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 2005

2 hours

Additional Materials: Answer Paper

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
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.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
Section A	
8	
9	
10	
TOTAL	

This document consists of **12** printed pages.

Section A

Answer **all** the questions.

Write your answers in the spaces provided.

1 Fig. 1.1 shows cross sections of an artery and a vein.

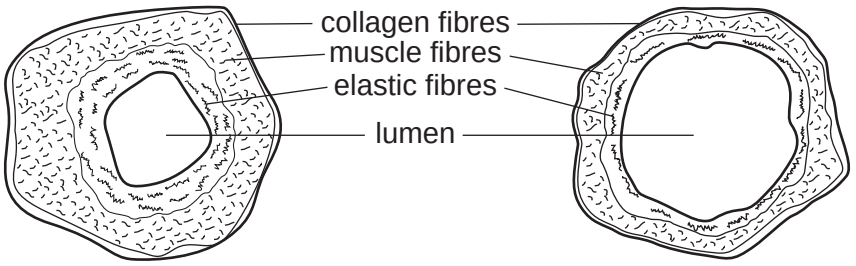

Fig. 1.1

(a) Complete the table below to show **three differences** in structure between the artery and the vein that **are shown in Fig. 1.1**.

feature	artery	vein

[3]

Fig. 1.2 shows how blood pressure and the speed of blood flow alter as blood travels around the body from the left ventricle.

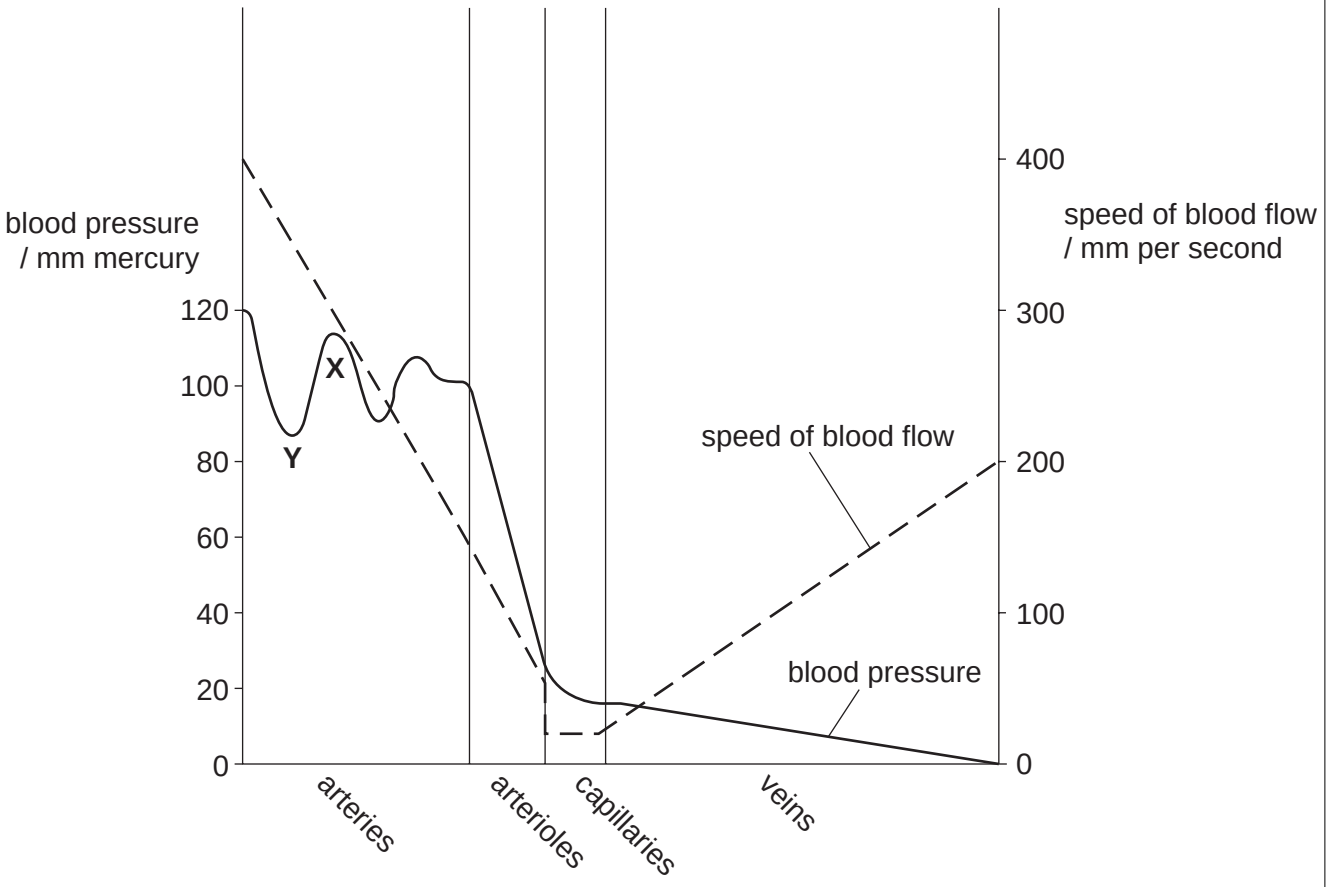

Fig. 1.2

(b) **Using Fig. 1.2**, state in which types of vessel you find

(i) the lowest pressure, ...

(ii) the lowest speed of flow, ...

(iii) speeds of more than 100 mm per second. .....

.....[5]

(c) State what is happening in the left ventricle

at **X**, ...

at **Y**. ..... [2]

[Turn over

(d) Blood flows through capillaries slowly and at low pressure.

State how this is useful to the body.

slowly .....

.....

at low pressure .....

.....[2]

(e) State the reason why tissue fluid contains no red blood cells or platelets and less protein than plasma.

.....

.....[1]

(f) 90% of tissue fluid returns to the blood at the capillaries. By which route does the remaining 10% return?

.....[1]

Arterioles are small, muscular vessels each of which supplies a bed of capillaries.
Fig. 1.3 shows an arteriole in its relaxed and in its contracted state.

relaxed contracted

Fig. 1.3

(g) State the effects that contraction of the arterioles in the skin would have on

(i) the supply of blood to the surface of the skin,

.....

(ii) blood pressure in the rest of the circulation.

.....[2]

(h) Explain the effect of such a contraction of the skin arterioles on heat loss from the body.

.....

.....

.....

.....

.....[4]

[Total : 20]

2 Table 2.1 lists some of the contents of 100 g samples of six different foods, three from animal sources and three from plants.

Table 2.1

source	energy / kJ	sugars / g	fats / g	protein / g	vit. C / mg	vit. D / πg	iron / mg
beef	940	0	17	22	0	0.1	2
fish	610	0	11	12	0	1.5	2
eggs	320	0	3	15	0	22	1.2
rice	1530	87	1.0	6.2	0.5	0	0.4
potatoes	340	20	0	1.4	15	0	0.5
beans	100	4	0	2.0	3	0	0.8

Using the information in Table 2.1

(a) State why a diet consisting only of animal-based foods might lead to increased chances of

(i) a heart attack, ...

(ii) scurvy. .....[2]

(b) State why a plant-based diet might lead to

(i) obesity, ...

(ii) rickets. .....[2]

(c) State which of the six foods listed in Table 2.1 would give the strongest reaction if one gram of each were tested with

(i) Biuret reagent, ...

(ii) heated Benedict's reagent. .....[2]

(d) For what reason, not given in the table, do most diets consist usually of plant-based foods?

.....[1]

[Total : 7]

[Turn over

3 The diagrams in Fig. 3.1 show demonstrations of two simple processes.

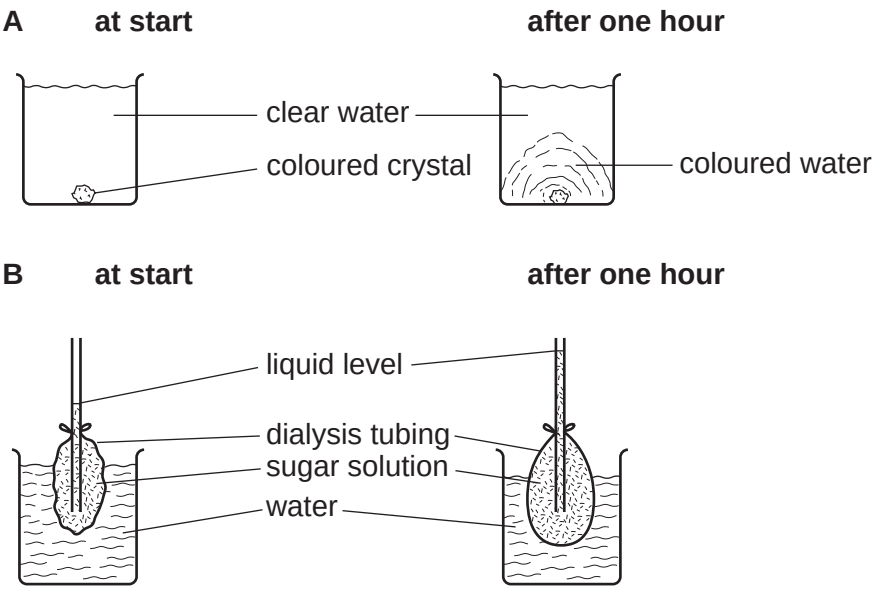

Fig. 3.1

(a) Name the processes demonstrated in Fig. 3.1 **A** and **B**.

A .....

B .....[2]

(b) **(i)** State **two** changes visible in **B** after one hour.

1. .....

2. .....[2]

(ii) Explain how the changes in **A** and **B** are brought about.

.....

.....

.....

.....

.....[4]

[Total : 8]

4 Fig. 4.1 shows the life cycle of the malarial parasite.

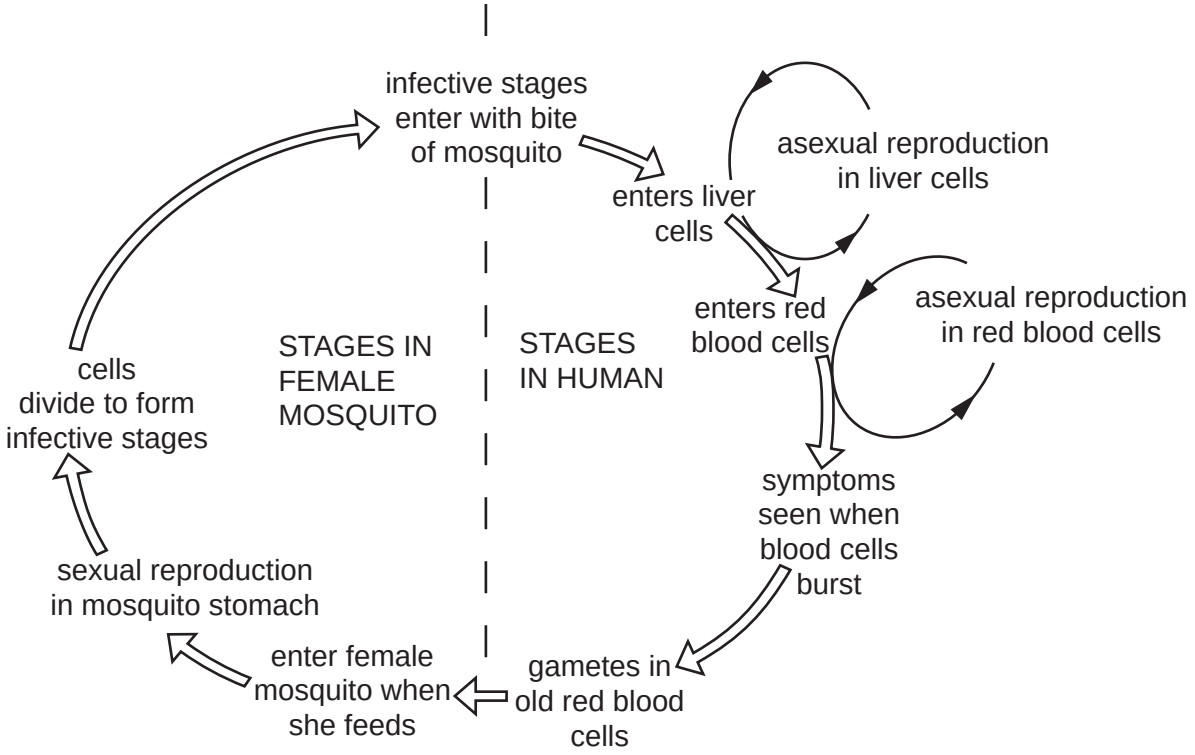

Fig. 4.1

(a) The malarial parasite is transferred between hosts in different fluids.

Name the fluids that transfer the parasite

(i) from human to mosquito, ...

(ii) from mosquito to human. .....[2]

(b) Why does the female mosquito suck blood?

.....[1]

(c) Doctors identify the malarial parasite in different places in the body at different times during an infection.

State where in the body of a patient a doctor may find stages of the parasite

(i) before the symptoms are seen .....

(ii) once the symptoms become apparent .....

.....[3]

[Total : 6]

[Turn over

5 Snow falling at the north and south poles carries with it particles of lead from the air. Samples of snow taken from different depths at the poles can be dated and analysed for lead content. Fig. 5.1 shows how the amounts of lead in such samples have changed since 1750 A.D.

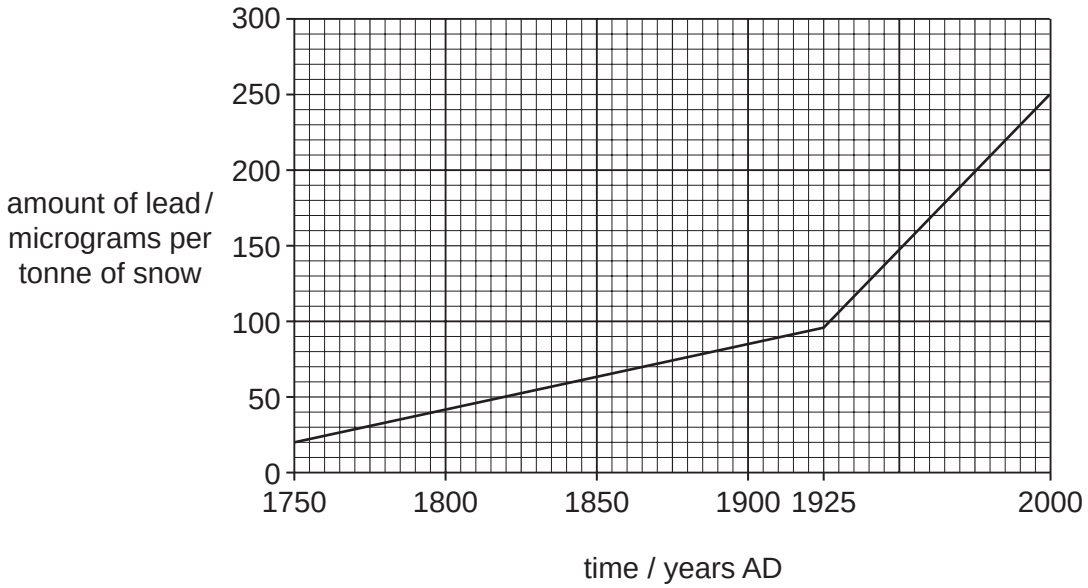

Fig. 5.1

(a) Describe, using figures from Fig. 5.1, what the graph shows.

.....

.....

.....[3]

(b) How do you explain the changes after 1925?

.....

.....[2]

(c) State **one** effect of lead intake on the body.

.....[1]

[Total : 6]

6 Fig. 6.1 is a diagram that shows how the sex chromosomes are inherited.

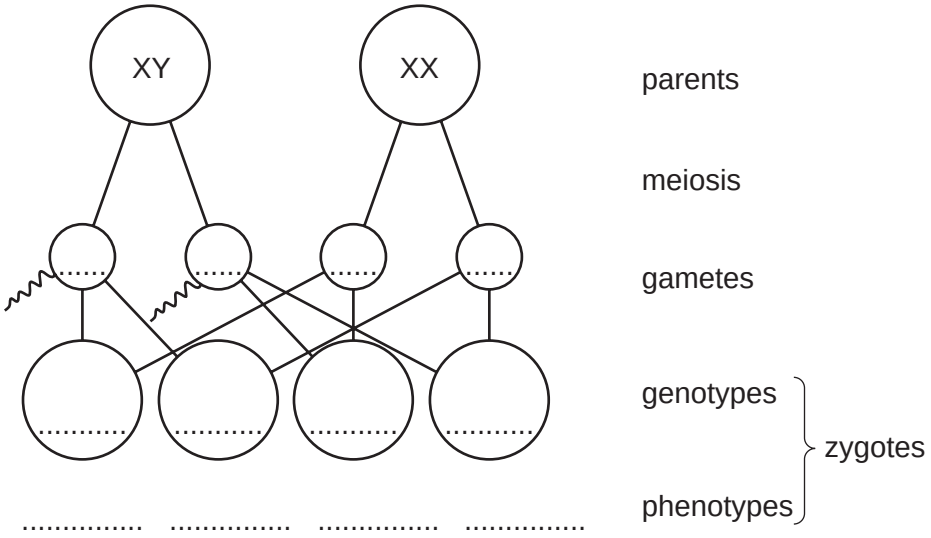

Fig. 6.1

(a) Complete Fig. 6.1, writing your answers in the spaces provided. [3]

(b) State the ratio of males to females in the zygotes.

.....[1]

[Total : 4]

7 Table 7.1 shows the concentration of some substances in three fluids,

- blood plasma
- glomerular filtrate
- urine

given as grams per 100 cm^3. One urine concentration has been left blank.

Table 7.1

substance	concentration / grams per 100 cm^3		
	plasma	filtrate	urine
water	90-93	97	95
protein	7	0	0
glucose	0.1	0.98	
urea	0.03	0.03	2.0
uric acid	0.003	0.003	0.05
sodium	0.03	0.03	0.6
potassium	0.02	0.02	0.15

(a) State which of the three fluids is the most dilute.

.....[1]

(b) Complete the table by filling in the figure you would expect in a healthy person for glucose in the **urine** column. [1]

(c) Which substance in the plasma has its concentration increased most during production of urine by the kidney?

.....[1]

(d) Each kidney filters about 125 cm^3 of blood per minute. Assuming you have 5 litres of blood, calculate how long it will take for all your blood to be filtered.

.....

.....[1]

[Total : 4]

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 section through the front of an eye adjusted for normal light and viewing a distant object.

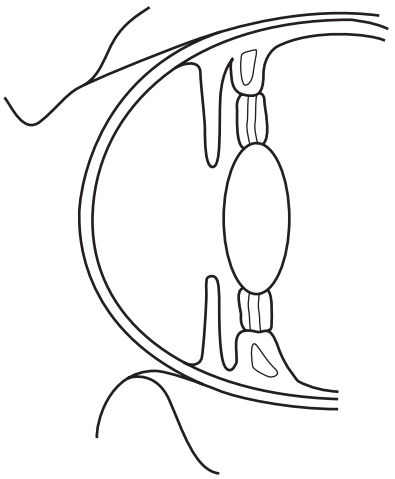

Fig. 8.1

(a) Draw the same eye viewing a distant object, but now adapted to **bright** light. [2]

(b) Describe how the changes you show in **(a)** are brought about. [4]

(c) Describe the changes that would occur in the eye to focus on a near object. [6]

(d) Explain why it is better to have two eyes rather than one. [3]

[Total : 15]

9 Disease may be caused by factors other than infectious organisms.

(a) State **three** types of such non-transmissible disease, and for each type give a named example. [6]

Typhoid, tuberculosis and gonorrhoea are three examples of transmissible disease caused by bacteria.

(b) For **each** of these three diseases in turn, explain

(i) how the bacterium enters the body,

(ii) how the spread of the disease to others can be limited.

[9]

[Total : 15]

[Turn over

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

10 Either

(a) Describe how a molecule of oxygen travels from an alveolus to the liver for use there in respiration. [8]

(b) Write down the word equation for aerobic respiration. [2]

(c) Fig. 10.1 shows a simple apparatus to measure the rate of respiration of maggots.

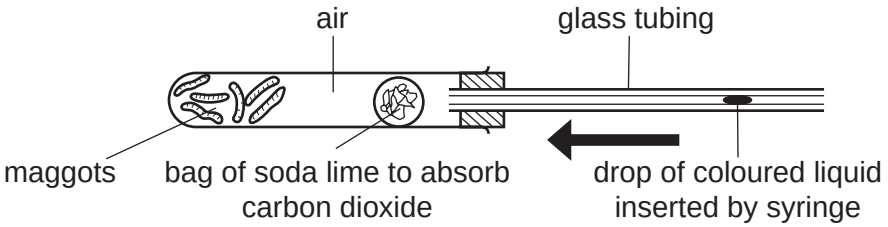

Fig. 10.1

As the maggots respire, the drop of coloured liquid moves down the tube in the direction of the arrow.

Explain fully why the liquid moves in this direction. [5]

[Total : 15]

Or

(a) Write down the word equation for photosynthesis. [2]

(b) Describe how carbon from carbon dioxide in the air passes through plants and animals, and the processes which return it to the air. [8]

(c) Fig. 10.2 shows a simple apparatus to measure the rate of photosynthesis.

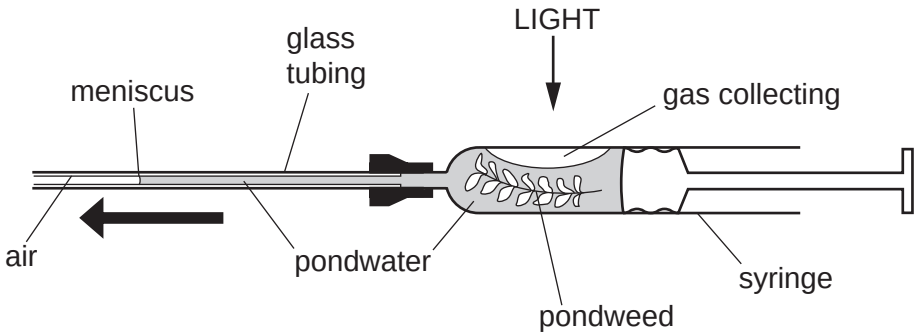

Fig. 10.2

When the light shines, gas collects as shown, and the meniscus moves in the direction shown by the arrow.

Explain fully why the meniscus moves in this direction. [5]

[Total : 15]