

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

BIOLOGY
 Transport

2803/01

Monday

10 JANUARY 2005

Morning

45 minutes

Candidates answer on the question paper.

Additional materials:

- Electronic calculator
- Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number										
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>						<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>					

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Read the questions carefully before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	16	
2	5	
3	13	
4	11	
TOTAL	45	

This question paper consists of 12 printed pages.

Answer **all** the questions.

- 1 (a) Flowering plants have two tissues to transport materials, xylem and phloem. Fig. 1.1 shows the outline of a transverse section of the **root** of a dicotyledonous flowering plant.

Sketch in and label the areas occupied by the xylem and phloem.

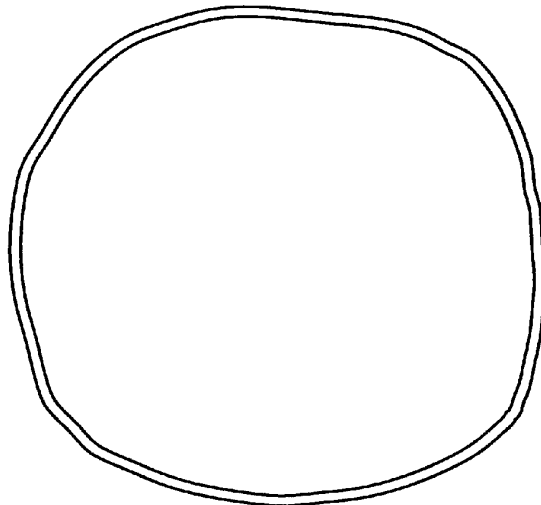


Fig. 1.1

[2]

- (b) Fig. 1.2 is a scanning electron micrograph of some xylem vessels.

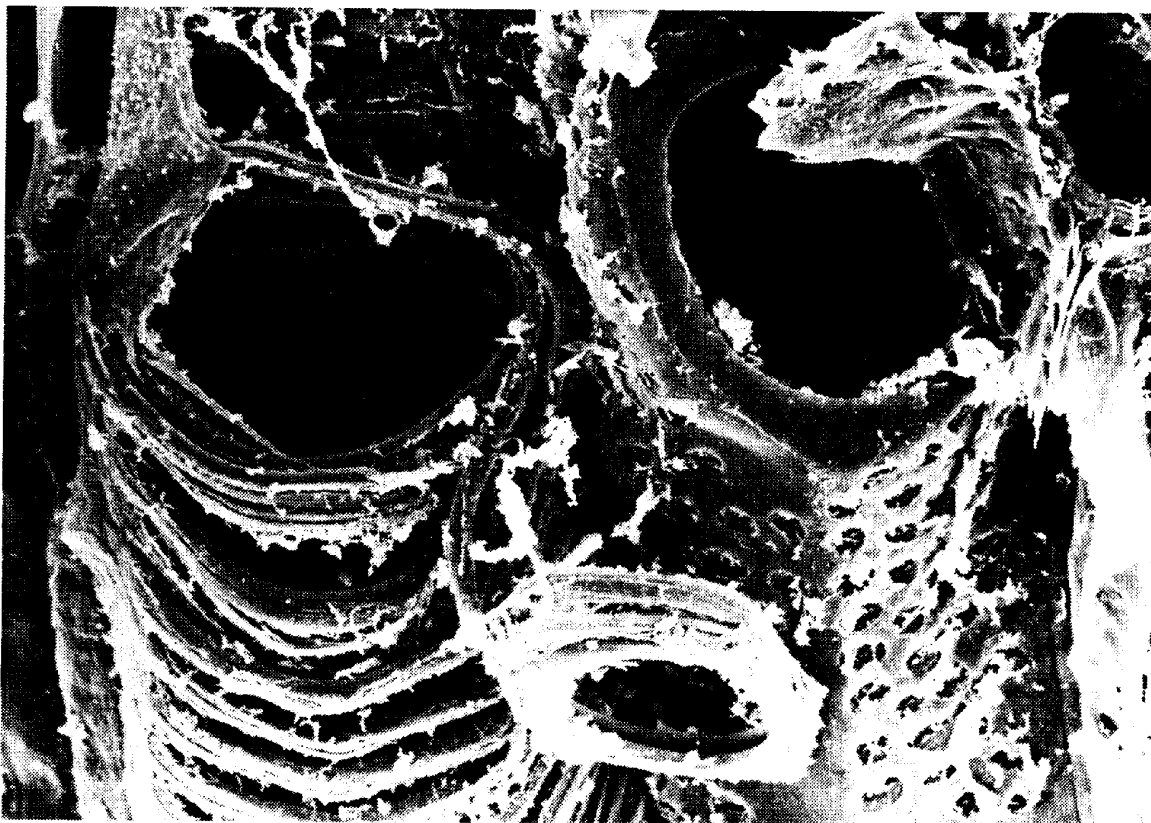


Fig. 1.2

Select **two** features **that are visible in the electron micrograph** and explain how these features help with the functioning of xylem vessels.

feature 1

.....

.....

.....

feature 2

.....

.....

.....[4]

- (c) Various hypotheses for the mechanism of transport in phloem have been suggested. One hypothesis proposes that movement between sources and sinks occurs entirely passively by the process of mass flow.

Fig. 1.3 shows a physical model to illustrate the principle of mass flow.

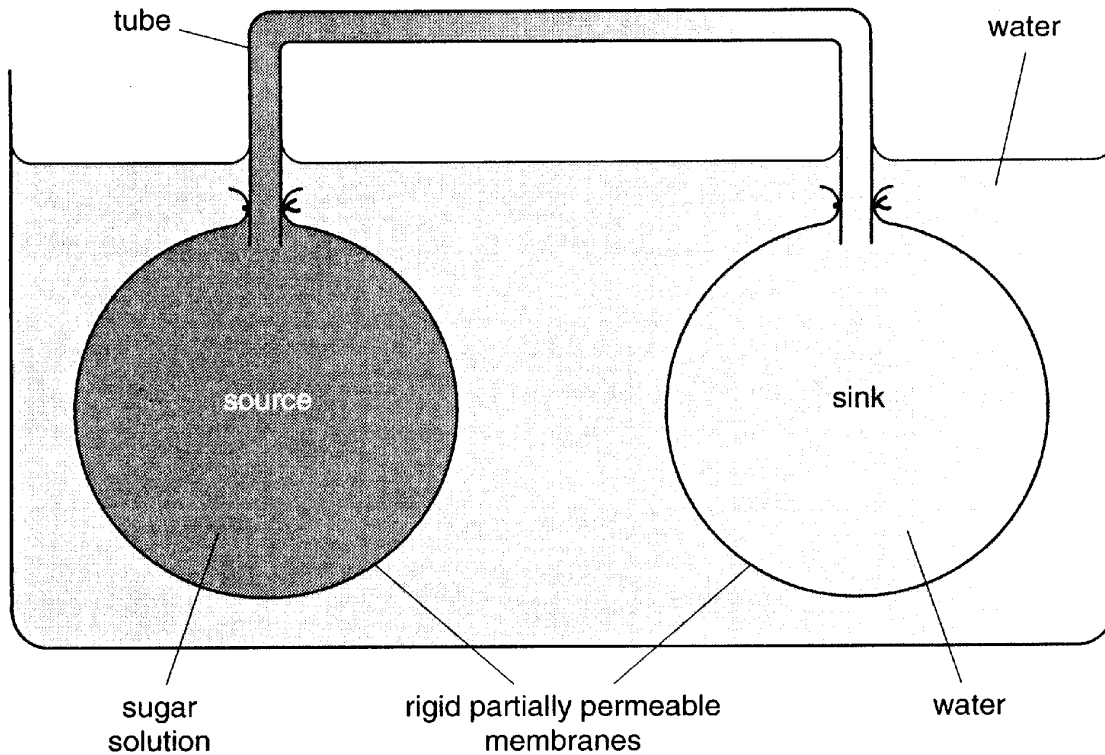


Fig. 1.3

- (i) Give an example in plants of:

a source

a sink[2]

- (ii) Use the information in Fig. 1.3 to explain how mass flow of materials between the source and the sink would be brought about.

.....

[4]

(d) There is evidence that sugar transport from sources to sinks in plants does not only involve passive movement by mass flow. There is also an active part to the mechanism.

(i) State **one** piece of evidence for the involvement of an active process.

.....
.....[1]

(ii) Describe an active mechanism which could possibly be involved in the transport of sugars from sources to sinks.

.....
.....
.....
.....
.....
.....
.....[3]

[Total: 16]

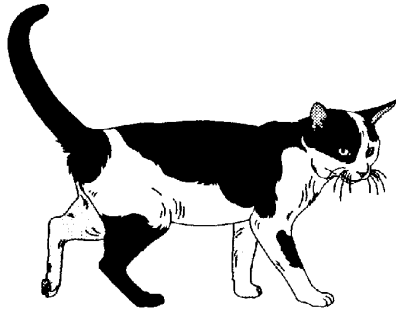
- 2 Use the most appropriate terms to complete the paragraph below about the role of haemoglobin.

Haemoglobin is a pigment found in the blood of mammals which has an important role in the transport of respiratory gases. Each haemoglobin molecule contains haem groups. In the lungs, oxygen binds with the atom of in each haem group. The maximum number of molecules of oxygen that can be carried by one molecule of haemoglobin is In areas like muscle tissue where the partial pressure of oxygen is low, oxygen dissociates from the haem group. This dissociation is increased by the presence of carbon dioxide; this is called the
..... . Most of the carbon dioxide produced in respiring tissues diffuses into the red blood cells where the enzyme
..... catalyses a reaction leading to the production of hydrogen ions and hydrogen carbonate ions. The hydrogen ions combine very readily with haemoglobin to form a compound known as The effect of this is to increase the release of oxygen from haemoglobin.

[5]

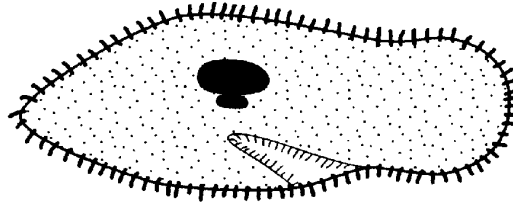
[Total: 5]

- 3 (a) Fig. 3.1 shows a mammal and a unicellular organism. The transport system in mammals is a double circulatory system driven by a pump (the heart), whilst unicellular organisms have no need for special transport systems.



mammal (cat)

X 0.075



unicellular organism
(*Paramecium*)

X 300

Fig. 3.1

- (i) Explain what is meant by a *double circulatory system*.

.....
.....
.....
.....[2]

- (ii) Explain **two** reasons why mammals need a circulatory system whilst unicellular organisms, such as that shown in Fig. 3.1, do not.

first reason

.....
.....
.....

second reason

.....
.....
.....[4]

(b) The cardiac cycle is the sequence of events which makes up one heart beat. Fig. 3.2 shows the events in the heart during one heart beat. The heart is viewed from the side.

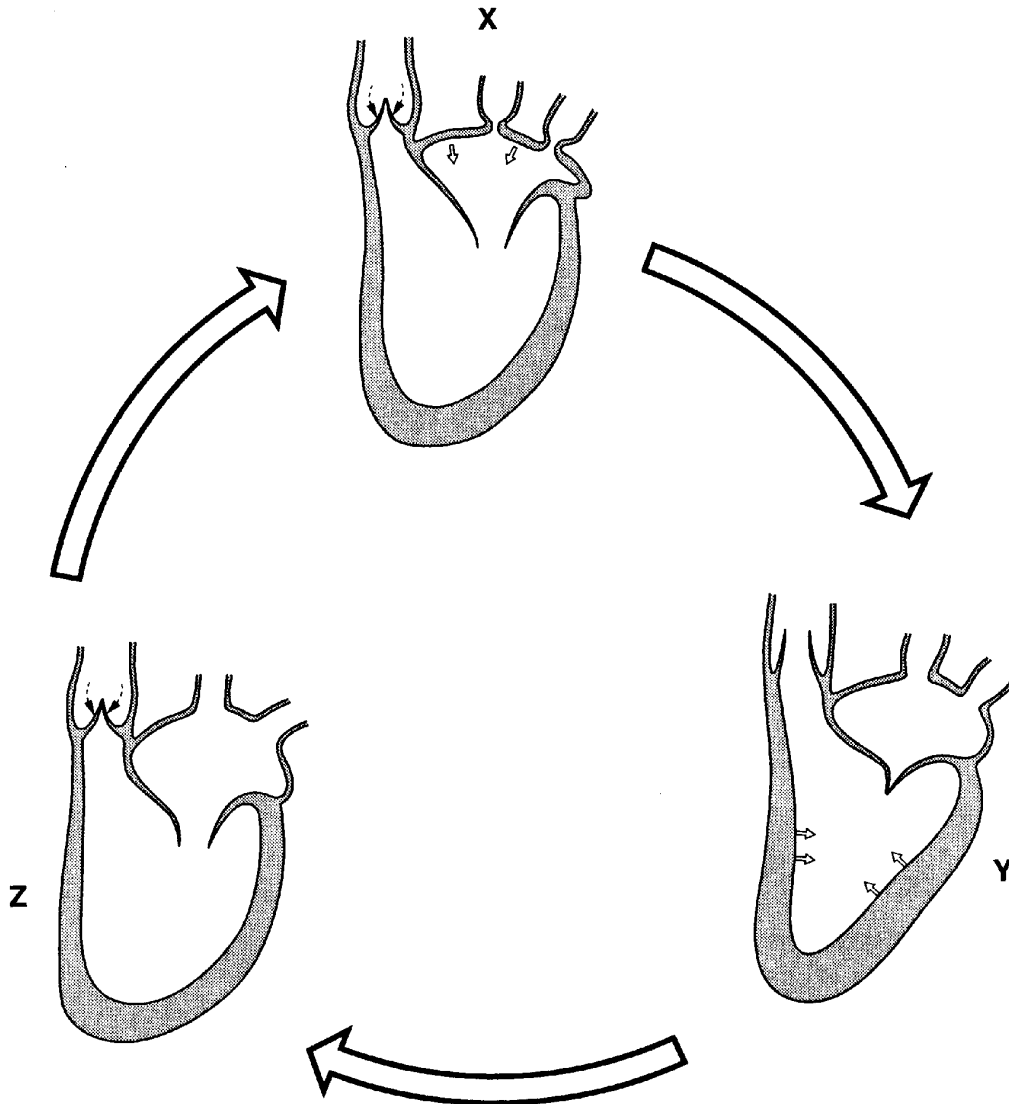


Fig. 3.2

- 4 (a) Fig. 4.1 shows the changes in blood pressure as blood flows through various parts of the mammalian blood system.

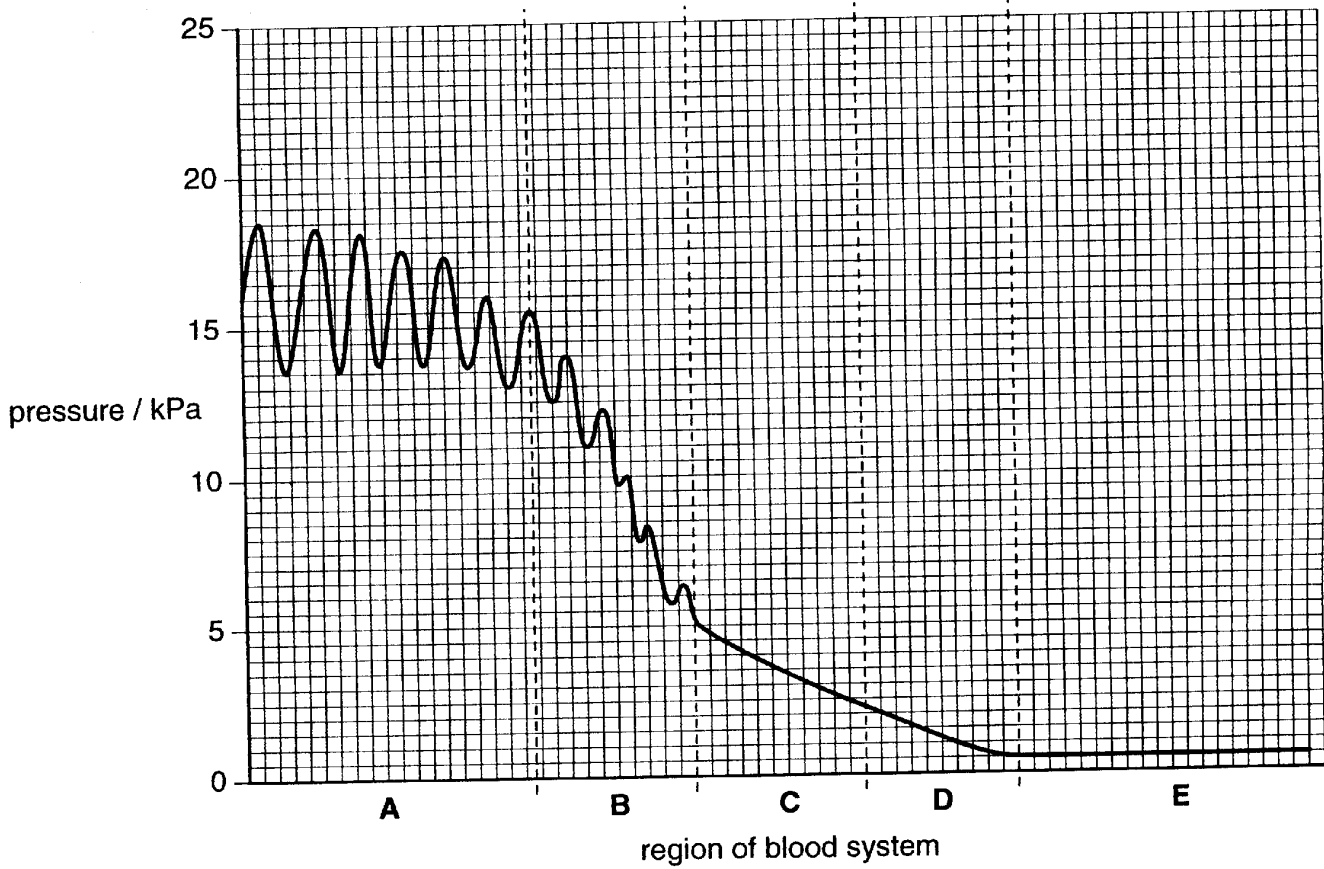


Fig. 4.1

- (i) Calculate the drop in blood pressure from the **start** of region **B** to the **end** of region **D**. Show your working.

Answer = kPa [2]

- (ii) Explain what brings about the drop in pressure between **B** and **D**.

.....

.....

.....

.....

.....

..... [2]

(iii) Suggest why it is important that the pressure in region **C** is not as great as the pressure in region **A**.

.....
.....
.....
.....[2]

(b) Fig. 4.2 shows the structure of part of a capillary.

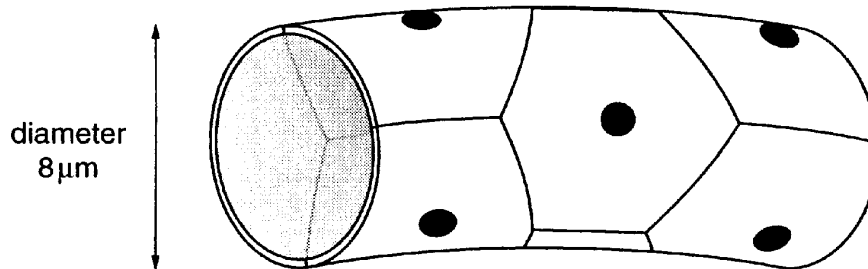


Fig. 4.2

(i) State which of the regions **A** to **E** shown on Fig. 4.1 represents the capillaries.

.....[1]

(ii) Select **two** structural features of capillaries and explain how each feature helps with the exchange of materials between the blood and the tissue fluid.

feature

role in exchange

.....
.....

feature

role in exchange

.....
.....

.....[4]

[Total: 11]