



**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Advanced Subsidiary GCE**

**BIOLOGY**

**2803/01**

Transport

Monday

**27 MAY 2002**

Morning

45 minutes

Candidates answer on the question paper.

Additional materials:

Electronic calculator

Candidate Name	Centre Number	Candidate Number												
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**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 the spaces 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.
- 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 stages in any calculations.

<b>FOR EXAMINER'S USE</b>		
Qu.	Max.	Mark
1	13	
2	17	
3	4	
4	11	
<b>TOTAL</b>	<b>45</b>	

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

Answer **all** questions.

- 1 Fig. 1.1 shows the outline structure of some cells from the phloem of a dicotyledonous plant.

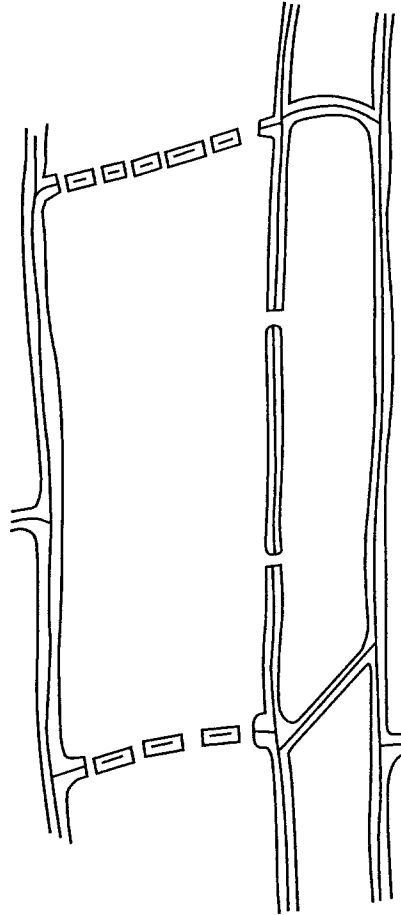


Fig. 1.1

- (a) (i) Label the following structures on the diagram using label lines:

**sieve tube, sieve plate, sieve pore, companion cell, plasmodesma.** [5]

- (ii) Complete the drawing by adding **cytoplasm** and a **nucleus** or **nuclei** where appropriate. Label these components. [2]

Movement in phloem occurs between **sources** and **sinks**.

- (b) Use examples of regions in a plant to explain the meaning of these terms.

.....

.....

.....

.....

.....

.....[2]

Table 1.1 shows some of the typical components of phloem sap.

**Table 1.1**

component	concentration/mg cm <sup>-3</sup>
sucrose	80 - 160
protein	1.45 - 2.20
amino acids	5.20
phosphate ions	0.35 - 0.55
potassium ions	2.30 - 4.40
ammonia	0.03
ATP	0.24 - 0.36
auxin	$10.5 \times 10^{-6}$

(c) State the form in which carbohydrate is translocated in the phloem.

.....[1]

Translocation is considered to be an active process.

(d) State,

(i) what is meant by an *active process*;

.....[1]

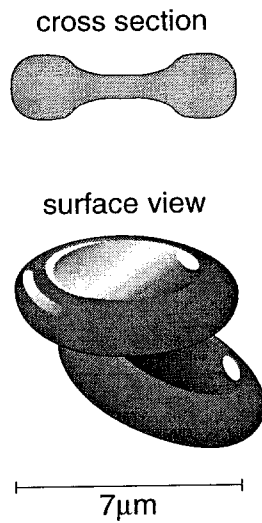
(ii) two pieces of evidence supporting the idea that translocation in the phloem is active.

1 .....

2 .....[2]

[Total : 13]

2 Fig. 2.1 shows red blood cells (erythrocytes) in cross section and surface view.



**Fig. 2.1**

(a) Explain **three** ways in which the structure of a red blood cell is adapted to its function.

- 1 .....
- .....
- 2 .....
- .....
- 3 .....
- .....[3]

Fig. 2.2 shows the dissociation curves for fetal and maternal haemoglobin in humans. The shape of the curves is described as sigmoid (S-shaped).

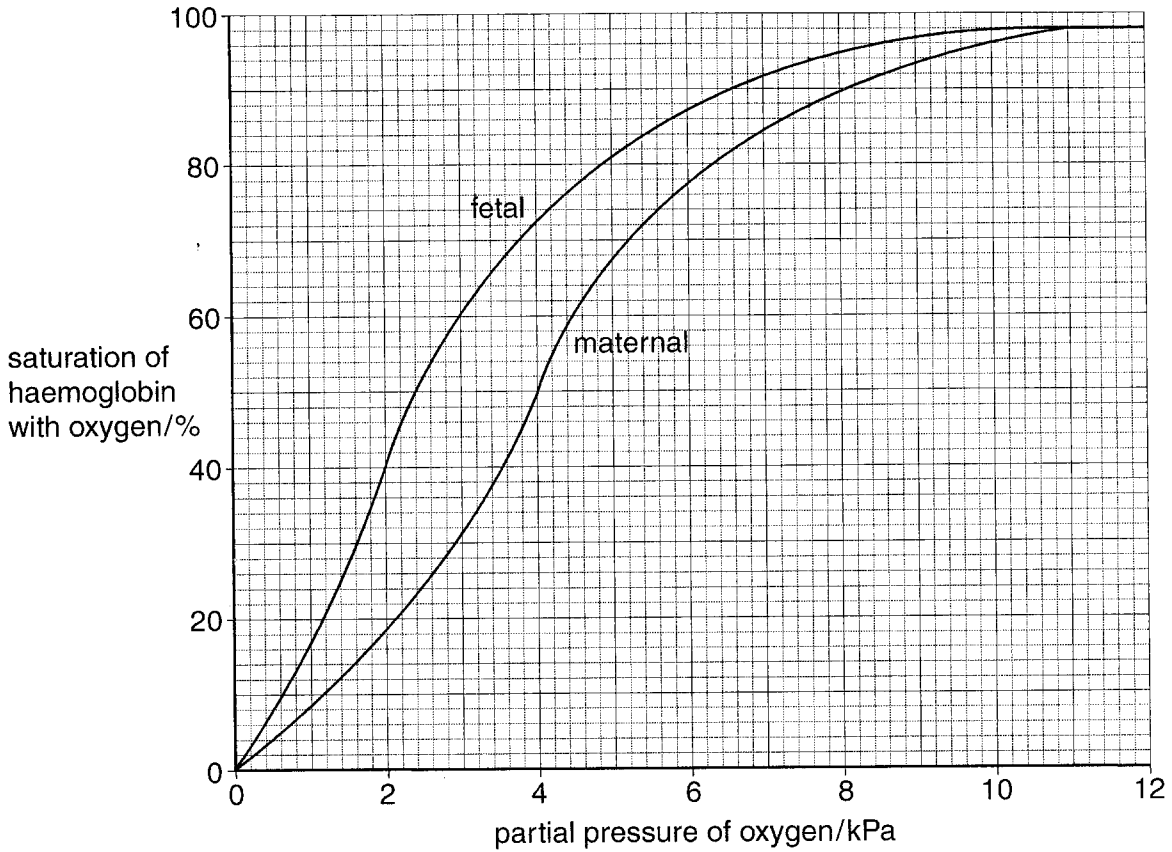


Fig. 2.2

(b) Explain the advantage, in terms of oxygen supply to the tissues, of the fact that the **maternal curve** is sigmoid.

.....

.....

.....

.....[3]

(c) State the difference in percentage saturation of haemoglobin with oxygen between maternal and fetal blood at an oxygen partial pressure of 4 kPa.

.....[1]

- (d) Explain why it is essential for the survival of the fetus that the fetal curve is to the left of the maternal curve.

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.....[3]



- 3 Fig. 3.1 shows the pathways taken by water across the cells in the root of a dicotyledonous plant.

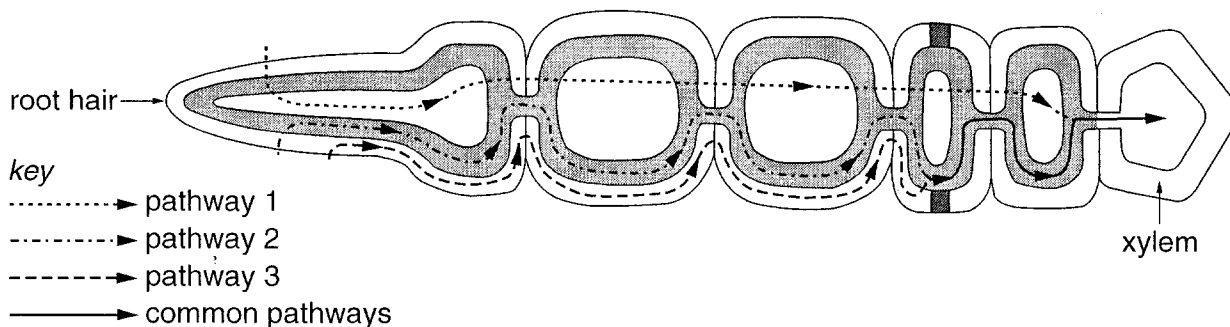


Fig. 3.1

- (a) (i) Label the endodermis on the diagram. [1]

- (ii) Using the information in Fig. 3.1, describe the pathways taken by water across the root.

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.....

.....

[3]

[Total : 4]





- 4 (a) Complete the following paragraph on the cardiac cycle using the most appropriate word or words.

The sequence of events during the beating of the mammalian heart is called the cardiac cycle. On average there are about ..... such cycles per minute in resting humans. The cardiac muscle is ..... i.e. it can contract and relax without nervous stimulation, but to ensure that the cycle stays in sequence there is an in-built control system. The cycle is initiated in a special part of the muscle in the wall of the ..... atrium called the ..... This sets up a wave of excitation causing the atria to contract. After a delay of about 0.6 sec. the wave of excitation passes to the ventricles via the ..... situated in the septum at the junction of the atria and ventricles. The excitation wave then passes to the base of the ventricles via the ..... causing the ventricles to ..... from the base upwards. [7]

The mammalian circulatory system is described as 'closed' and 'double'.

- (b) State the meaning of the terms

(i) *closed*; .....

(ii) *double*. .....

[Total : 11]