OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

BIOLOGY 2803/1

Transport

Friday **19 JANUARY 2001** Afternoon 1 hour

Candidates answer on the question paper.
Additional materials:
Electronic calculator

Candidate Name	Centre Number	Candidate Number

TIME 1 hour

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 the spaces on the question paper.
- Read each question carefully and make sure you know what you have to do before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 60.
- You will be awarded marks for the quality of written communication where an answer requires a piece of extended writing.
- You may use an electronic calculator.
- You are advised to show all the stages in calculations.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	4	
2	20	
3	16	
4	15	
5	5	
TOTAL	60	

This question paper consists of 11 printed pages and 1 blank page.

For Examiner's Use

Answer **all** questions.

1 Both multicellular animals and plants can have transport systems consisting of various tubular vessels.

Complete the table below by placing a tick (✔) or a cross (✘) in the boxes.

feature	animal	plant
the contents of the vessels are pumped round the system		
the vessels link to form a circulatory system		
the vessels form a major nutrient transport system		
some of the vessels are living and some are dead		

[4]

[Total : 4]

2 Fig. 2.1 shows cross sections of two types of vessel from the mammalian blood system.

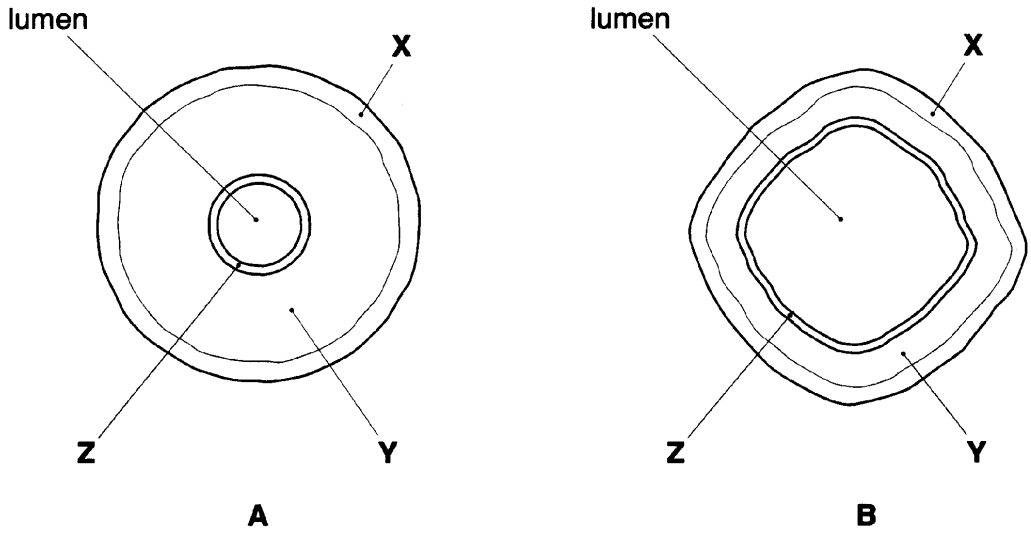

Fig. 2.1

(a) With reference to Fig. 2.1,

(i) name the blood vessels **A** and **B**;

A .....

B .....[1]

(ii) name **X** to **Z**;

X .....

Y .....

Z .....[3]

(iii) describe briefly the structure of **X** to **Z**.

X .....

Y .....

Z .....[3]

Fig. 2.2 gives information about the blood pressure in various parts of the mammalian blood system.

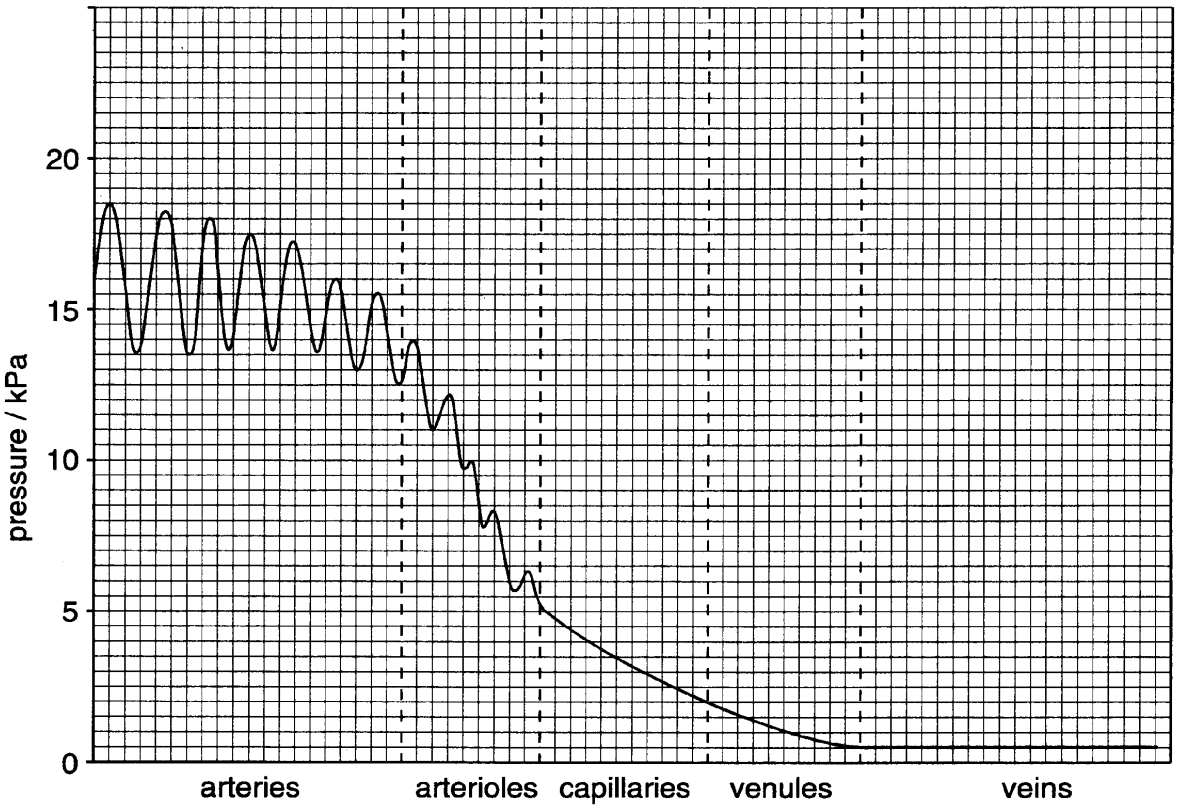

Fig. 2.2

(b) With reference to Fig. 2.2,

(i) describe the changes in blood pressure in the arteries;

.....

.....

.....[2]

(ii) explain the changes you have described;

.....

.....

.....[2]

(iii) suggest why it is important that the blood pressure drops steeply in the arterioles.

.....

.....[1]

Fig. 2.2 shows that blood pressure is at its lowest in the veins.

(c) Explain how blood at low pressure is returned to the heart.

.....

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.....[4]

(d) **(i)** Explain why blood contains more protein than tissue fluid.

.....

.....[1]

(ii) State **three further ways** in which blood differs from tissue fluid.

1 .....

2 .....

3 .....[3]

[Total : 20]

3 **(a)** Define the term transpiration.

.....

.....[2]

Fig. 3.1 shows an apparatus used to investigate transpiration in plants.

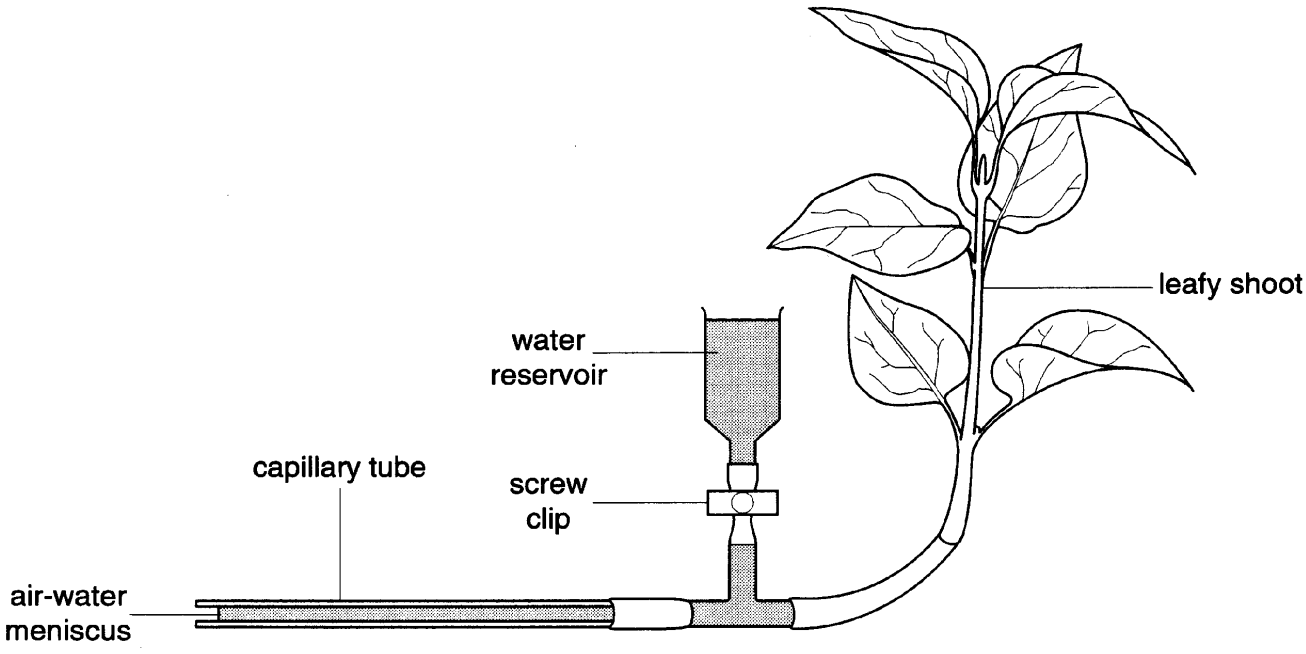


Fig. 3.1

(b) With reference to Fig. 3.1,

(i) name the apparatus; .....[1]

(ii) state what is measured by the apparatus; .....[1]

(iii) state **three** precautions that should be taken when setting up this apparatus in order to ensure accurate results.

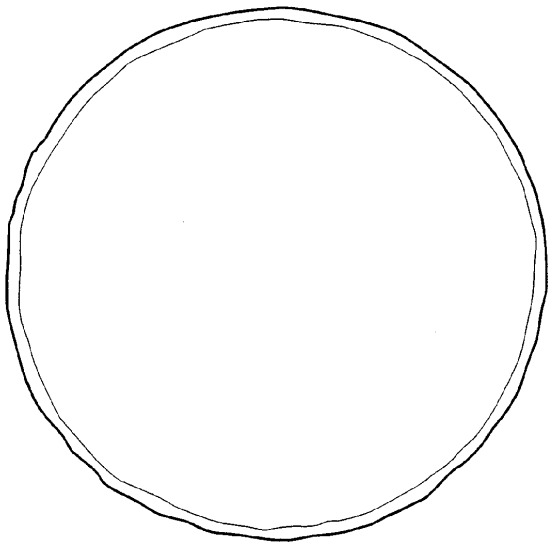
1 .....

2 .....

3 .....[3]

Fig. 3.2 shows the outline of a transverse section through the root of a dicotyledonous plant.

(c) Sketch in and label the xylem and phloem in the diagram. Individual cells should **not** be shown.



[2]

Fig. 3.2

Plants can be provided with mineral nutrients by 'foliar feeding' which involves spraying solutions of mineral nutrients onto the leaves. These minerals are then transported to other parts of the plant.

(d) Name the tissue in which the minerals will be transported. Give a reason for your answer.

tissue .....[1]

reason .....

.....[1]

Fig. 3.3 shows a plant cell and the solution surrounding it. The water potential (ψ) of the cell sap and the surrounding solution is given.

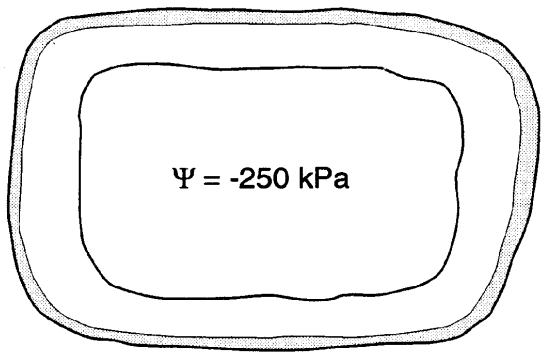


Fig. 3.3

(e) State whether water will enter or leave the cell. Explain your answer.

.....

.....[2]

The fungus *Ceratocystis ulmi* causes Dutch elm disease in elm trees in Europe and North America. The fungus infects the trees and secretes a toxin which causes growths into the xylem vessels eventually blocking them. Early symptoms of the disease are that the leaves at the top of the tree wilt. Then they turn yellow and dry. Finally they drop off.

(f) Explain how infection by the fungus produces the symptoms described.

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.....[3]

[Total : 16]

4 An ECG (electrocardiogram) trace shows the electrical activity within a person's beating heart. Fig. 4.1 shows a normal trace, **A**, a trace after the administration of the drug digitalis, **B**, and a trace from someone whose heart has entered a state known as fibrillation, **C**. **P** represents activity in the atrial wall, **R** contraction of the ventricle and **T** recovery of the ventricle walls.

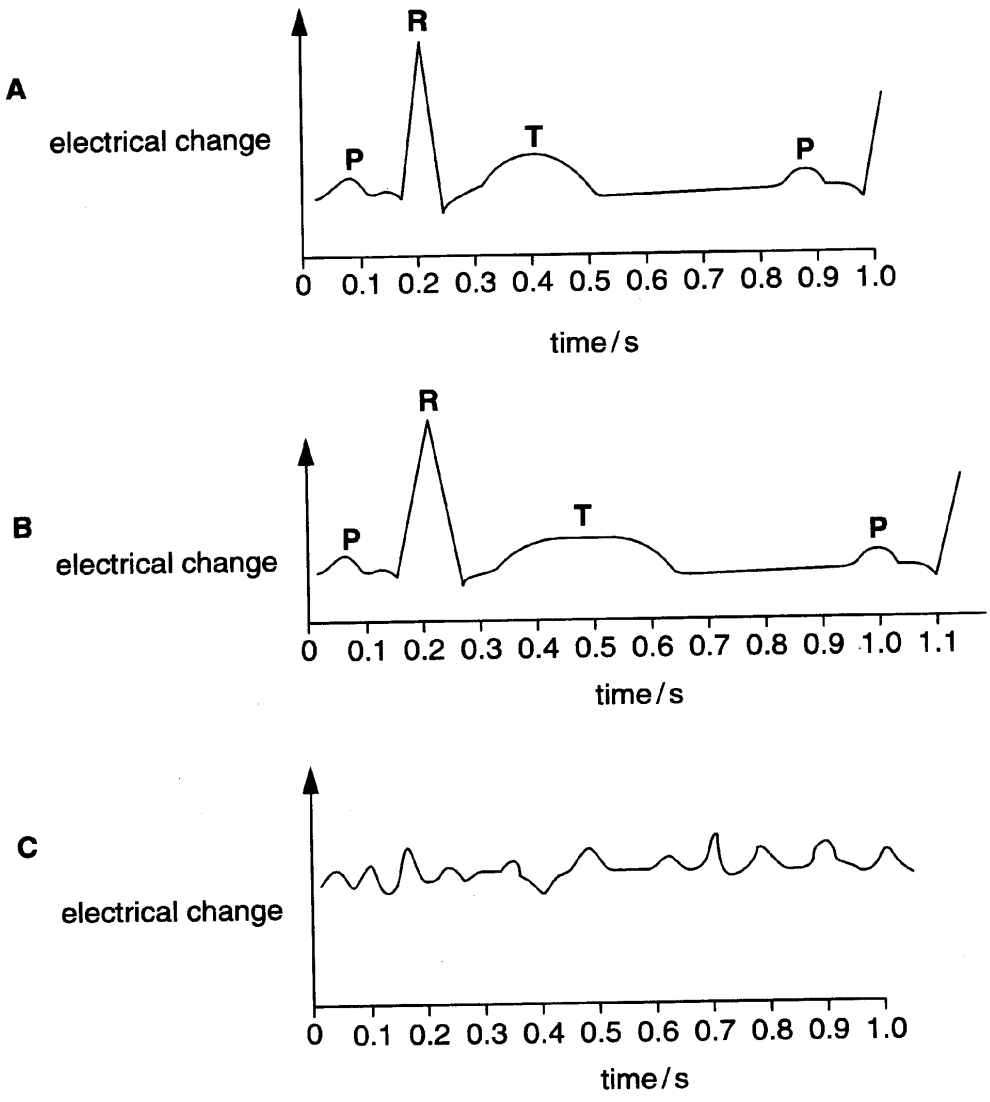

Fig. 4.1

(a) With reference to trace **A**, calculate the length of a single cardiac cycle and the number of cycles per minute.

length of a single cycle .....

number of cycles per minute .....[2]

(b) With reference to trace **B**, state **two** effects of digitalis on heart activity.

1 .....

2 .....[2]

For Examiner's Use

(c) With reference to trace **C**,

(i) describe the effect of fibrillation on heart activity;

.....

.....[1]

(ii) state **one** likely effect on the patient.

.....[1]

(d) Describe the events that occur in the cardiac cycle.

(In this question one mark is available for the quality of written communication.)

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.....[9]

[Total : 15]

5 Use the most appropriate word or words to complete the paragraph below on the carriage of carbon dioxide in the blood.

The carbon dioxide produced in respiring tissue diffuses into the blood where most of it enters the red blood cells. Here the enzyme ..... catalyses a reaction resulting in the production of carbonic acid (H_2CO_3) which dissociates into hydrogen ions (H^+) and ..... . The hydrogen ions combine very readily with haemoglobin forming ..... acid thus removing them from solution where they would make the blood very acidic. In this way the haemoglobin is acting as a ..... , maintaining the blood pH close to neutral. Some of the carbon dioxide that enters the red blood cells does not undergo the process described above, but combines directly with haemoglobin forming ..... .

[Total : 5]

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