OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE **2803/01**

BIOLOGY

Transport

MONDAY 4 JUNE 2007 Morning

Time: 45 minutes

Additional materials: Electronic calculator
Ruler (cm/mm)

Candidate Name

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks for each question 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 calculation.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	9	
2	15	
3	10	
4	6	
5	5	
TOTAL	45	

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

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Answer **all** the questions.

1 Fig. 1.1 shows the changes in the pressure of blood as it flows through various parts of the mammalian blood system.

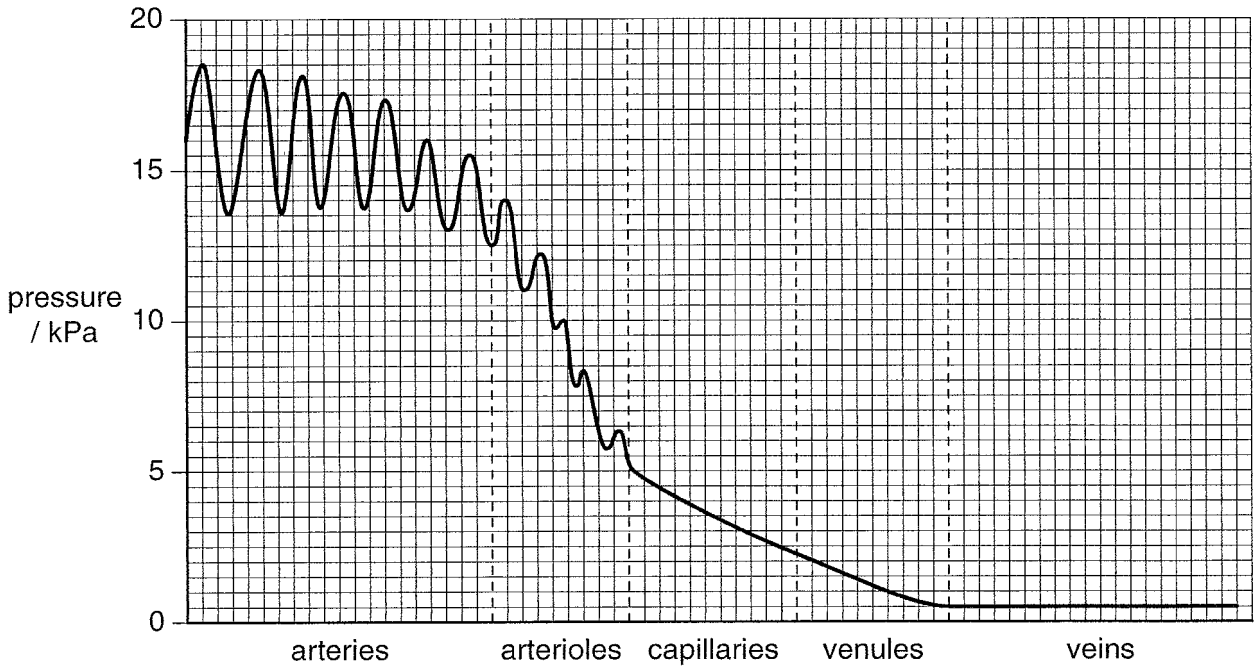

Fig. 1.1

(a) Fig. 1.1 shows that the pressure rises and falls in the arteries.

Explain what causes this rise and fall in pressure.

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.....[2]

(b) Fig. 1.1 shows that:

- the rise and fall in pressure seen in the arteries is not evident by the time the blood enters the capillaries
- the pressure is much lower by the time the blood enters the capillaries.

Explain what causes the changes described above.

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.....[3]

(c) Explain why it is important that the pressure is lower by the time blood reaches the capillaries.

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.....[2]

(d) The pressure in veins is very low. Explain how the blood in veins is returned to the heart.

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.....[2]

[Total: 9]

2 Fig. 2.1 is a diagram showing some of the cells in the root of a dicotyledonous plant.

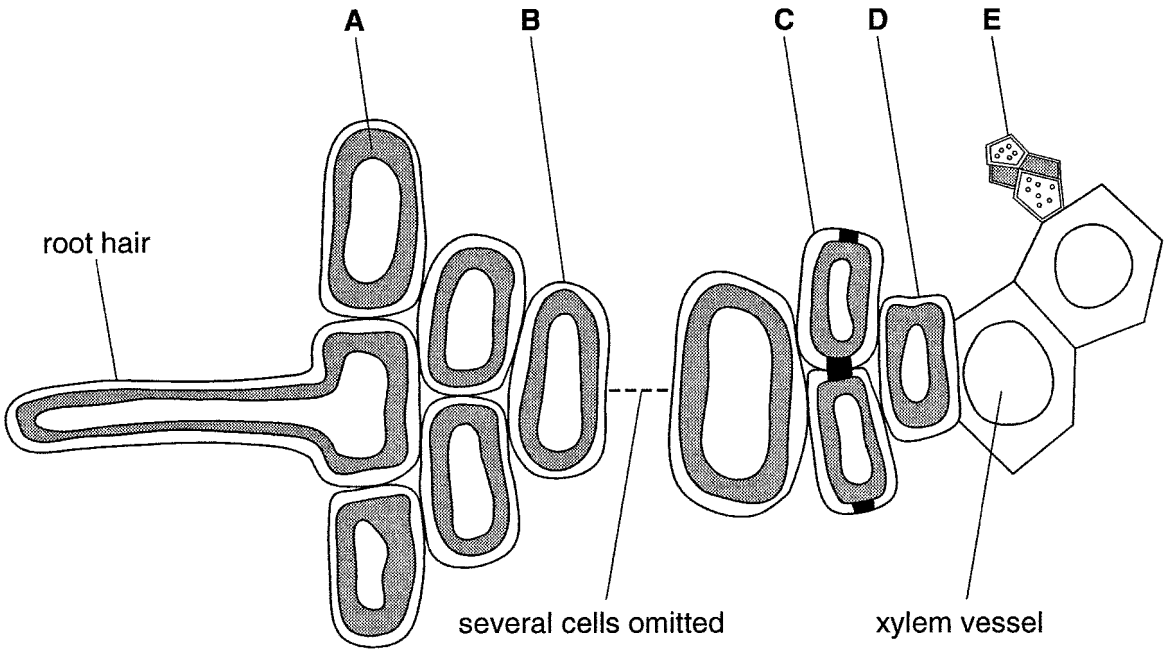

Fig. 2.1

(a) Complete the table below by indicating which of the letters **A** to **E** indicates:

- a cell from the endodermis
- a cell from the phloem.

	letter
endodermis	
phloem	

[2]

(b) State **two** features of root hair cells which adapt them for water uptake.

1 .....

2 .....[2]

(c) In this question, one mark is available for the quality of spelling, punctuation and grammar.

Plants absorb water from the soil via their roots.

Describe the pathways **and** mechanisms by which water passes from the soil to the xylem vessels in the root.

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....[6]

Quality of Written Communication [1]

(d) After water has entered the xylem vessels in the root, it passes through them to the rest of the plant.

Describe how **two** features of xylem vessels adapt them for water transport.

1 .....

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2 .....

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.....[4]

[Total: 15]

3 Fig. 3.1 is a vertical section of the heart to show the position of certain structures. The diagram also shows a minor heart defect called patent foramen ovale (PFO).

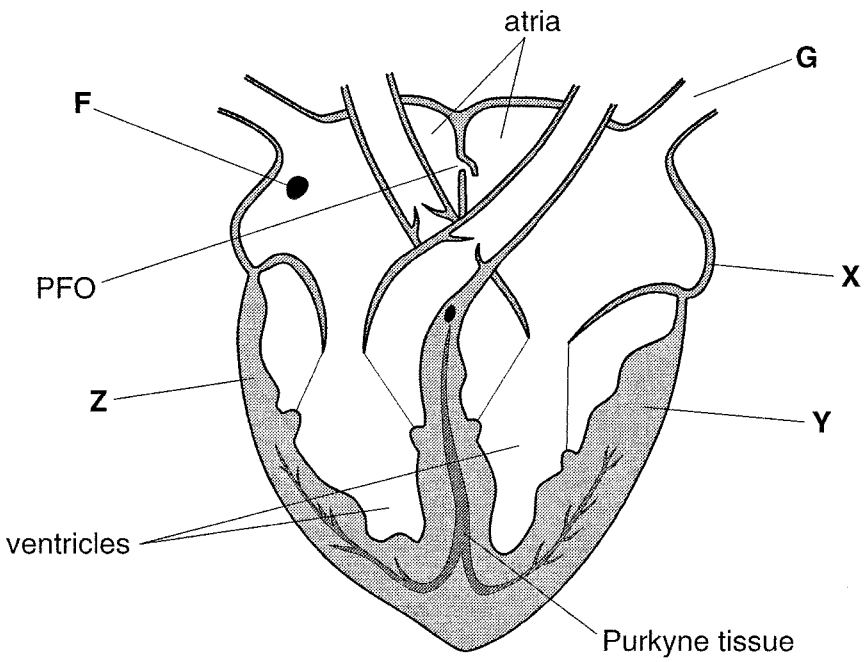

Fig. 3.1

(a) State the names of structures **F** and **G**.

F .....

G .....[2]

(b) The statements below were made to a group of students.

Explain why each statement is true.

(i) The difference in thickness of the walls of the chambers, as shown by the letters **X**, **Y** and **Z**, is related to the functions of the different chambers.

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.....[3]

(ii) Without the Purkyne tissue, blood would not be pumped out of the heart efficiently.

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.....[2]

(c) Recent research has shown that there may be a link between migraines (severe headaches) and the minor heart defect PFO. In PFO the small flap shown in Fig. 3.1 fails to close completely at birth.

Suggest how PFO might lead to a migraine.

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.....[3]

[Total: 10]

4 **(a)** Two slightly different types of haemoglobin are found in mammals. Fetal haemoglobin is found in the developing fetus, but is replaced by adult haemoglobin. In humans, this replacement is completed by the time a baby is six months old.

Fig. 4.1 shows the change in the percentage of each type of haemoglobin for six months before birth and for eight months after birth.

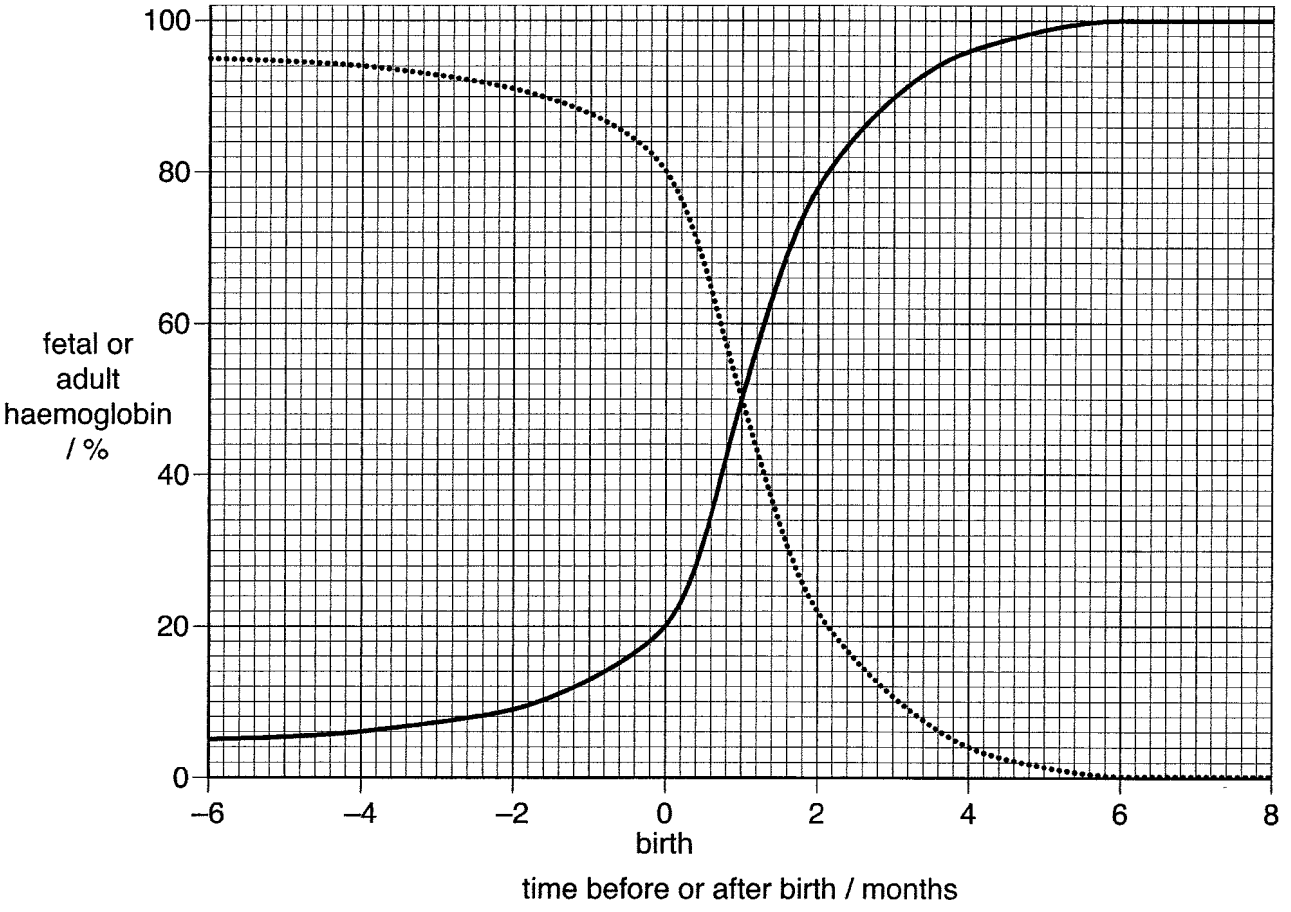

Fig. 4.1

State the percentage of adult haemoglobin present when the baby is two months old.

Answer = ...% [1]

(b) (i) Explain why it is essential that the fetus has a different type of haemoglobin from the adult.

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(ii) Explain why the change from fetal to adult haemoglobin seen in Fig. 4.1 is essential after birth.

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[5]

[Total: 6]

5 Use the most appropriate terms to complete the paragraph below about the transport of gases in the blood.

Respiring tissues in the body produce carbon dioxide which diffuses into the blood.

Most of it then enters red blood cells where an enzyme named .....

..... catalyses a reaction to produce ..... .

This dissociates rapidly into hydrogen ions and ..... ions.

The hydrogen ions combine very readily with haemoglobin to form a compound known as

..... . There are two effects of this reaction.

1 Hydrogen ions are removed from the blood making it less acidic.

2 As haemoglobin picks up the hydrogen ions it releases ..... . [5]

[Total: 5]

END OF QUESTION PAPER