

**ADVANCED SUBSIDIARY GCE
BIOLOGY**

Transport

TUESDAY 3 JUNE 2008

2803/01

Morning
Time: 45 minutes

Candidates answer on the question paper
Additional materials (enclosed): Insert

Additional materials (required):
Electronic calculator
Ruler (cm/mm)



Candidate
Forename

Candidate
Surname

Centre
Number

--	--	--	--	--

Candidate
Number

--	--	--	--

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **45**.
- 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 calculation.

FOR EXAMINER'S USE

Qu.	Max.	Mark
1	10	
2	8	
3	13	
4	9	
5	5	
TOTAL	45	

This document consists of **11** printed pages, **1** blank page and an Insert.

Answer **all** the questions.

- 1 Fig. 1.1 is a drawing made from an electron micrograph of a longitudinal section of a blood capillary.

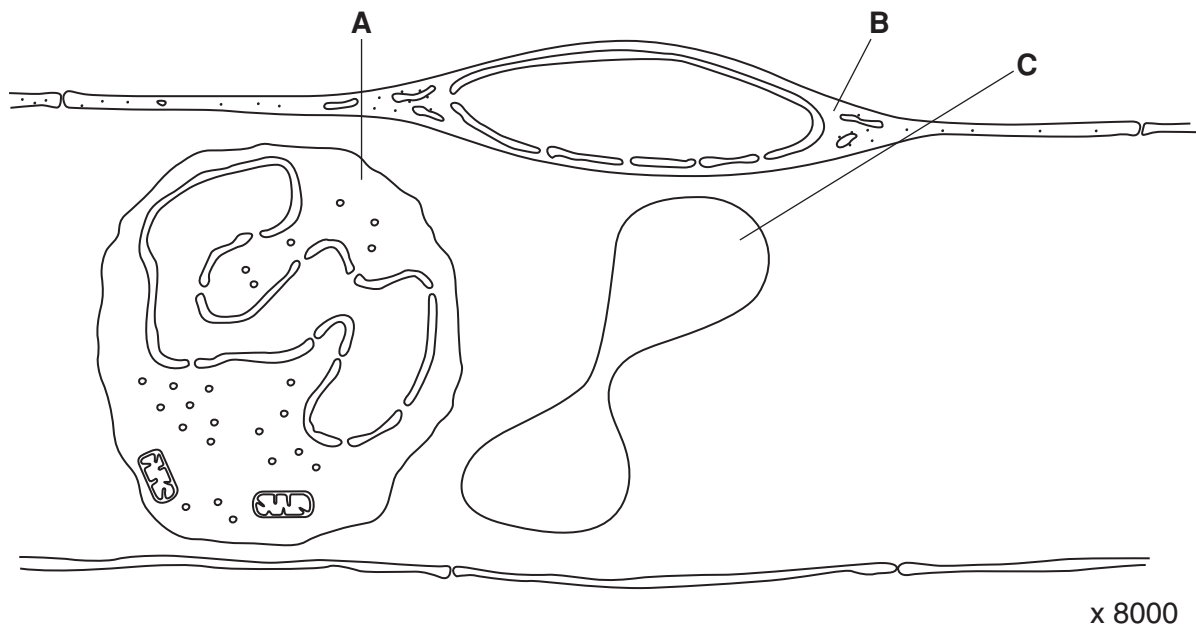


Fig. 1.1

- (a) Complete the table below using the information in Fig. 1.1 to help you.

	cell A	cell B	cell C
name of cell	red blood cell
function of cell	ingest bacteria	permit exchange of gases
maximum diameter / μm	20	7

[4]

- (b) The capillary shown in Fig. 1.1 was from a mammal. Red blood cells (cell type **C**) in mammals have no nuclei when mature.

State **one** advantage and **one** disadvantage of this.

advantage

.....

disadvantage

.....[2]

- (c) Substances are exchanged between red blood cells, plasma, tissue fluid and lymph.

Complete the table below to show which of the statements apply to each of these components of the body.

Fill in each box using a tick (✓) to show that the statement applies or a cross (✗) if it does not. The first row has been completed for you.

statement	plasma	tissue fluid	lymph	cytoplasm of red blood cells
formed by leakage from capillaries	✗	✓	✗	✗
contains haemoglobin				
contains water				
contains antibodies				
in direct contact with muscle cells				

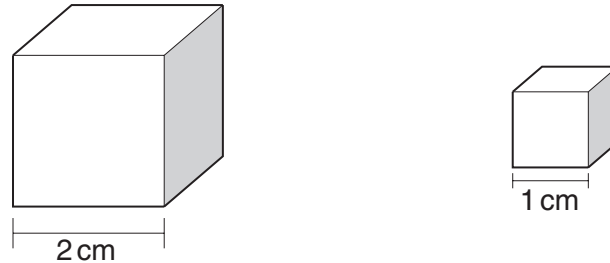
[4]

[Total: 10]

- 2 A student carried out an experiment to find the effect of surface area:volume ratio on the rate of water uptake by potato.

Pieces of potato were cut into cubes of the following sizes:

- 2 cm × 2 cm × 2 cm (surface area = 24 cm², volume = 8 cm³)
- 1 cm × 1 cm × 1 cm (surface area = 6 cm², volume = 1 cm³).



One 2 cm cube was carefully blotted dry, weighed and its fresh mass recorded.

Eight 1 cm cubes were carefully blotted dry, weighed together and their combined fresh mass recorded.

The 2 cm cube was put into a beaker and covered with distilled water.

The eight 1 cm cubes were put into another beaker and covered with distilled water.

At intervals, for a period of 24 hours, the cubes were removed from the beakers, blotted dry, reweighed and then replaced into fresh distilled water.

The percentage increase in mass was calculated for the 2 cm cube and for the eight 1 cm cubes.

The results are shown in Fig. 2.1.

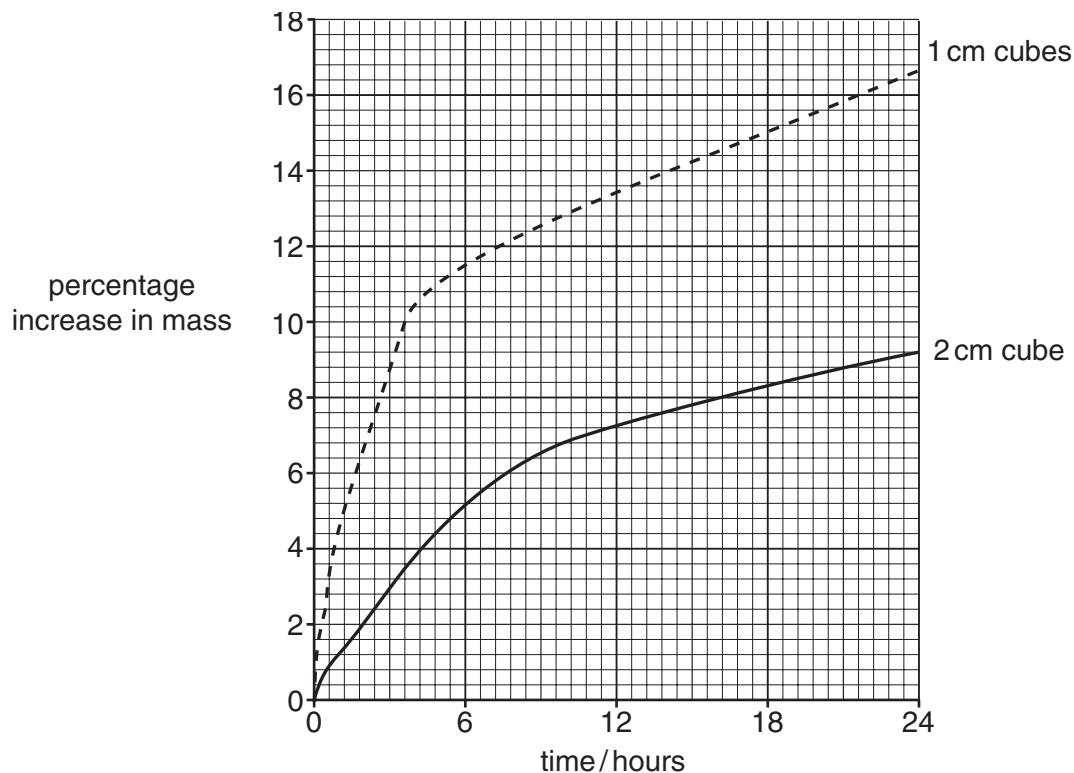


Fig. 2.1

- (a) Describe the results for the 1 cm cubes as shown in Fig. 2.1.

.....

.....

.....

.....

.....

.....[3]

- (b) Explain, **in terms of water potential**, why all the cubes of potato gained mass.

.....

.....

.....

.....

.....

.....[3]

- (c) Suggest why the percentage increase in mass rises more quickly for the eight 1 cm cubes than for the 2 cm cube.

.....

.....

.....

.....

.....

.....[2]

[Total: 8]

3 Fig. 3.1, on the insert, shows three stages of the cardiac cycle, labelled **X**, **Y** and **Z**.

(a) Name the blood vessels labelled **A** and **B**.

A

B[2]

(b) Fig. 3.1 shows that one heart beat takes 0.8 seconds.

State the heart rate in beats per minute.

Answer = beats per minute. [1]

(c) Explain,

(i) why the walls of the atria are thinner than those of the ventricles;

.....

(ii) why the wall of the right ventricle is thinner than the wall of the left ventricle.

.....

[3]

Start your answer at stage X. Details of the electrical activity of the heart are **not** required.

.....[6

[Total: 13]

- 4 Mistletoe is a plant that is a partial parasite. It has no roots in the ground, but grows by attaching itself to the branches of a tree.

Fig. 4.1 shows mistletoe attached to the branch of a tree. The enlargements show details, in transverse section, of part of the leaf structure of mistletoe (**C**) and of the region where it attaches to the tree branch (**D**).

Mistletoe carries out photosynthesis and transpiration like non-parasitic plants.

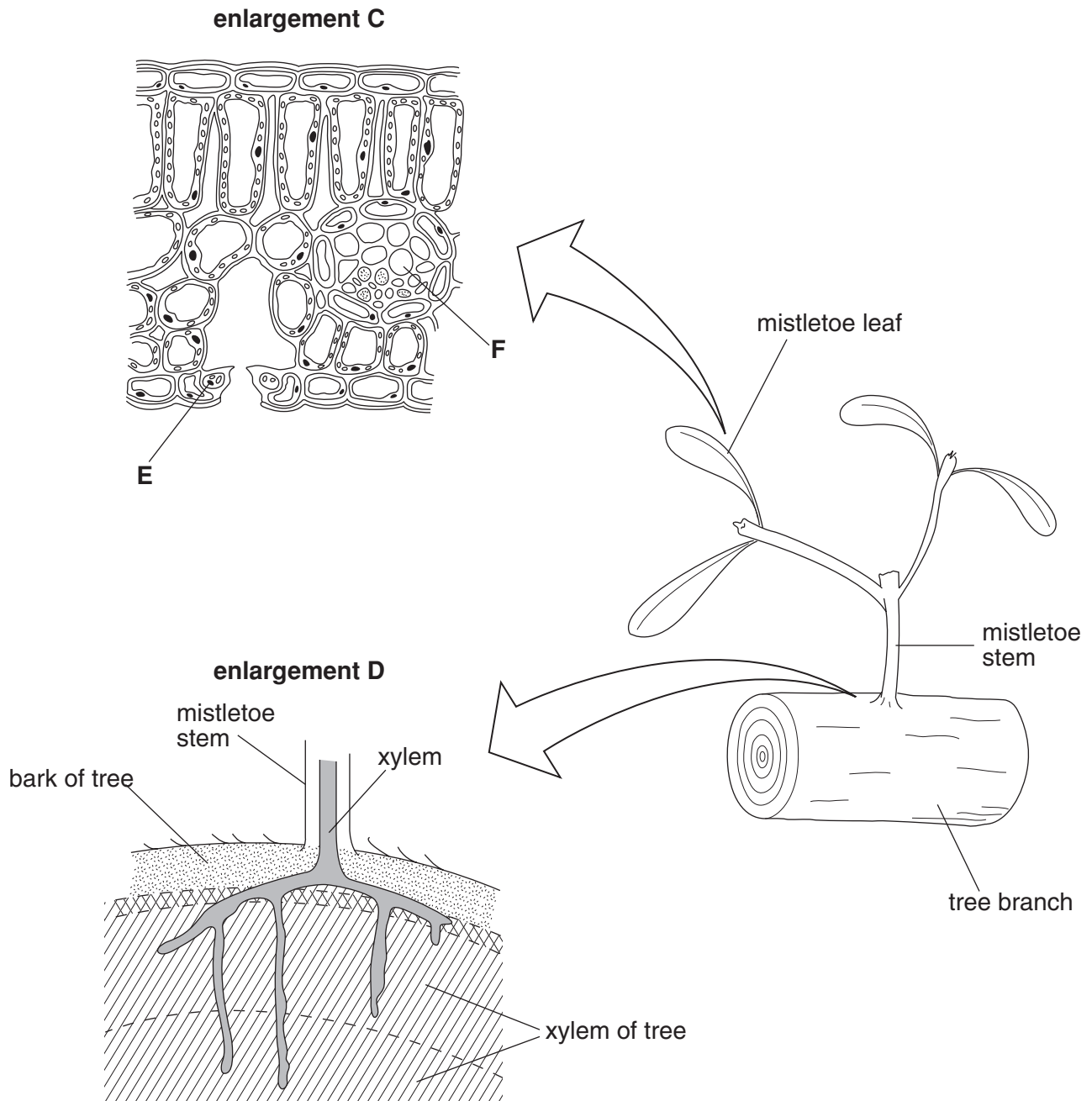


Fig. 4.1

- (a) Name cells **E** and **F** shown in enlargement **C**.

E

F[2]

- (b) Many text books state that transpiration is an inevitable consequence of gas exchange in plants.

Explain why transpiration is considered to be an inevitable consequence of gas exchange.

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

- (c) Mistletoe has no roots in the ground.

Using the information in Fig. 4.1 to help you, outline the mechanism by which water reaches the cells in the leaf of mistletoe.

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

[Total: 9]

- 5 The list below contains statements about various aspects of the circulatory system of mammals.

Select the statement which **best** matches the features of the circulatory system given in the table and write the appropriate letter in the box.

Each letter can only be used once.

The first one has been done for you.

Statements

- A** involved in vasoconstriction
- B** blood flows in vessels
- C** nothing enters or leaves the vessels
- D** contracts to move blood
- E** relatively narrow to maintain pressure
- F** smooth to reduce friction
- G** prevents backflow of blood in veins
- H** always carries oxygenated blood from the heart
- J** blood passes through the heart twice in one cycle
- K** relatively large to accommodate much blood

feature	letter
capillary wall	F
double circulation	
smooth muscle	
valves	
closed system	
artery lumen	

[5]

[Total: 5]

END OF QUESTION PAPER

11
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE

Copyright Acknowledgements:

Q.2 Experiment adapted from D.R.B. Barrett, *Osmosis and surface area to volume ratio*, Journal of Biological Education, 1984, vol. 18(4), pp. 273-4, by kind permission of D.R.B. Barrett.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (OCR) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

OCR is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.