OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

BIOLOGY 2803/01

Transport

Thursday **8 JANUARY 2004** Morning 45 minutes

Candidates answer on the question paper.
Additional materials:
Electronic calculator
Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number

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 each question 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	6	
2	13	
3	9	
4	6	
5	11	
TOTAL	45	

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

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For Examiner's Use

Answer **all** the questions.

1 Many small animals rely on diffusion across outer surfaces of their bodies for gas exchange. Mammals have lungs for gas exchange. Fig. 1.1 shows the structure of part of a mammalian lung and associated airways.

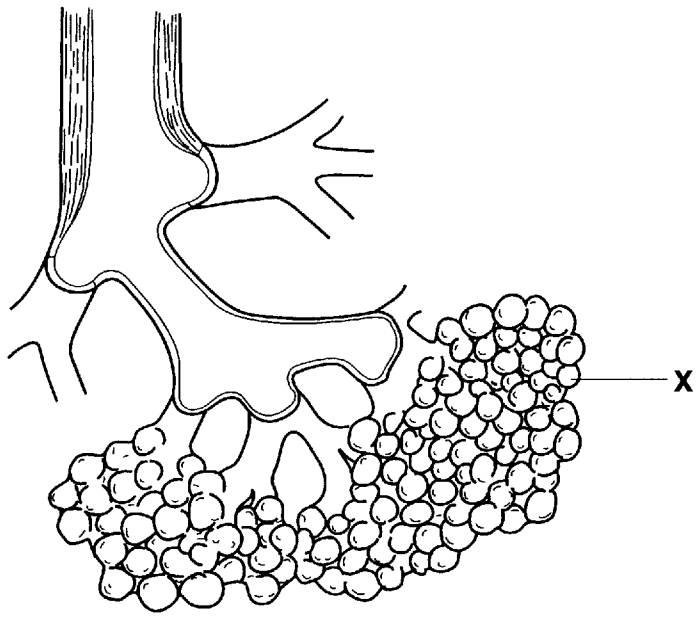

Fig. 1.1

(a) (i) Name structure **X**.

.....[1]

(ii) Describe the process by which gases are exchanged at **X**.

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.....[3]

(b) Explain why mammals have large numbers of structure **X** in their lungs.

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.....[2]

[Total: 6]

[Turn over

For Examiner's Use

2 Fig. 2.1 shows the formation and drainage of tissue fluid in a mammal.

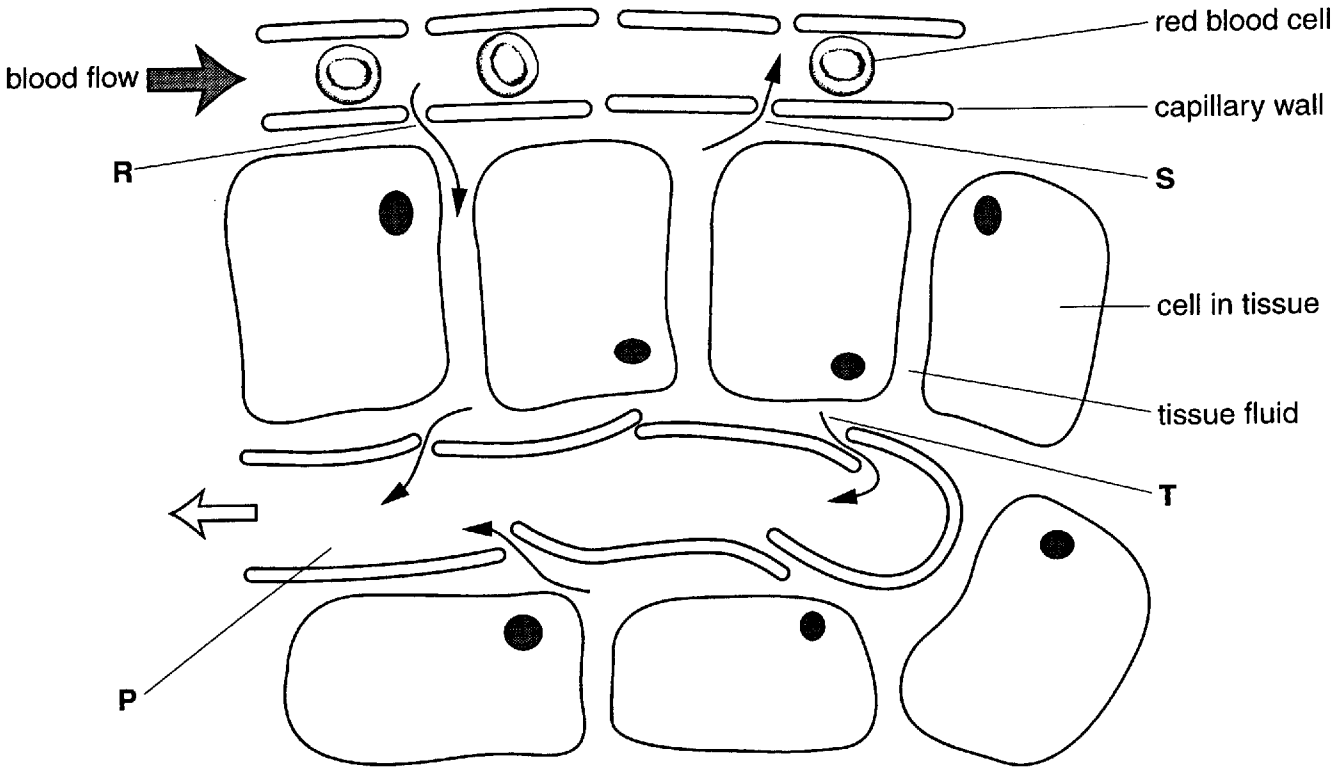

Fig. 2.1

(a) (i) Complete the table to give **three** differences between tissue fluid and blood.

tissue fluid	blood

[3]

(ii) Name the type of vessel labelled **P** in Fig. 2.1.

.....[1]

For Examiner's Use

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

Describe how tissue fluid is **formed** at **R** and **drained** at **S** and **T**.

Credit will be given if you use information from Fig. 2.1.

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.....[6]

Quality of Written Communication [1]

For Examiner's Use

(c) Suggest what could happen in the tissues of a person if the drainage at **S** and **T** was inefficient.

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.....[2]

[Total: 13]

3 Fig. 3.1 shows the distribution of some of the tissues in a transverse section of a plant organ. Fig. 3.2 is a photograph showing details of two cells, **D** and **E**, from one of the tissues.

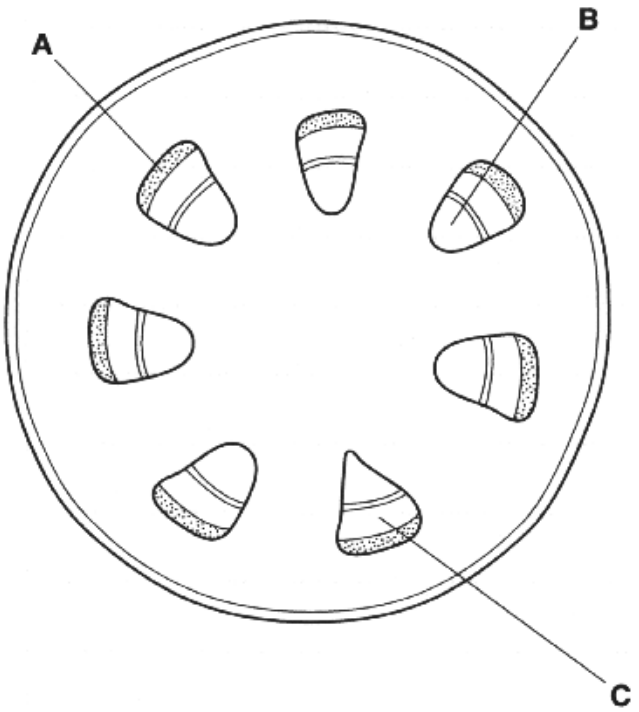

Fig. 3.1

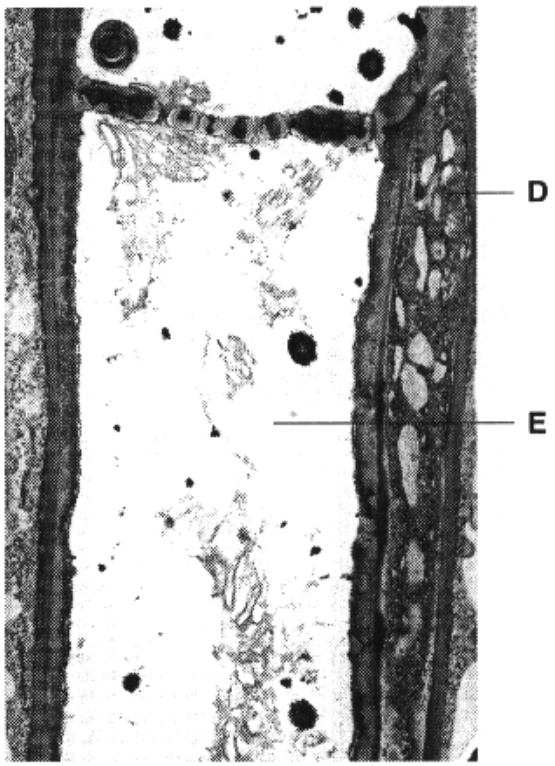

Fig. 3.2

(a) Name the plant organ shown in Fig. 3.1.

.....[1]

(b) Name the tissue shown in Fig. 3.2.

.....[1]

(c) State in which region, **A** to **C** of Fig. 3.1, you would expect to find the tissue shown in Fig. 3.2.

.....[1]

(d) Complete the table below by:

- **stating three** features or properties of cells **D** or **E** in Fig. 3.2 which adapt them to their function;
- **explaining** how the features or properties you have given help the tissue to carry out its function.

Make it clear in your answer which cell, **D** or **E**, you are describing for each feature you give.

feature or property	how the feature or property helps the tissue to carry out its function

[6]

[Total: 9]

For Examiner's Use

4 Fig. 4.1 shows some plants growing in desert conditions. Such plants are known as xerophytes.

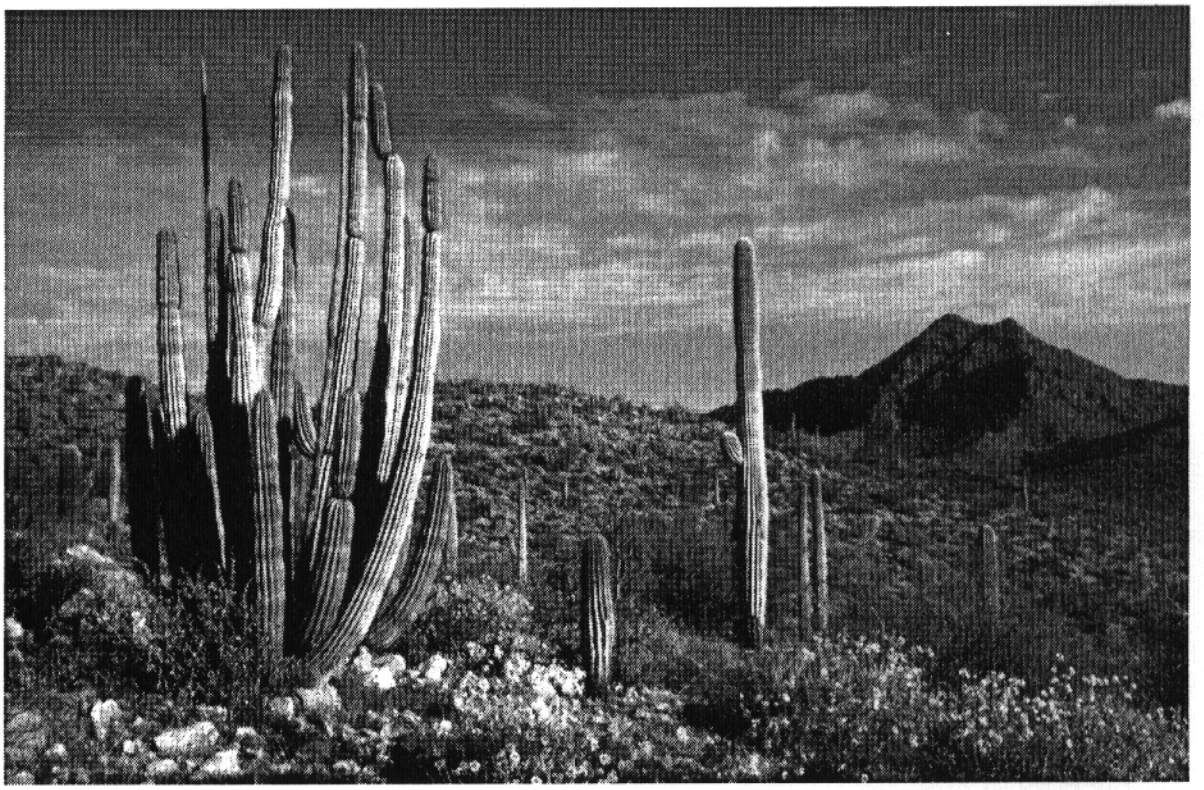

Fig. 4.1

Suggest how each of the following features of xerophytic plants helps them to survive in their habitat.

(a) The stomata are shut during the day and open at night.

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(b) The leaves of some plants are reduced to spines or needles.

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For Examiner's Use

(c) The epidermis may be covered by hairs.

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.....[6]

[Total: 6]

Turn over for Question 5

For Examiner's Use

5 Haemoglobin is a pigment which can combine with oxygen and is found in red blood cells.

Fig. 5.1 shows the sigmoid (S-shaped) dissociation curve for maternal haemoglobin.

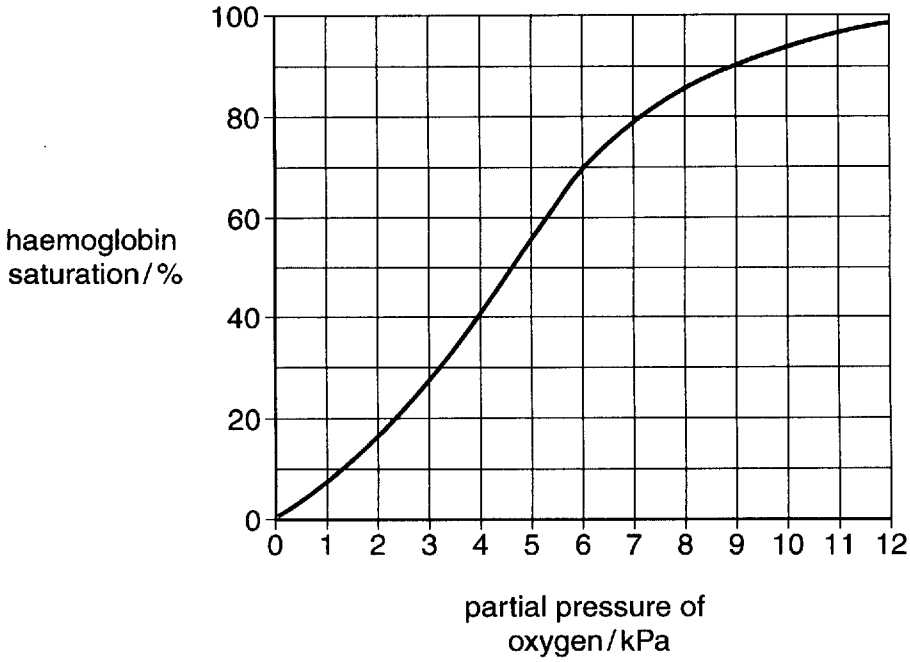

Fig. 5.1

(a) (i) Using Fig. 5.1, state the likely partial pressure of oxygen in the pulmonary vein leaving the lungs and in a vein leaving a muscle during strenuous exercise.

pulmonary vein ..... kPa

vein leaving a muscle during strenuous exercise ..... kPa [2]

(ii) On Fig. 5.1, sketch the curve for fetal haemoglobin. [2]

(iii) Using Fig. 5.1, explain why it is important that fetal haemoglobin and maternal haemoglobin are different.

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.....[3]

(b) Buffers are substances that regulate pH by releasing or accepting hydrogen ions (H^+). Haemoglobin acts as a buffer in the blood.

(i) Describe how the production of carbon dioxide during respiration leads to a higher concentration of hydrogen ions in the blood.

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(ii) Describe how haemoglobin acts to reduce the concentration of hydrogen ions in the blood.

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.....[4]

[Total: 11]

END OF QUESTION PAPER