Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

HUMAN AND SOCIAL BIOLOGY **5096/02**

Paper 2

May/June 2006

2 hours

Additional Materials: Answer Booklet/Paper.

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.
Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A
Answer **all** questions.
Write your answers in the spaces provided on the question paper.
You are advised to spend no longer than 1 hour on Section **A**.

Section B
Answer **all** the questions, including questions 8, 9 and 10 **Either** or 10 **Or**.
Write your answers to questions 8, 9 and 10 on the separate answer paper provided.
At the end of the examination,
1. fasten all your work securely together;
2. write an E (for Either) or an O (for Or) next to the number 10 in the grid below to indicate which question you have answered.

The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
Section A sub-total	
8	
9	
10	
Total	

This document consists of **14** printed pages and **2** blank pages.

For Examiner's Use

Section A

Answer **all** the questions.

Write your answers in the spaces provided.

1 Fig. 1.1 shows a section through the heart from the front.

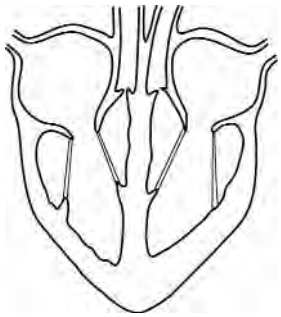


Fig. 1.1

(a) Using label lines and the labels **A** to **E**, show the position of the following structures on Fig. 1.1.

A aorta
B aortic valve
C bicuspid valve
D right atrium
E pulmonary vein. [5]

(b) Fig. 1.2 shows changes in blood pressure in the left atrium, left ventricle and aorta during one heartbeat.

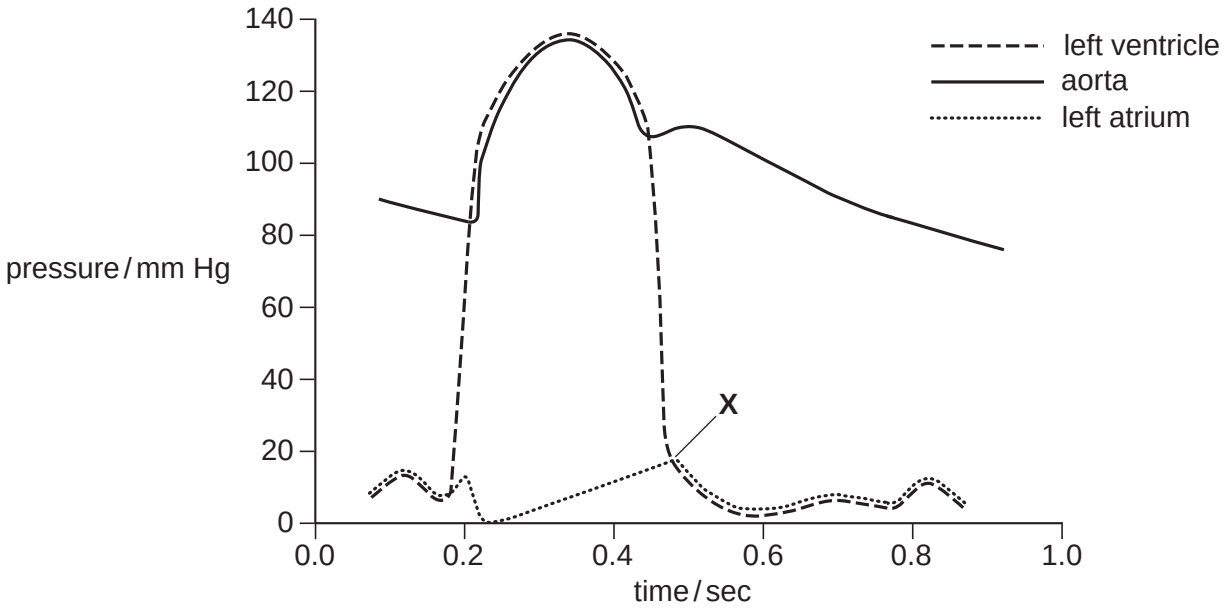


Fig. 1.2

Use the information in Fig. 1.2 to answer the following questions.

(i) State the highest pressure reached in

1. the left atrium, ...mmHg

2. the left ventricle. .....mmHg [2]

(ii) The aortic valve opens when the pressure in the ventricle becomes greater than the pressure in the aorta. State the time when this occurs during the heartbeat.

..... seconds. [1]

(iii) Describe what happens in the heart at the point marked **X**.

.....

.....[2]

(c) Red blood cells are biconcave discs with a flexible cell surface membrane. They do not have nuclei or mitochondria but contain much haemoglobin.

Complete the table to show how these features assist red blood cells in collecting, carrying and delivering oxygen.

feature	explanation
biconcave shape	....
flexible cell surface membrane	....
no mitochondria	....
contains much haemoglobin	....

[4]

(d) Fig. 1.3 shows two types of white blood cell labelled **F** and **G**.

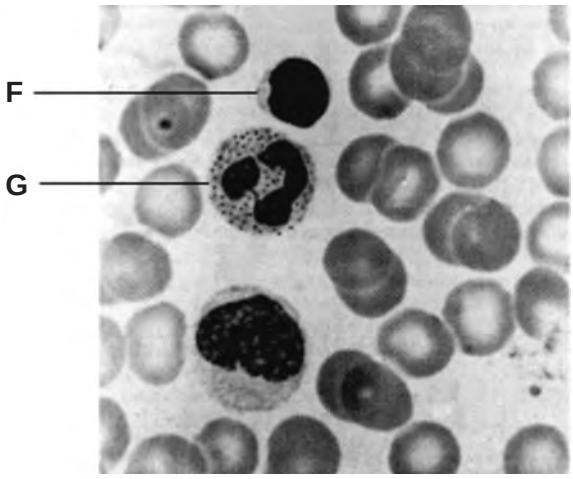


Fig. 1.3

(i) State two ways in which the structure of cell **F** differs from the structure of cell **G**.

1. .....

2. .....[2]

(ii) Name the cells.

F = ...

G = ...[2]

(iii) State the functions of these cells.

cell **F** .....

cell **G** .....[2]

[Total : 20]

2 Fig. 2.1 shows a graph comparing the amount of tooth decay in two groups of children, group **H** having fluoride in their drinking water and group **J** without added fluoride.

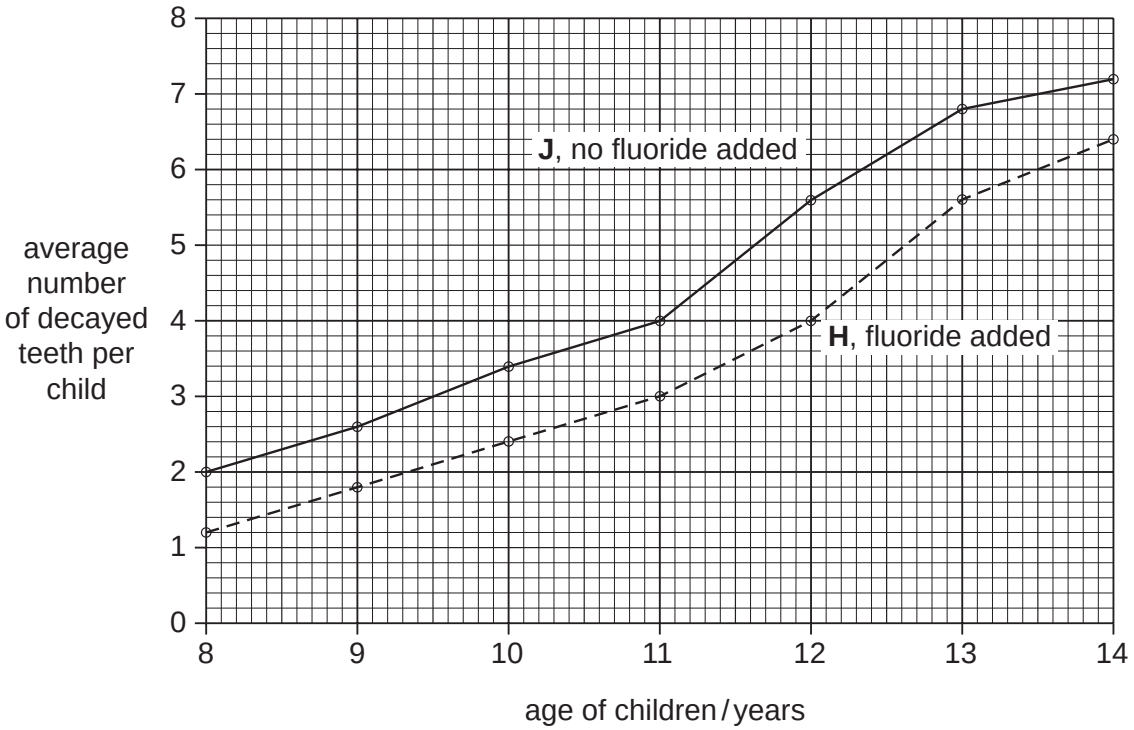


Fig. 2.1

(a) What do you conclude from Fig. 2.1 about adding fluoride to the drinking water?

.....

.....[2]

(b) State two ways in which the results shown for group **H** are similar to those shown for group **J**.

1. .....

.....

2. .....

.....[2]

(c) Name the part of the tooth which is affected by fluoride.

.....[1]

[Total : 5]

3 Table 3.1 compares the composition of cow's milk and breast milk.

Table 3.1

substance	quantity per 100 grams of milk	
	cow's milk	breast milk
water / g	88	88
proteins / g	3.3	1.2
lactose (sugar) / g	4.8	6.4
fats / g	3.5	4.0
vit A / μg	40	60
vit D / μg	20	200
vit C / mg	1	2
iron / mg	0.1	0.1
calcium / mg	120	120

Use only information in Table 3.1 to answer the following questions.

(a) Name three substances present in the same quantity in the two milks.

1. .....

2. .....

3. ..... [1]

(b) Name three substances present in greater quantities in breast milk.

1. .....

2. .....

3. ..... [1]

(c) Cow's milk is likely to lead to greater amounts of urea in the baby's blood. Why is this?

.....

.....[1]

(d) Suggest why babies are more likely to absorb the calcium from breast milk rather than from cow's milk.

.....

.....[1]

(e) Breast milk has a higher energy value than cow's milk. What causes this?

.....

.....

.....[1]

[Total : 5]

[Turn over

4 Fig. 4.1 shows a diagram of a kidney machine which can be used to remove waste substances from a patient's blood when the kidneys have failed. Small molecules such as urea diffuse from the blood through special membranes into the surrounding dialysis fluid which is then removed.

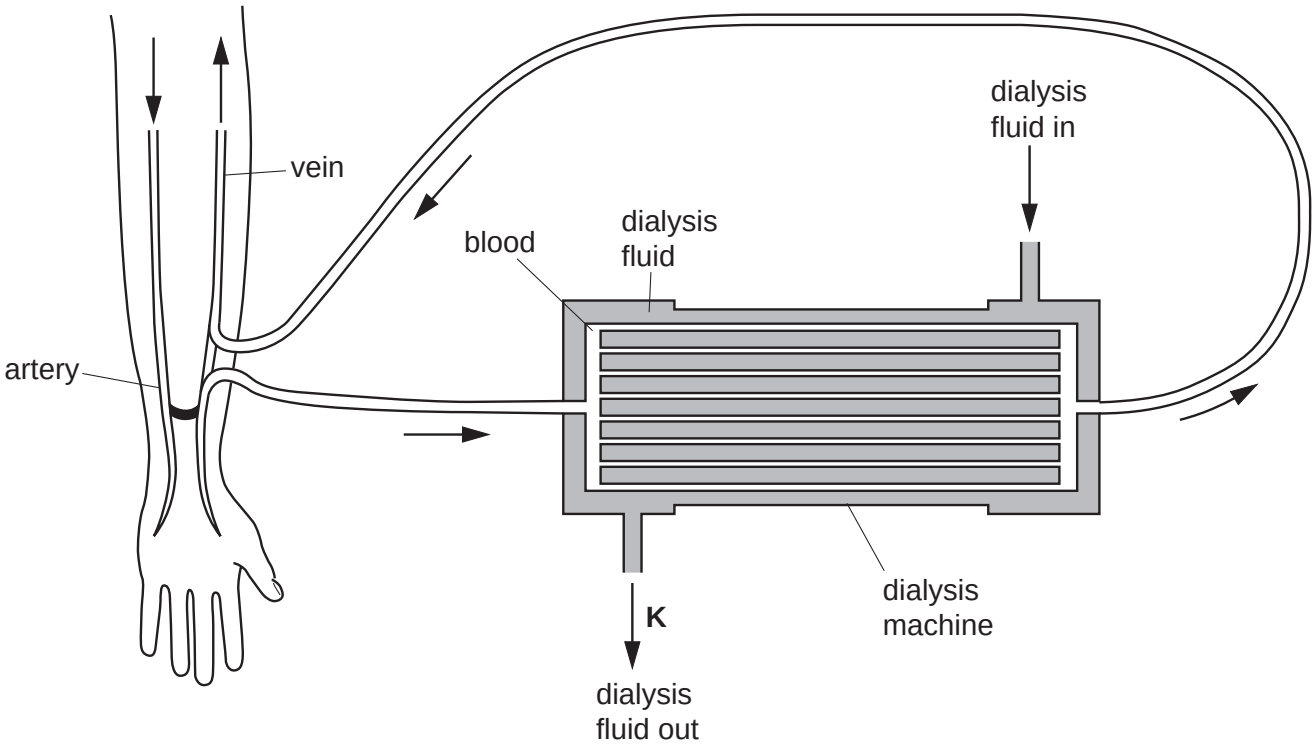


Fig. 4.1

(a) Dialysis membranes carry out one of the functions of the kidney nephron.

State the name of the part of the nephron that carries out this function.

.....[1]

(b) Explain why the dialysis fluid is

(i) changed continuously,

.....

.....

.....[2]

(ii) kept at 40 °C.

.....[1]

(c) Explain why glucose is added to the dialysis fluid before it enters the machine.

.....

.....[1]

(d) A haemoglobin sensor is attached to the machine at **K**. Explain the purpose of this sensor.

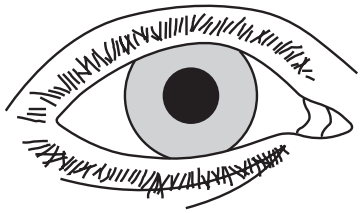
.....

.....

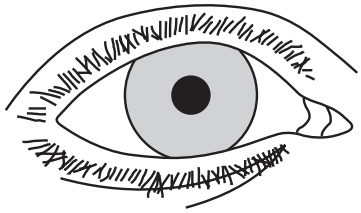
.....[2]

[Total : 7]

5 Fig. 5.1 shows two frontal views of an eye under different conditions.



view **L**



view **M**

Fig. 5.1

(a) Use label lines to indicate the position of the following structures on view **L** of Fig. 5.1.

1. iris
2. pupil [2]

(b) Describe how the change from view **L** to view **M** is brought about.

.....

.....

.....

.....

.....

.....[4]

[Total : 6]

6 Fig. 6.1 shows a vertical section through an incomplete pit latrine.

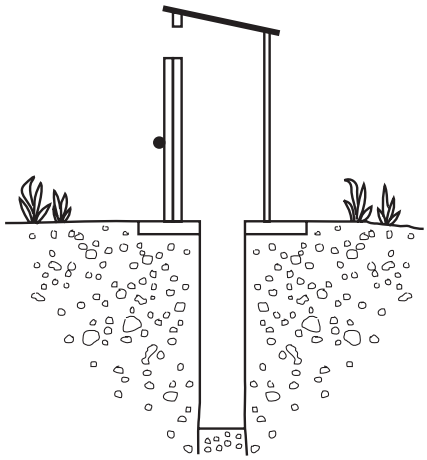


Fig. 6.1

State **three** improvements you would make to this latrine and for each improvement give your reason.

improvement 1. .....

reason.....

.....[2]

improvement 2. .....

reason.....

.....[2]

improvement 3. .....

reason.....

.....[2]

[Total : 6]

7 Fig. 7.1 is a diagram of a placenta.

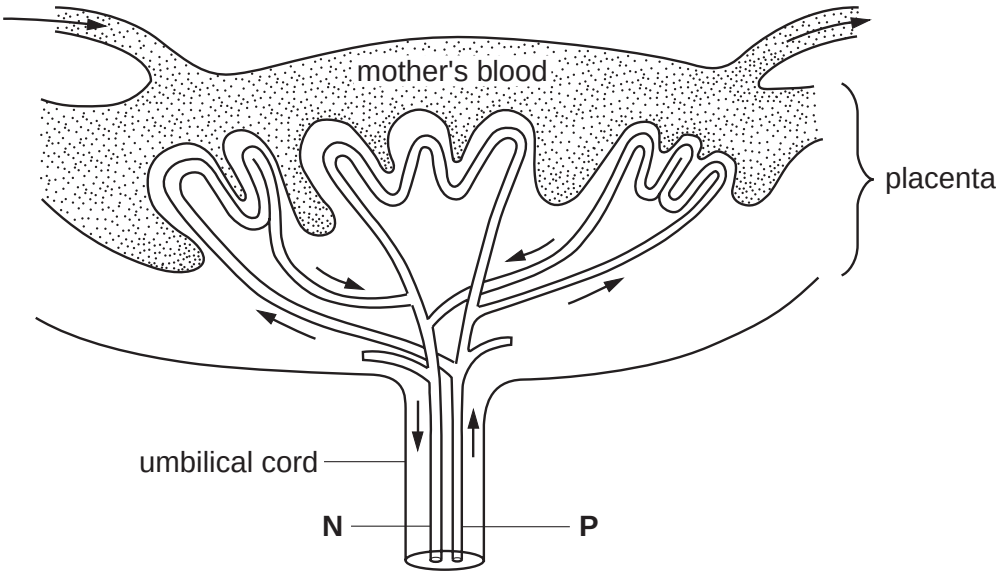


Fig. 7.1

(a) State two ways in which the blood composition at **N** differs from that at **P**.

1. .....

2. .....[2]

Fig. 7.1 shows that the maternal blood and fetal blood remain separate.

(b) State three reasons why the fetal blood must not mix with the maternal blood.

1. .....

2. .....

3. .....[3]

(c) Name **one** hormone secreted by the placenta.

.....[1]

[Total : 6]

Section B

Answer **all** the questions, including questions 8, 9 and 10 **Either** or 10 **Or**.

Write your answers on the separate answer paper provided.

8 Fig. 8.1 shows a small town with three blocks of houses, **R**, **S** and **T**.

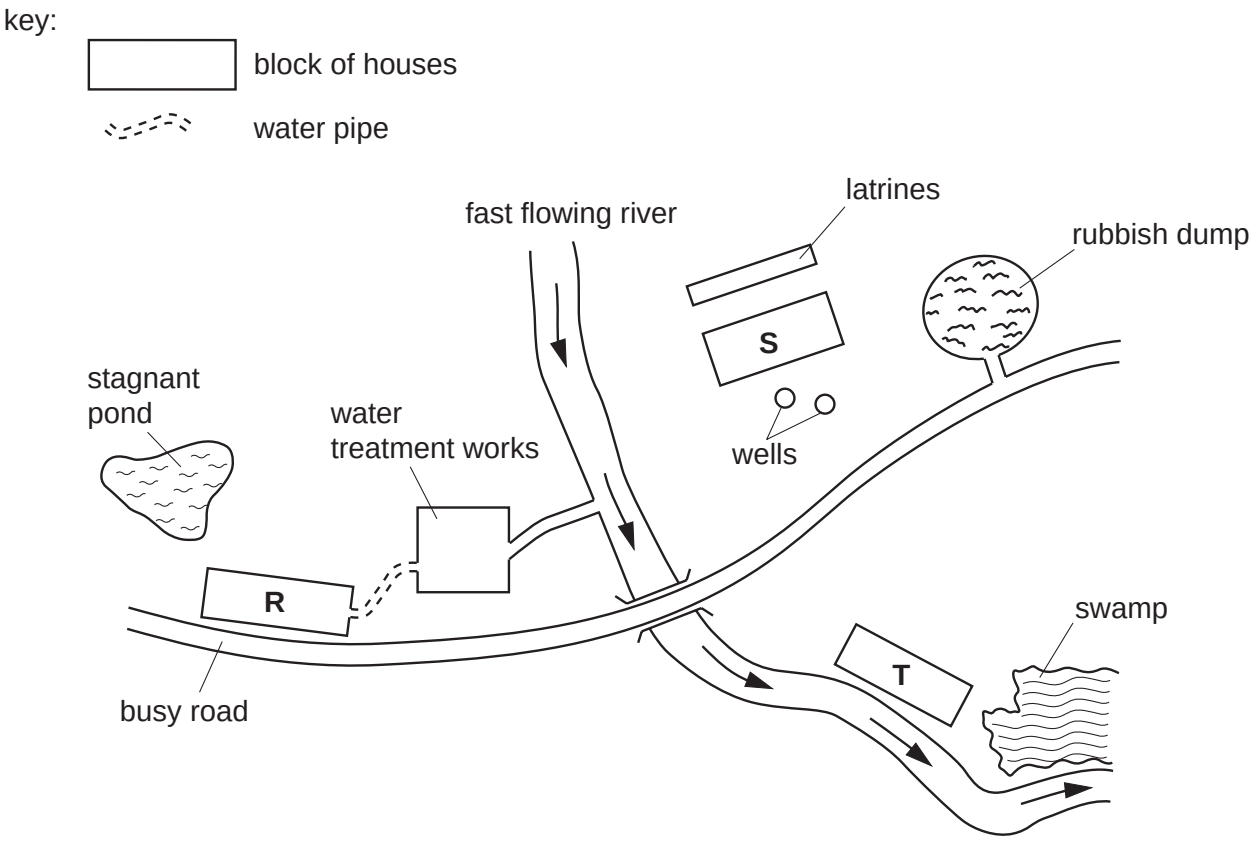


Fig. 8.1

Explain the possible hazards to health of living in each of the three blocks **R**, **S** and **T**. [15]

9 **(a)** Explain what is meant by the terms **nerve** and **neurone**. [2]

(b) If you pick up a hot pan you may burn yourself. Describe the reflex action that protects your hand from being burned on touching the hot pan. You may include a diagram. [12]

(c) Why is the circuit you describe called a reflex? [1]

[Turn over

Question 10 is in the form of an **Either**/**Or** question. Only answer question 10 **Either** or question 10 **Or**.

10 Either

Albinism is a genetic condition in which there is no skin pigmentation. It is caused by a recessive allele, **a**.

(a) A couple who both have normal skin pigmentation have a child who shows albinism. Using **A** and **a** in a genetic diagram, show how this is possible. [5]

(b) Describe the part played by each of the following in the inheritance of a condition such as albinism.

- gene
- allele
- chromosome
- meiosis [10]

10 Or

(a) Describe how the following methods of birth control work in trying to prevent unwanted pregnancies.

(i) contraceptive pill
(ii) intra-uterine device (coil)
(iii) condom
(iv) cap [12]

(b) State **three** advantages of family planning. [3]

BLANK PAGE

BLANK PAGE