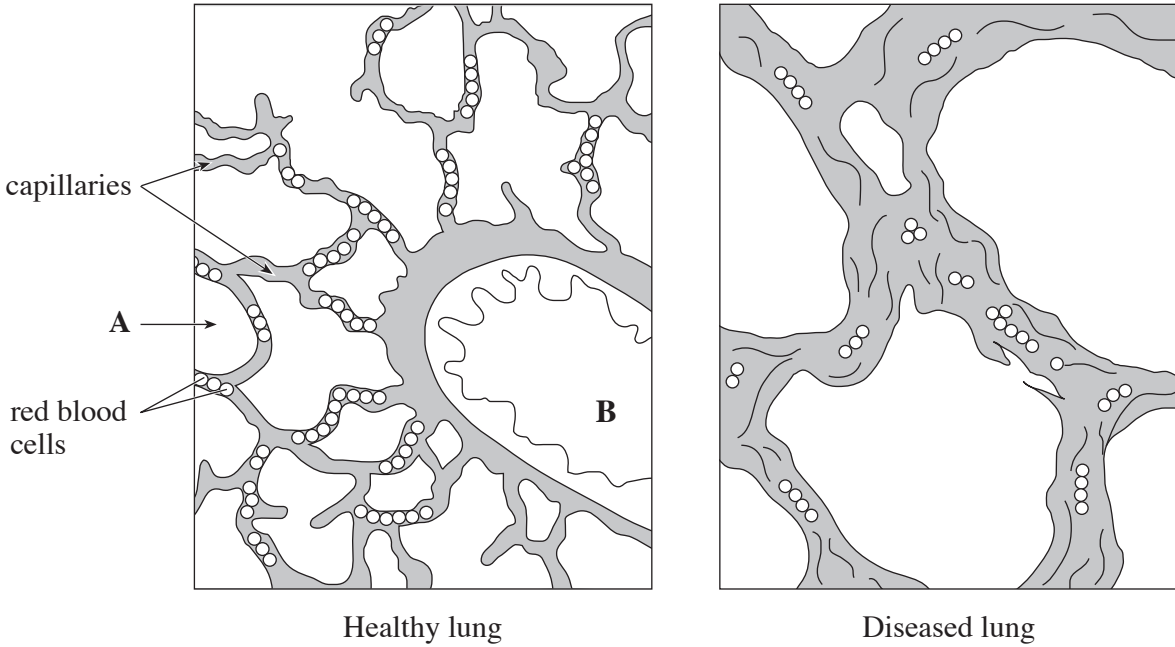
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(ii) State **one other** function of red blood cells. [1]

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**(Total 12 marks)**

3. (a) The diagrams show a section through a healthy lung and a section, drawn to the same scale, through a diseased lung.



- (i) Name the structures labelled **A** and **B**. [2]

**A** .....

**B** .....

- (ii) State the name of the disease shown in the diagram and explain your reasons for this choice. [3]

Name of disease .....

Explanation .....

.....

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- (iii) Explain the effects that the disease will have on the process of gaseous exchange in the diseased lung. [2]

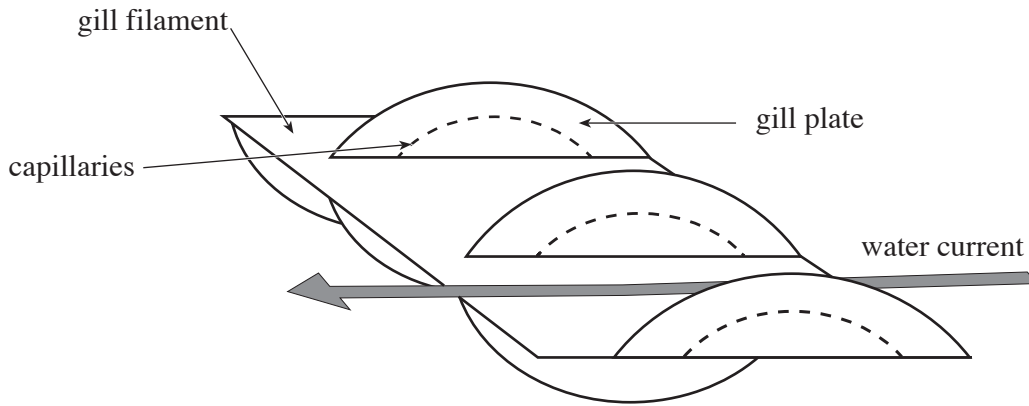
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(b) The diagram shows the gill filaments of a bony fish. The flow of water across the gill plates is shown.



- (i) Draw an arrow on a capillary to show the direction of blood flow in the gill plate. [1]
- (ii) Use the letter **H**, to indicate on the diagram, an area where there is the highest concentration of oxygen in the blood of the gill plate.  
Use the letter **L** to indicate where there is the lowest concentration of oxygen in the water passing over the gill plate. [2]
- (iii) Name this type of flow and explain how it improves the efficiency of oxygen uptake. [2]

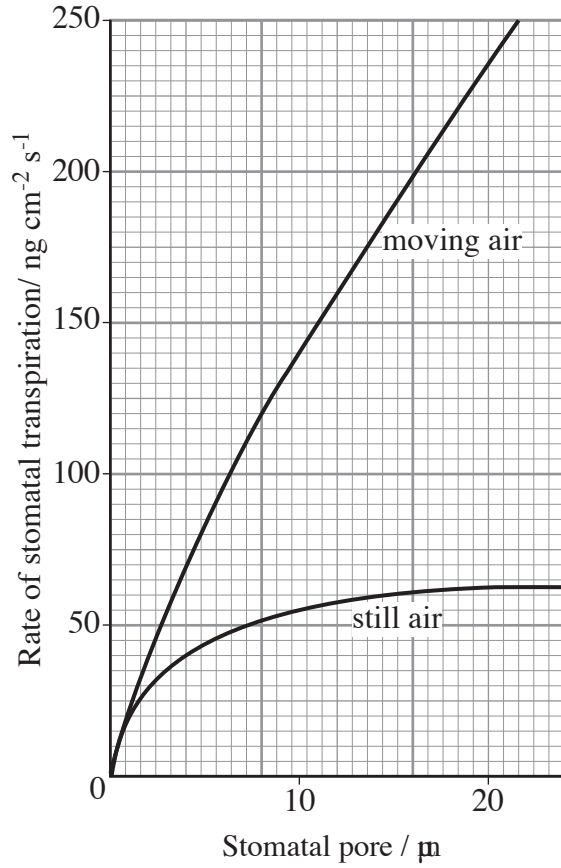
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**(Total 12 marks)**

4. (a) The graph shows the relationship between the rate of transpiration and the diameter of the stomatal pores in still and moving air.



- (i) Describe the relationship between the rate of transpiration and the stomatal diameter in still air. [3]

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- (ii) Explain the differences between transpiration rates in still and moving air. [3]

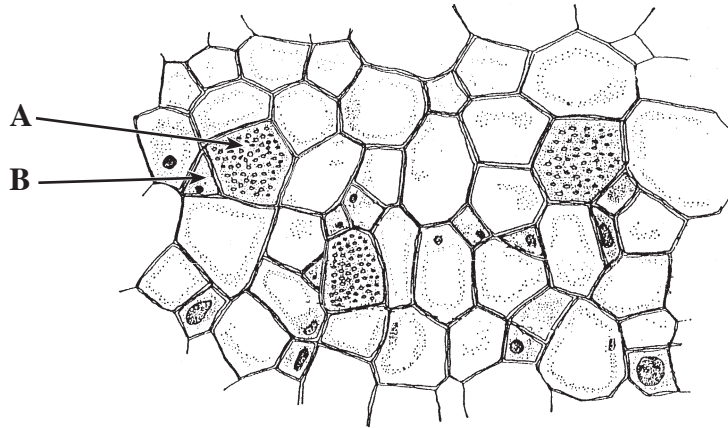
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(b) The diagram shows a transverse section (TS) through the phloem of a plant stem.



(i) Name the cell types labelled **A** and **B**. [2]

**A** .....

**B** .....

(ii) Describe the function of the phloem. [3]

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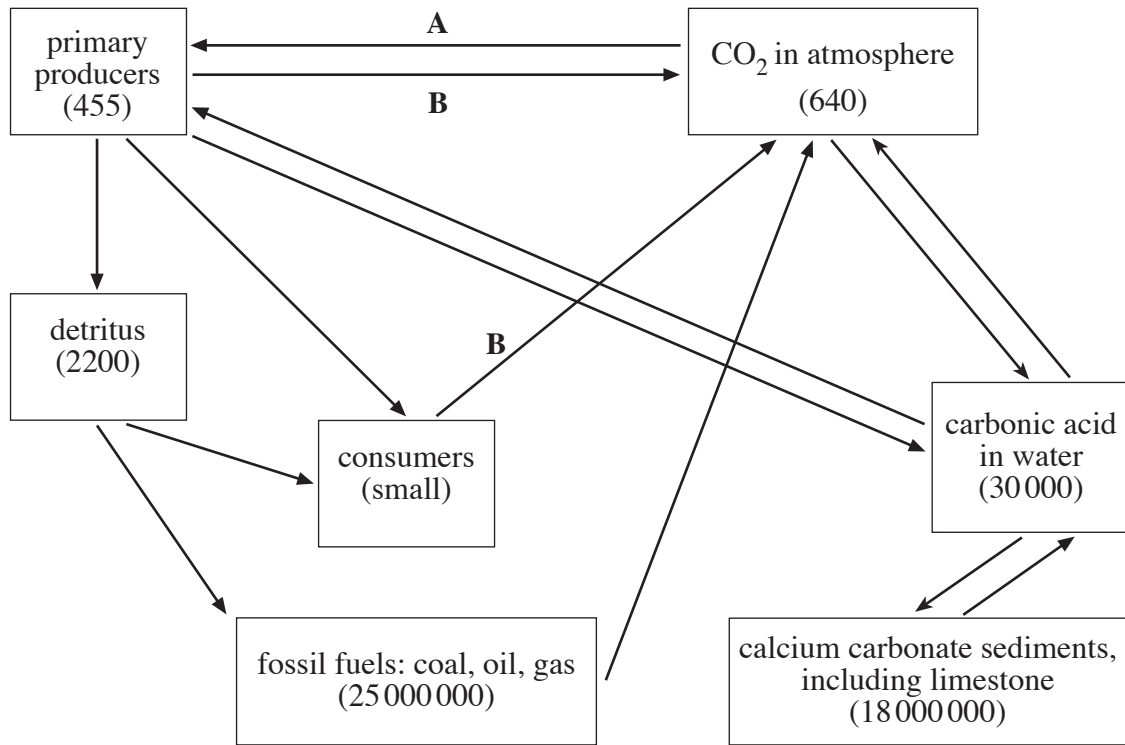
(iii) In the table indicate with a tick (✓) if the structure is present in cells **A** and **B**, or a cross (X) if the structure is absent. [4]

<i>Structure</i>	<i>cell A</i>	<i>cell B</i>
nucleus		
chloroplast		
plasmodesmata		
cytoplasm		

(Total 15 marks)

Turn over.

5. (a) The diagram shows part of the carbon cycle. The figures in brackets represent the mass of carbon in billion metric tonnes.



Using the information in the diagram:

- (i) Where is the greatest mass of carbon to be found? [1]

.....

- (ii) State the names of the **two** processes labelled **A** and **B**. [2]

**A** .....

**B** .....

- (b) Levels of carbon dioxide in the atmosphere are increasing.

- (i) Use the diagram to help you explain why carbon dioxide levels are increasing. [3]

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(ii) State **two** consequences of this increase in carbon dioxide. [2]

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(iii) State **three** measures that would reduce the effect of human activity on the carbon cycle. [3]

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**(Total 11 marks)**

6. (a) Explain why not all of the energy present in primary consumers is passed onto secondary consumers. [3]

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- (b) Three types of primary consumer were studied. Each type can be used for human food consumption. Different numbers of animals were used so that identical masses could be used.  
 Each group was supplied with 1000 kg of food and at the end the conversion efficiency was calculated.  
 The conversion efficiency is the daily mass increase expressed as a percentage of the daily food consumption.  
 The results of the study are shown in the table.

	<i>5 sheep</i>	<i>300 rabbits</i>	<i>1 cow</i>
Initial mass/kg	500	500	500
Time taken to consume food/days	110	35	120
Total mass gain/kg	90	100	105
Daily food consumption/kg day <sup>-1</sup>	9.1		8.3
Daily mass increase/ kg day <sup>-1</sup>		2.9	0.9
Conversion efficiency/%		10.1	10.8

- (i) Complete the table by inserting the correct missing figures. [3]
- (ii) Suggest, giving a reason, which primary consumer you consider to be the best for use as a meat producer. [1]

primary consumer .....

reason .....

.....

**(Total 7 marks)**



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