

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced Subsidiary GCE

BIOLOGY

2803/1

Transport

Tuesday

5 JUNE 2001

Afternoon

1 hour

Candidates answer on the question paper.

Additional materials:

Electronic calculator

Candidate Name	Centre Number	Candidate Number												
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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	14	
2	14	
3	7	
4	15	
5	10	
TOTAL	60	

This question paper consists of 10 printed pages and 2 blank pages.

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Answer all questions.

1 Figs 1.1 and 1.2 show the external and internal features respectively of the mammalian heart.

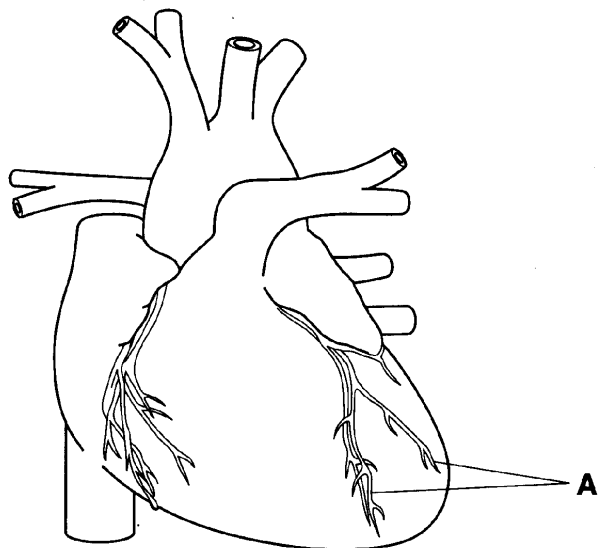


Fig. 1.1

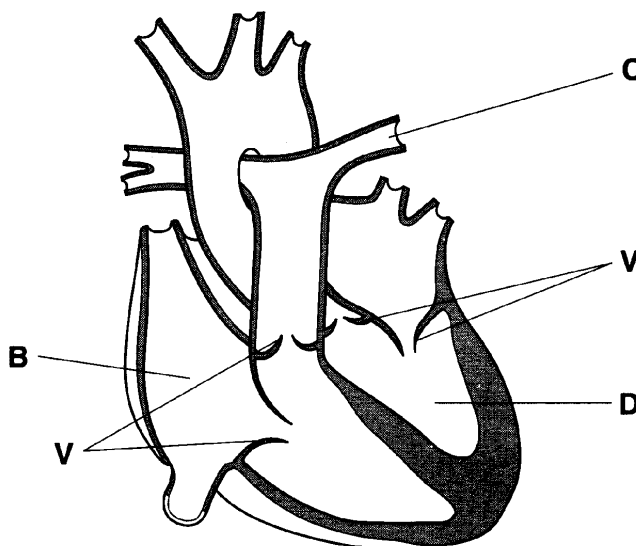


Fig. 1.2

(a) Name structures A to D.

- A
- B
- C
- D

[4]

Some people are born with heart defects, while others develop heart defects later.

(b) Suggest the likely effects on the circulatory system of the following heart defects:

(i) a baby born with a hole in the wall between the left and right chambers of the heart ('hole in the heart');

-
-
-
-

[2]

(ii) valves (V) not working properly.

-
-
-
-

[2]

Fig. 1.3 shows the pressure changes in various parts of the circulatory system during one cardiac cycle.

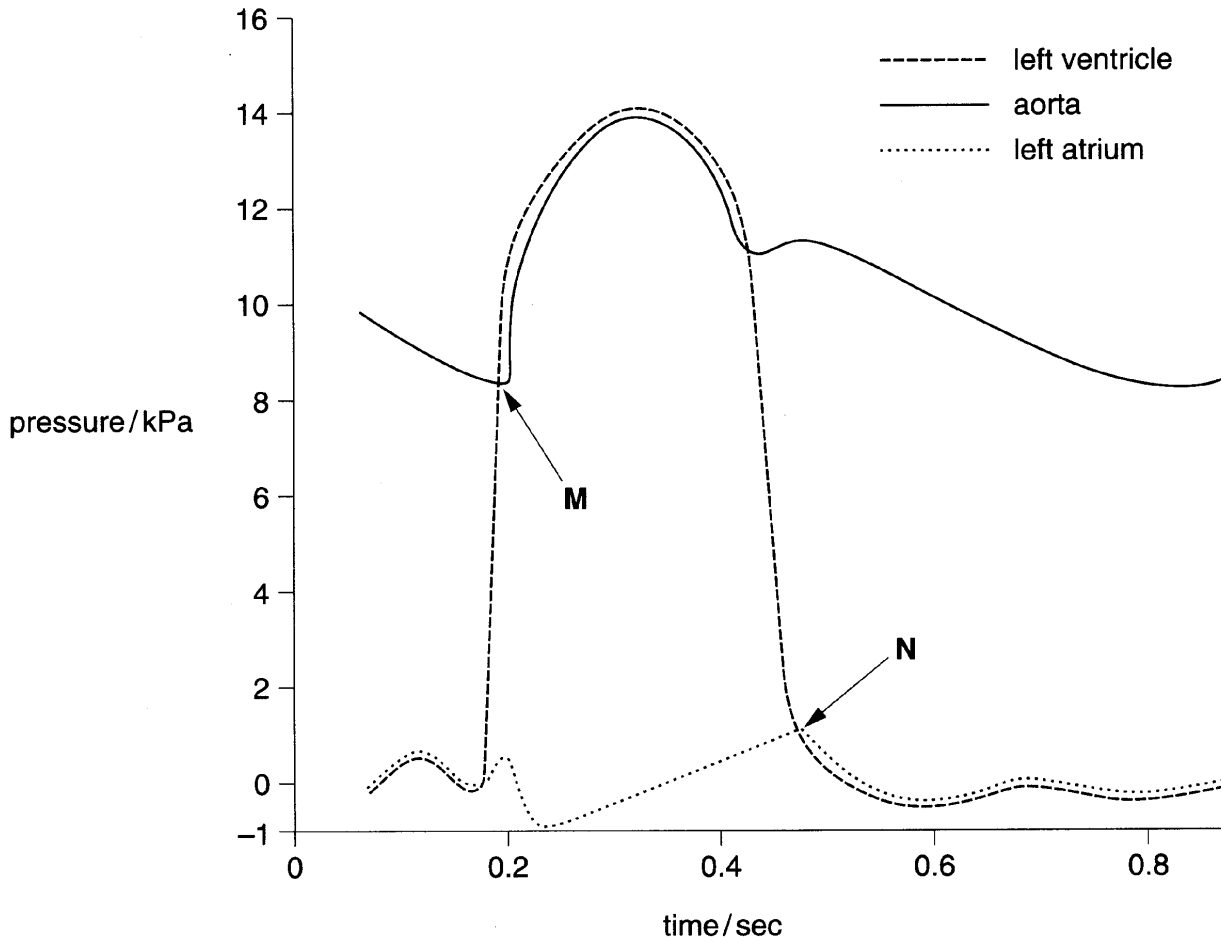


Fig. 1.3

At **M** and **N**, valves are either opening or closing.

(c) With reference to Fig. 1.3, explain what is happening at **M** and **N**.

M

.....

.....

N

.....

.....[4]

(d) Explain why the maximum pressure in the left atrium is lower than the maximum pressure in the left ventricle.

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

[Total : 14]

2 The cells shown in Fig. 2.1 are adapted for transport in flowering plants.

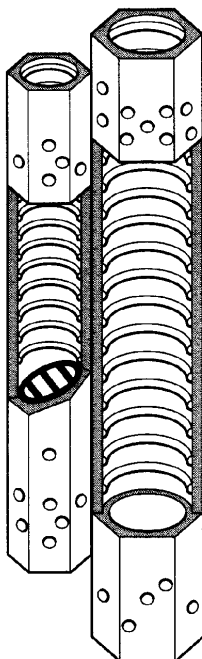


Fig. 2.1

(a) Name the tissue in which these cells are found.

.....[1]

(b) Identify and explain **two** features of these cells that adapt them to their role in transport.

feature 1

role in transport

.....

feature 2

role in transport

.....[4]

3 Multicellular animals have transport systems.

(a) Explain why multicellular animals need transport systems.

.....

.....

.....

.....[3]

(b) Complete the table below by placing a tick (✓) or a cross (✗) in the boxes.

feature	red blood cell	lymphocyte	phagocyte
possesses a nucleus			
produces antibodies			
possesses endoplasmic reticulum			
contains haemoglobin			

[4]

[Total : 7]

4 Up to 99% of the water that plants take up through their roots may be lost by transpiration.

(a) Define the term *transpiration*.

.....

 [2]

(b) Explain briefly why so much water is lost by transpiration.

.....

 [2]

The rates of transpiration for two different species of flowering plant, **A** and **B**, were measured over several hours. One of the plants, **B**, is adapted to survive in very dry conditions. Fig. 4.1 shows the transpiration rate measured in $\mu\text{g per cm}^2$ of leaf surface for the two different species.

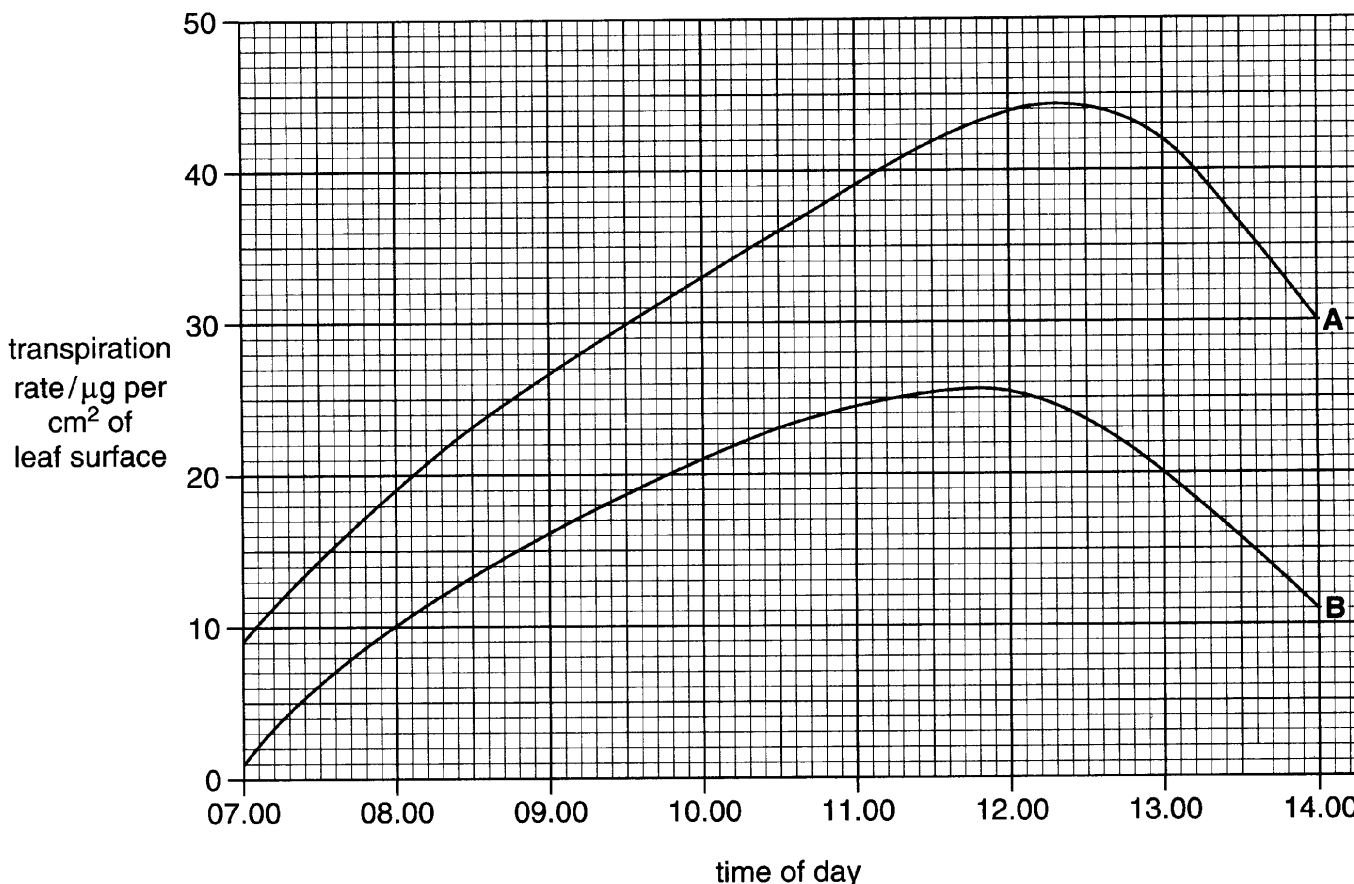


Fig. 4.1

(c) With reference to Fig. 4.1, calculate;

(i) the difference in rate between species **A** and **B** at 10.30;

.....

(ii) the increase in rate for species **A** between 8.00 and 11.00.

.....[2]

(d) State and explain **two** possible reasons for the change in the rate of transpiration seen in both species between 8.00 and 11.00.

1.

.....

.....

2.

.....

.....[4]

Species **B** is adapted to living in dry conditions.

(e) (i) state the general name given to plants which can live successfully in dry areas;

.....[1]

(ii) state **two** features that such a plant may possess and explain how each of these may contribute to its success in dry areas.

1st feature

explanation

.....

2nd feature

explanation

.....[4]

[Total : 15]

- 5 Table 5.1 compares the red blood cell count of a group of people when they were living at sea level and after they had spent several weeks at an altitude of 5 000 m.

Table 5.1

altitude/m	number of red blood cells / 10^{12} dm^{-3}
0	4.90
5 000	6.10

- (a) Calculate the % increase in red blood cells after spending several weeks at high altitude. Show your working.

Answer [2]

A company advertises a programme to athletes of living and training at altitude to improve their performance.

- (b) Explain why the performance of an athlete at altitude would be expected to improve as a result of such training.

.....

.....

.....

.....

.....[3]

Fig. 5.1 shows the effect of different partial pressures of carbon dioxide on the dissociation curve for haemoglobin.

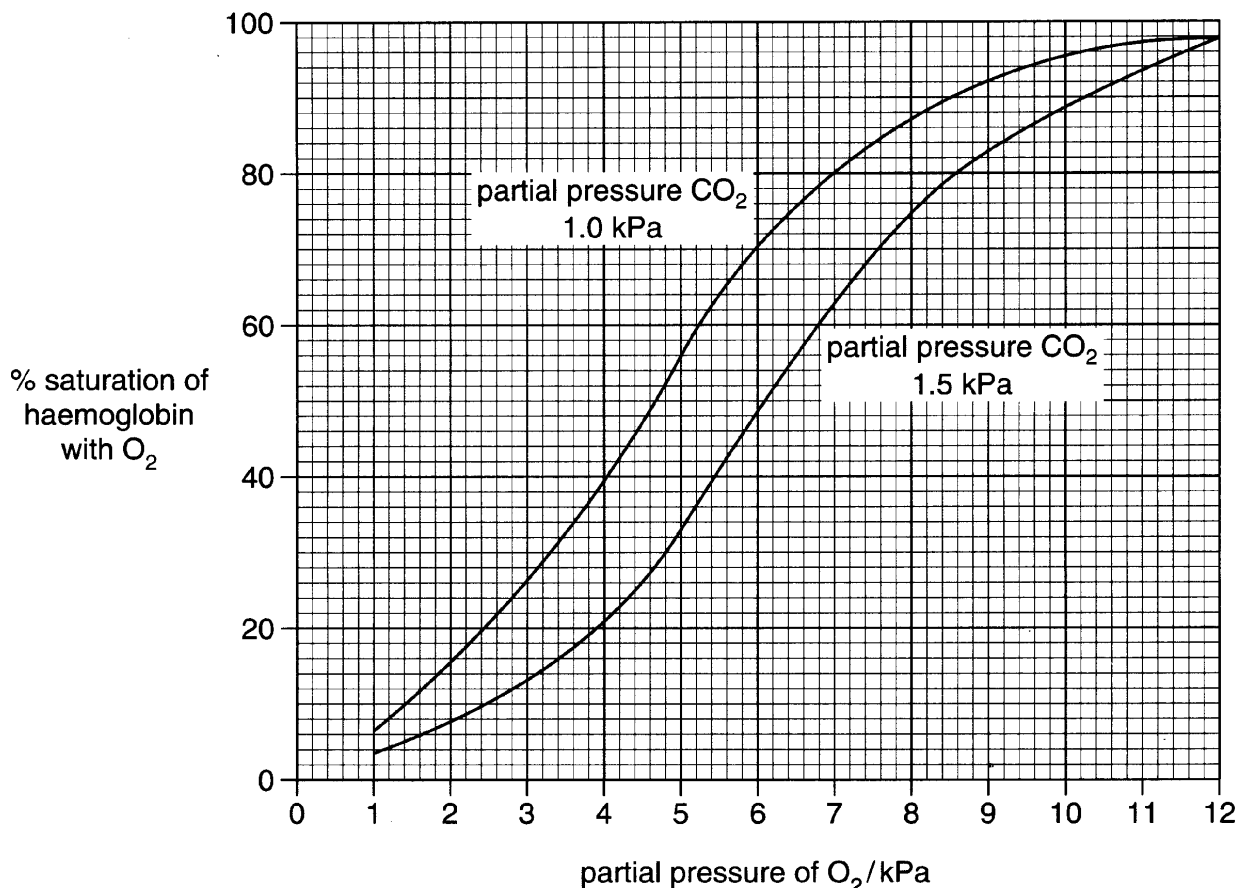


Fig. 5.1

(c) With reference to Fig. 5.1;

(i) name this effect;

.....[1]

(ii) calculate the difference in % oxygen saturation between the two partial pressures of carbon dioxide at a partial pressure of oxygen of 5 kPa;

.....[1]

(iii) outline how this effect ensures more efficient delivery of oxygen to the tissues when exercising.

.....

[3]

[Total : 10]

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