

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

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General Certificate of Education
 June 2006
 Advanced Subsidiary Examination



BIOLOGY (SPECIFICATION B)
Unit 1 Core Principles

BYB1

Monday 5 June 2006 9.00 am to 10.00 am

For this paper you must have:

- a ruler with millimetre measurements

You may use a calculator.

Time allowed: 1 hour

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 marked.

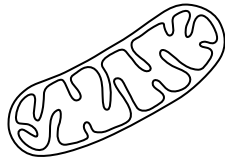
Information

- The maximum mark for this paper is 54.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.
- Use accurate scientific terminology in your answers.
- Answers for **Questions 1 to 6** are expected to be short and precise.
- Answer **Question 7** in continuous prose. Quality of Written Communication will be assessed in the answer.

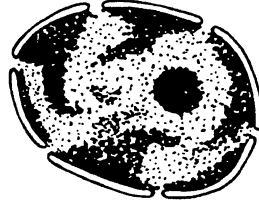
For Examiner's Use			
Number	Mark	Number	Mark
1			
2			
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4			
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7			
Total (Column 1) →			
Total (Column 2) →			
Quality of Written Communication			
TOTAL			
Examiner's Initials			

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

- 1 (a) The diagram shows two organelles found in a eukaryotic cell.



A



B

- (i) Name the organelles.

A

B

(1 mark)

- (ii) Explain how the inner membrane is adapted to its function in organelle **A**.

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(2 marks)

- (b) Give **one** feature of a prokaryotic cell that is not found in a eukaryotic cell.

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(1 mark)

(c) Describe how a sample consisting only of chloroplasts could be obtained from homogenised plant tissue.

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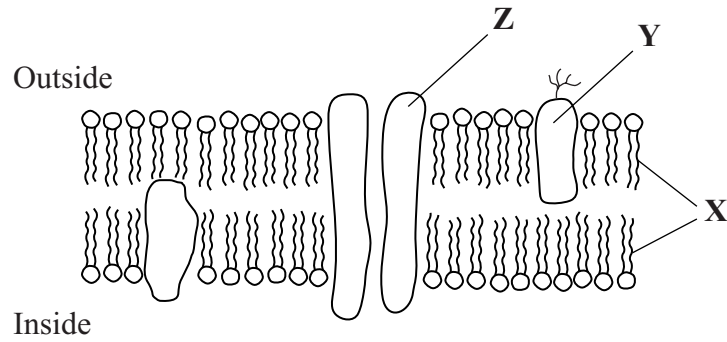
(3 marks)

7

Turn over for the next question

Turn over 

2 The diagram shows part of a plasma membrane.



(a) Describe **two** functions of the structure made from the parts labelled **X**.

- 1
-
- 2
-

(2 marks)

(b) Give **one** function of the molecule labelled **Y**.

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(1 mark)

(c) The part labelled **Z** is involved in facilitated diffusion of substances across the membrane.

(i) Give **one** similarity in the way in which active transport and facilitated diffusion transport substances across the membrane.

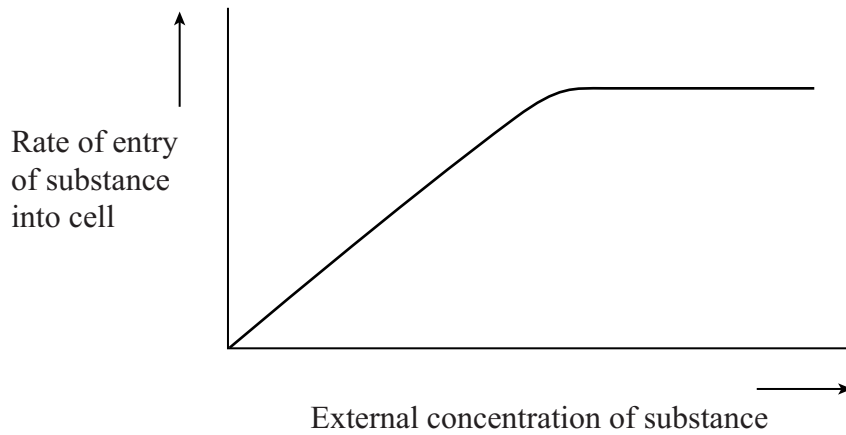
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(ii) Give **one** way in which active transport differs from facilitated diffusion.

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(2 marks)

(iii) The graph shows the relationship between the concentration of a substance outside a cell and the rate of entry of this substance into the cell.



Explain the evidence from the graph that this substance is entering the cell by facilitated diffusion and not by simple diffusion.

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(2 marks)

3 (a) Explain how a person breathes in.

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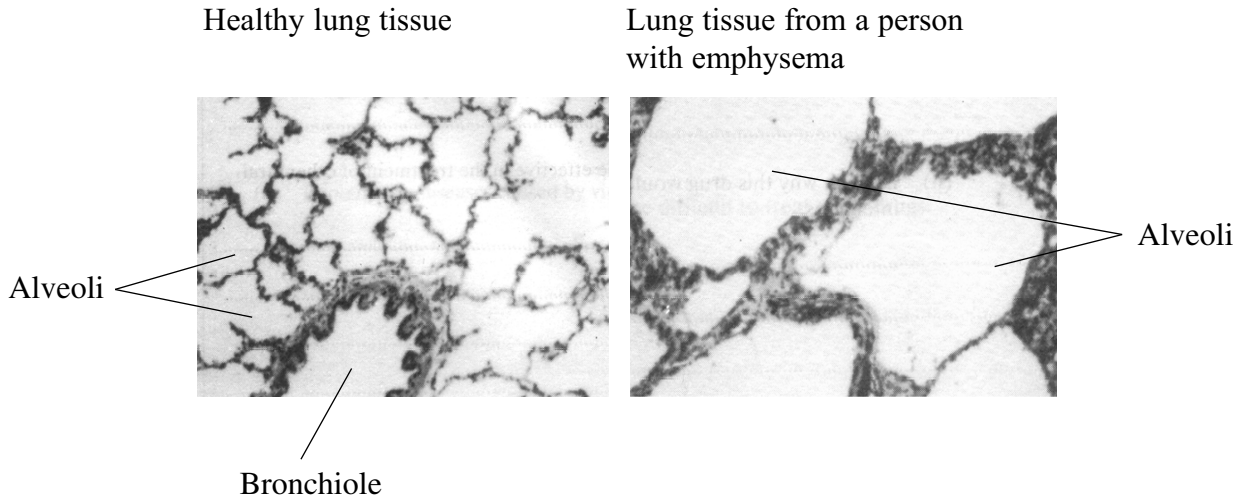
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(3 marks)

(b) Emphysema is a disease that affects the alveoli of the lungs and leads to the loss of elastic tissue. The photographs show sections through alveoli of healthy lung tissue and lung tissue from a person with emphysema. Both photographs are at the same magnification.



Using the evidence given above and your own knowledge, explain why a person with emphysema is unable to do vigorous exercise.

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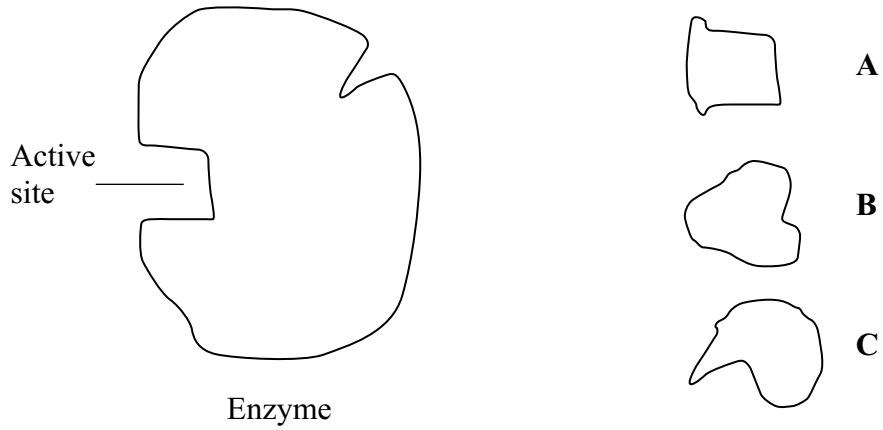
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(4 marks)

7

Turn over

- 4 The diagram represents an enzyme molecule and three other molecules that could combine with it.



- (a) Which molecule is the substrate for the enzyme? Give a reason for your answer.

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(1 mark)

- (b) Use the diagram to explain how a **non-competitive** inhibitor would decrease the rate of the reaction catalysed by this enzyme.

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(3 marks)

(c) Lysozyme is an enzyme. A molecule of lysozyme is made up of 129 amino acid molecules joined together. In the formation of its active site, the two amino acids that are at positions 35 and 52 in the amino acid sequence need to be close together.

(i) Name the bonds that join amino acids in the primary structure.

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(1 mark)

(ii) Suggest how the amino acids at positions 35 and 52 are held close together to form the active site.

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(2 marks)

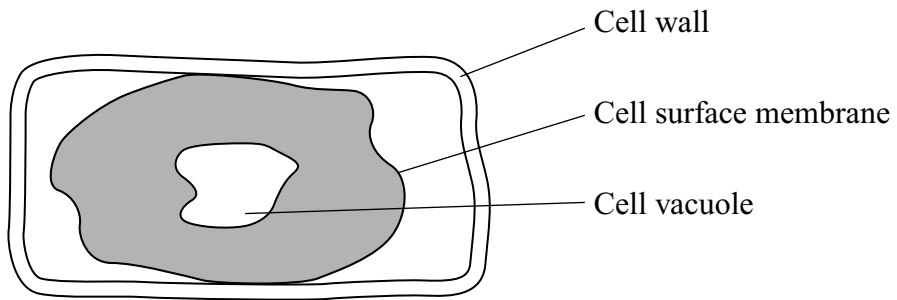
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Turn over for the next question

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5 (a) **Figure 1** shows a plant cell that was placed in a sucrose solution.

Figure 1



Explain the appearance of the cell.

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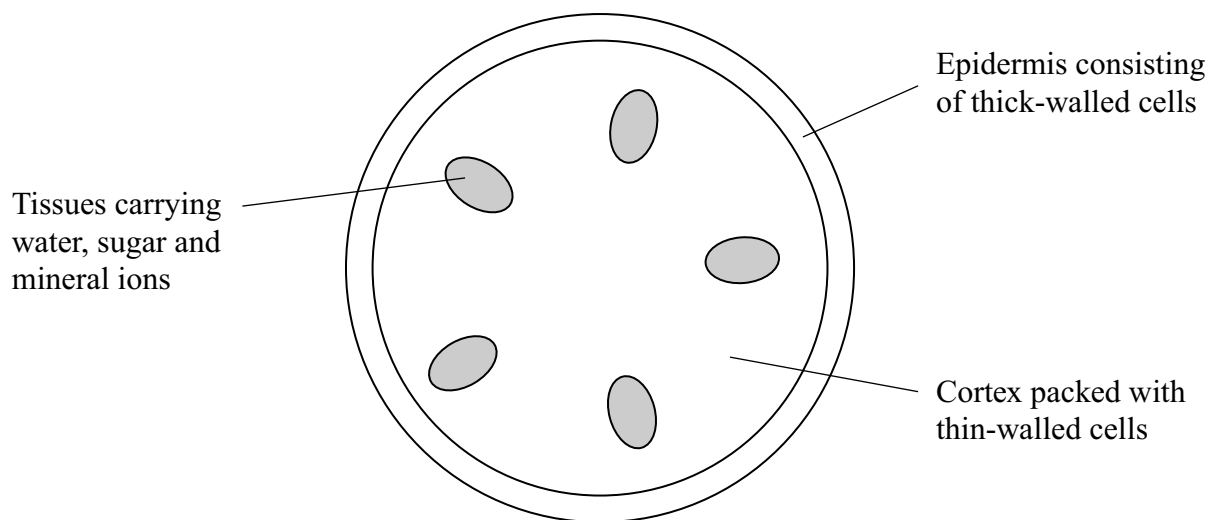
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(2 marks)

(b) **Figure 2** shows a section through a young plant stem.

Figure 2



The cells of the cortex do not carry out photosynthesis and cannot synthesise their own sugar. They have thin walls and large vacuoles. The vacuoles contain a solution with a very low (very negative) water potential. These cells support the stem, keeping it upright.

(i) Using the information given above, suggest how the cells of the cortex maintain a very low water potential.

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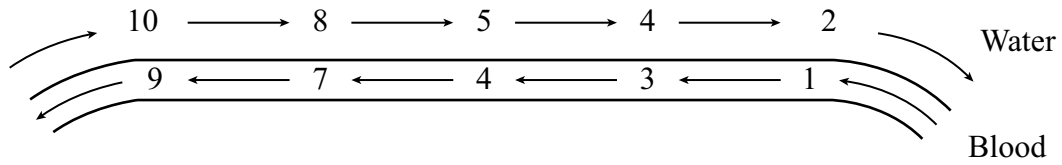
(2 marks)

(ii) Explain how the cells of the cortex and the epidermis support the stem.

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(3 marks)

- 6 (a) The diagram represents the flow of water and blood through the gills of a fish. The figures give relative oxygen concentrations.



Use the information in diagram to explain the advantage of the counter-current flow.

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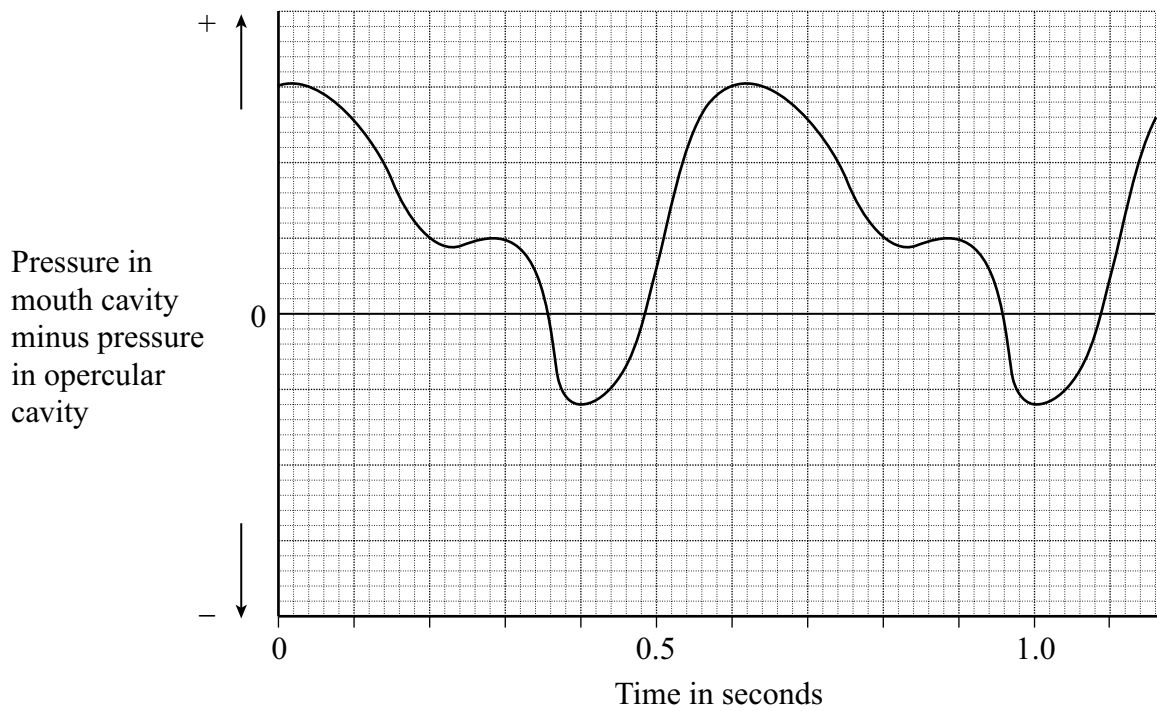
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(2 marks)

- (b) In the ventilation cycle of a fish, water enters the mouth cavity and then passes through the gills into the opercular cavity. The graph shows the difference in pressure between the mouth cavity and the opercular cavity.



- (i) Calculate the number of ventilation cycles per minute of the fish. Show your working.

Answer (2 marks)

- (ii) Between 0 and 0.35 s the pressure in the mouth cavity is higher than the pressure in the opercular cavity. What causes this pressure difference?

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(2 marks)

- (iii) What causes the pressure difference to fall below zero?

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(2 marks)

(b) In an investigation, the rate of digestion of a protein was compared in the presence of different enzymes. The table shows the results.

Enzymes present	Rate of digestion
a carbohydrase	zero
an exopeptidase	slow
an endopeptidase	slow
an endopeptidase and an exopeptidase	fast

Explain how the action of these enzymes accounts for the results.

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(4 marks)

END OF QUESTIONS

QWC

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