Surname			Other Names		
Centre Number				Candidate Number	
Candidate Signature					

Leave blank

General Certificate of Education
January 2006
Advanced Subsidiary Examination

AQA
ASSESSMENT and
QUALIFICATIONS
ALLIANCE

BIOLOGY (SPECIFICATION B)   **BYB3/W**
Unit 3   Physiology and Transport

Tuesday 10 January 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			
3			
4			
5			
6			
7			
Total (Column 1) →			
Total (Column 2) →			
Quality of Written Communication			
TOTAL			
Examiner's Initials			

BYB3/W

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

1 (a) The diagram shows a section through the heart at one stage of the cardiac cycle.
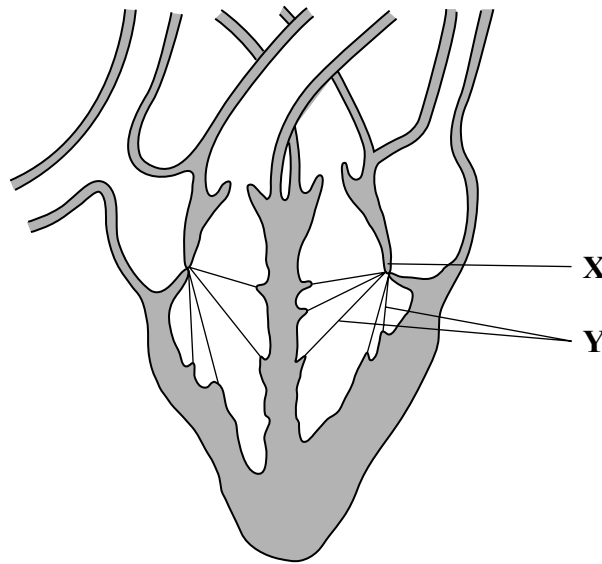
(i) Name the structure labelled **X**.

....
(1 mark)

(ii) Suggest how the structures labelled **Y** help to maintain the flow of blood in one direction through the heart.

....

....

....

....
(2 marks)

(b) The chart shows the actions of the atria and the ventricles during a complete cardiac cycle. Different stages have been given letters and a time scale added.

Stage		
A	**B**	**C**

	A	B	C
Atria	Contract-ing	Relaxing	
Ventricles	Relaxing	Contracting	Relaxing

0.0   0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8

Time / seconds

(i) Give the letter of the stage which is shown in the diagram of the heart.

....
(1 mark)

(ii) The heart beats for one minute at the rate shown by the chart. Calculate the total time the ventricles are relaxed during one minute. Show your working.

Answer .... seconds *(2 marks)*

6

4

2   The diagram shows part of a leaf. The arrows show one pathway taken by water through the leaf and into the atmosphere.
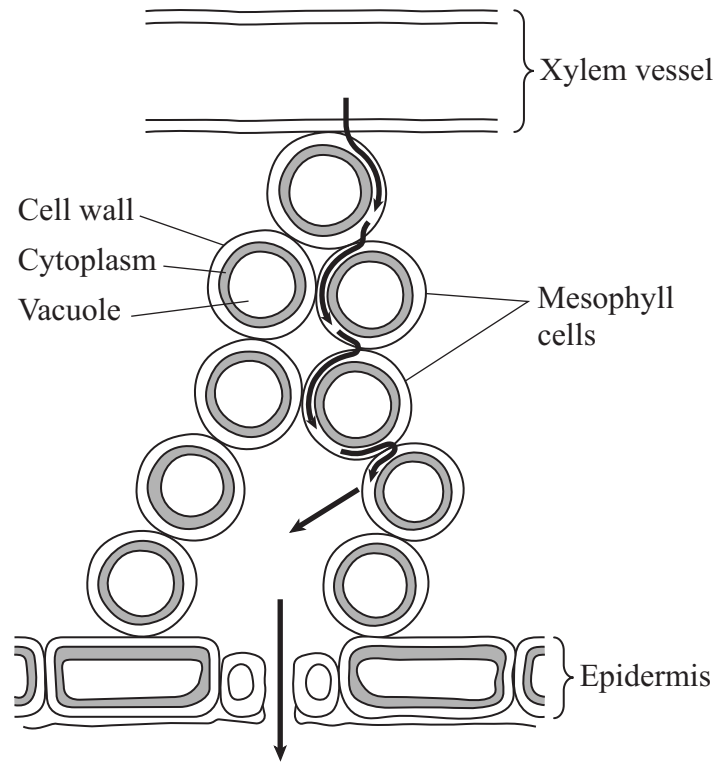
(a)   (i)   Name the pathway shown.

....

(1 mark)

(ii)   Describe and explain how water in the mesophyll cells passes out of the leaf.

....

....

....

....

....

....

(3 marks)

WWW.XTREMEPAPERS.NET   www.theallpapers.com

(b) Explain how **two** adaptations of their leaves reduce water loss from xerophytes.

Adaptation ....

Explanation ....

....

Adaptation ....

Explanation ....

....

(2 marks)

Turn over for the next question

Turn over ▶

WWW.XTREMEPAPERS.NET   www.theallpapers.com

3 The diagram shows vessels in a small piece of tissue from a mammal. The chart shows the hydrostatic pressure of the blood as it flows through the capillary.
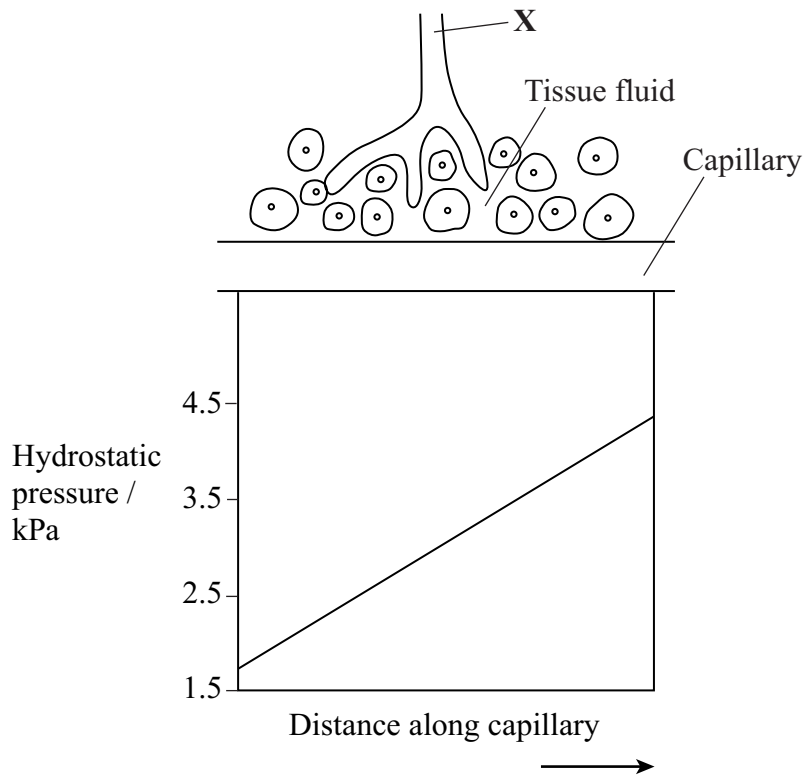
(a) Name the fluid contained in vessel **X**. ....

(1 mark)

(b) Draw an arrow on the capillary to show the direction of the flow of blood. Describe the evidence from the chart to support your answer.

....

....

(1 mark)

(c) Describe and explain how water is exchanged between the blood and tissue fluid as blood flows along the capillary.

....

....

....

....

....

....

....

....

(4 marks)

(d) Shrews are small mammals. Their tissues have a much higher respiration rate than human tissues. The graph shows the position of the oxygen haemoglobin dissociation curves for a shrew and a human.
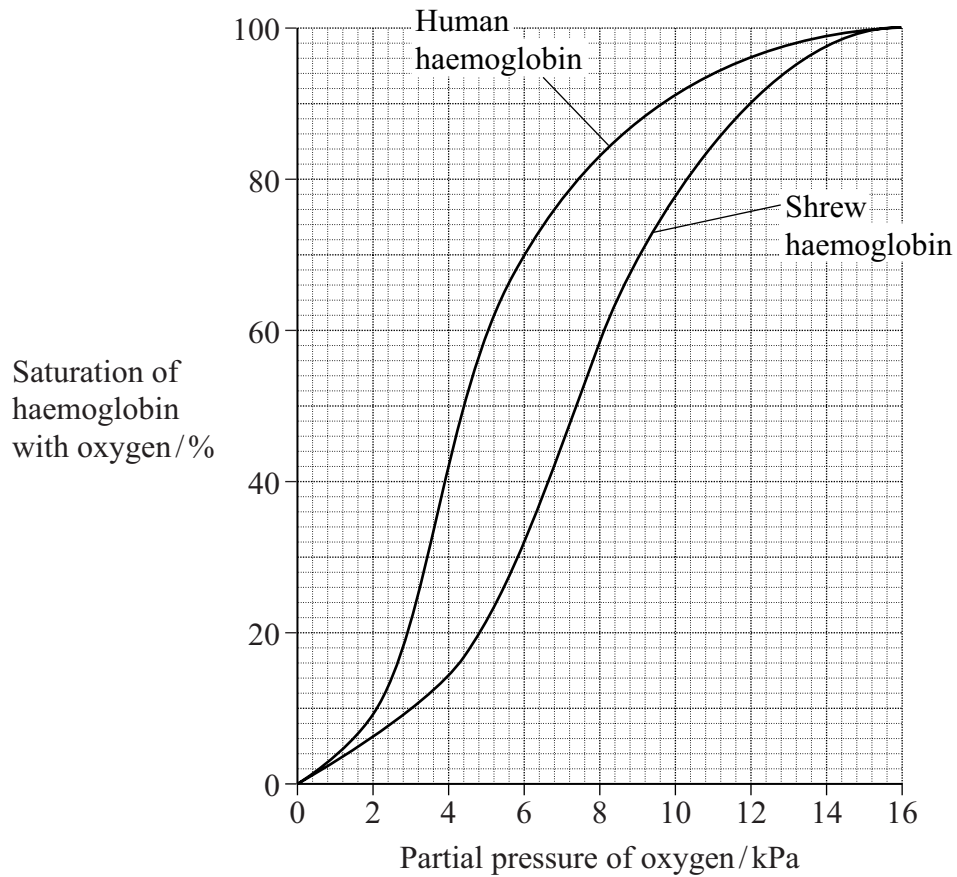
Explain the advantage to the shrew of the position of the curve being different from that of a human.

....

....

....

....

....

....

(3 marks)

9

Turn over ▶

4 (a) Explain how xylem tissue is adapted for its function.

....

....

....

....

....

....

....

....

(4 marks)

(b)   The graph shows the flow rate in the xylem in the trunk of a tree.

Rate of flow
in xylem

Time of day
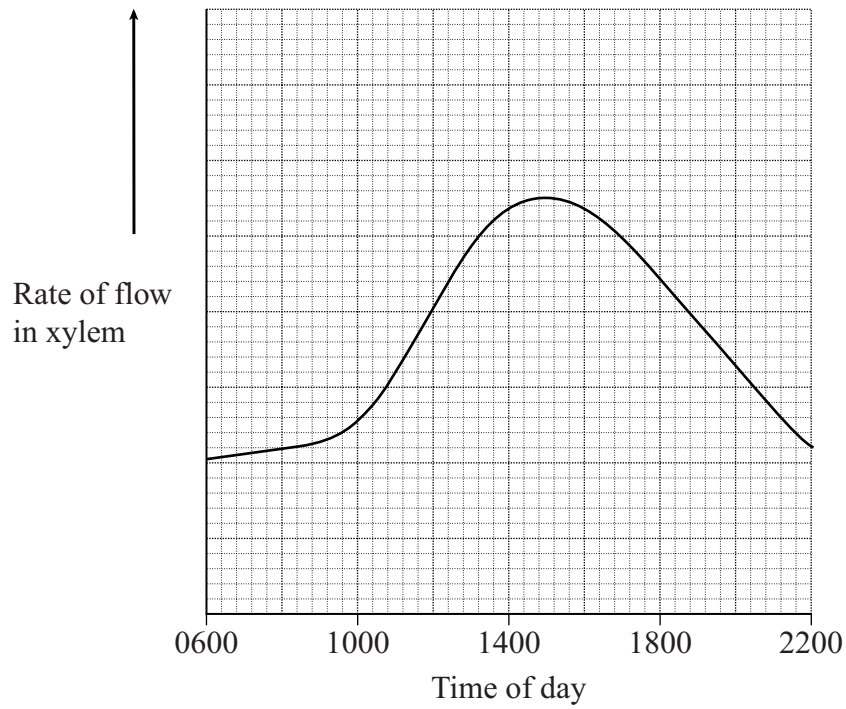
(i)   Explain the increase in the flow rate between 1000 and 1400 hours.

....

....

....

....
(2 marks)

(ii)   The diameter of the trunk decreased during the same period, reaching its
minimum when the flow rate was highest. Use your knowledge of the
cohesion-tension theory to suggest an explanation for this decrease.

....

....

....

....
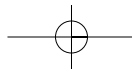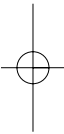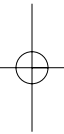*(2 marks)*

8

Turn over ▶

There are no questions printed on this page

5 (a) Name the **two** substances produced by anaerobic respiration in humans.

1 ....

2 ....

(2 marks)

(b) When an athlete runs in a 100 metre race, 90% of the energy needed is provided by anaerobic respiration.

(i) Explain why most of the energy is provided by anaerobic respiration rather than aerobic respiration.

....

....

....

....

(2 marks)

(ii) The athlete continues to breathe deeply for several minutes after the race ends. Explain why this is necessary.

....

....

....

....

(2 marks)

6

Turn over for the next question

12

6 The effect of carbon dioxide concentration on lung ventilation was investigated. The table shows the results.

	Concentration of carbon dioxide of air breathed in / %					
	0.04	0.80	1.50	3.00	5.50	6.00
Mean volume of one breath / cm^3	670	740	800	1250	1850	2100
Mean number of breaths per minute	14	14	15	15	16	27

(a) Describe the effect of increasing carbon dioxide concentration on the rate of breathing.

....

....

....

....
(2 marks)

(b) Calculate the percentage increase in the total volume of air breathed in per minute when the concentration of carbon dioxide was increased from 0.04 to 6.0 %.
Show your working.

Answer .... % *(2 marks)*

WWW.XTREMEPAPERS.NET www.theallpapers.com

(c)   Explain how an increase in carbon dioxide concentration in the air breathed in causes an increase in ventilation rate.

....

....

....

....

....

....

....

....

(4 marks)

8

Turn over for the next question

Answer **Question 7** in continuous prose.
Quality of Written Communication will be assessed in these answers.

7 (a) Describe how carbohydrate produced in the leaves is transported to the roots by mass flow.

....

....

....

....

....

....

....

....

....

....

....
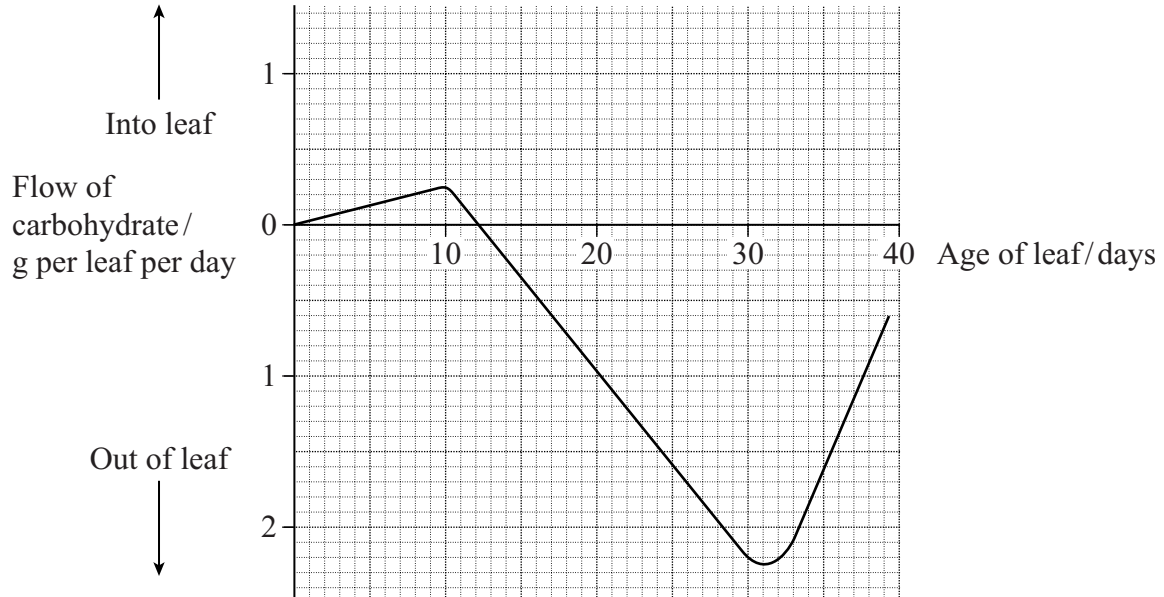
(6 marks)

(b) The flow of carbohydrate into and out of a leaf was measured over a period of 40 days. The graph shows the results.

Describe and explain the flow of carbohydrate over this period of 40 days.

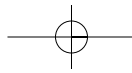..

....

....

....

....

....

....

....

(4 marks)

END OF QUESTIONS

10

QWC   1

16

There are no questions printed on this page

WWW.XTREMEPAPERS.NET   www.theallpapers.com