

Centre Number	Candidate Number	Name
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MINISTRY OF EDUCATION, BOTSWANA
 in collaboration with
 UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
Botswana General Certificate of Secondary Education

BIOLOGY **0572/03**
 Paper 3 October/November 2003
1 hour 15 minutes
 Additional Materials:
 Answer paper

Read the following carefully before you start.

Write your centre number, candidate number and name in the spaces provided at the top of this page.

Section A
 Answer **all** questions.
 Write your answers in the spaces provided on the question paper.

Section B
 Answer **both** questions.
 Write your answers on the separate answer paper provided.
 Write your centre number, candidate number and name on each sheet of answer paper you use.
 At the end of the examination fasten all sheets of answer paper to this question paper using the string provided.
 Do not use staples, paper clips, highlighters, glue or correction fluid.
 The number of marks is given in brackets [] at the end of each question or part question.
 You are advised to spend no longer than 40 minutes on Section A.

For Examiner's Use	
Section A	
Section B	
6	
7	
TOTAL	

Section A

Answer **all** the questions.

Write your answers in the spaces provided.

- 1 Fig. 1.1 shows the effect of carbon dioxide concentration on the rate of photosynthesis of a pondweed.

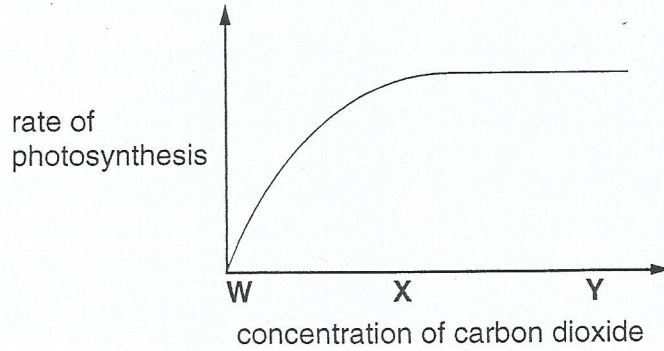


Fig. 1.1

- (a) (i) State the effect of carbon dioxide concentration on the rate of photosynthesis between **W** and **X** in Fig. 1.1.

.....
 [1]

- (ii) Explain the shape of the curve between **X** and **Y**.

.....

 [2]

- (b) Briefly describe how a green leaf absorbs carbon dioxide.

.....

 [4]

[Total: 7]

2 Fig. 2.1 shows the energy needs for people of different age groups.

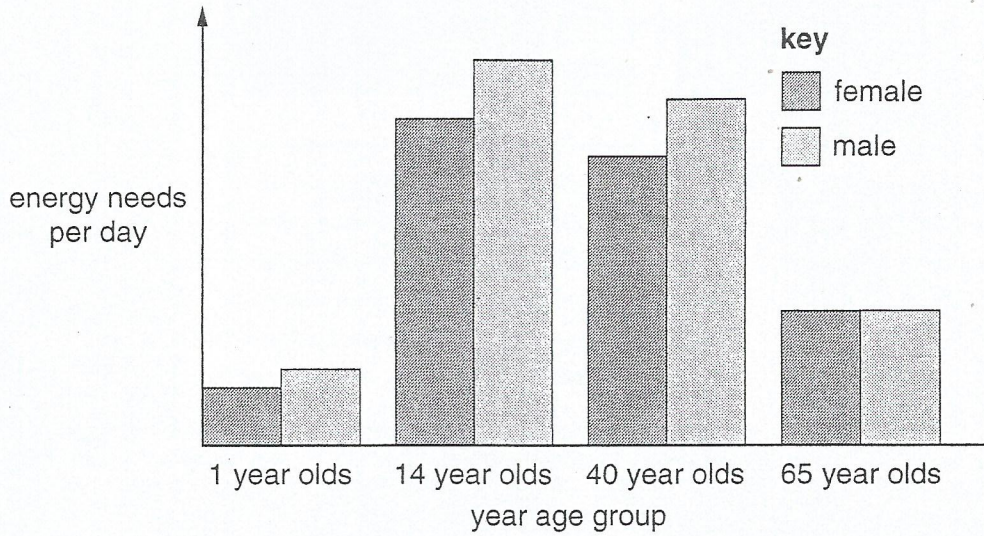


Fig. 2.1

(a) (i) State **two** factors which affect energy needs in humans.

.....
 [2]

(ii) Explain why 14 year olds have higher energy needs than 65 year olds.

.....

 [2]

(b) Describe how energy is released from food.

.....

 [4]

[Total: 8]

3 Fig. 3.1 shows the levels of hormones J and K at different stages of the menstrual cycle.

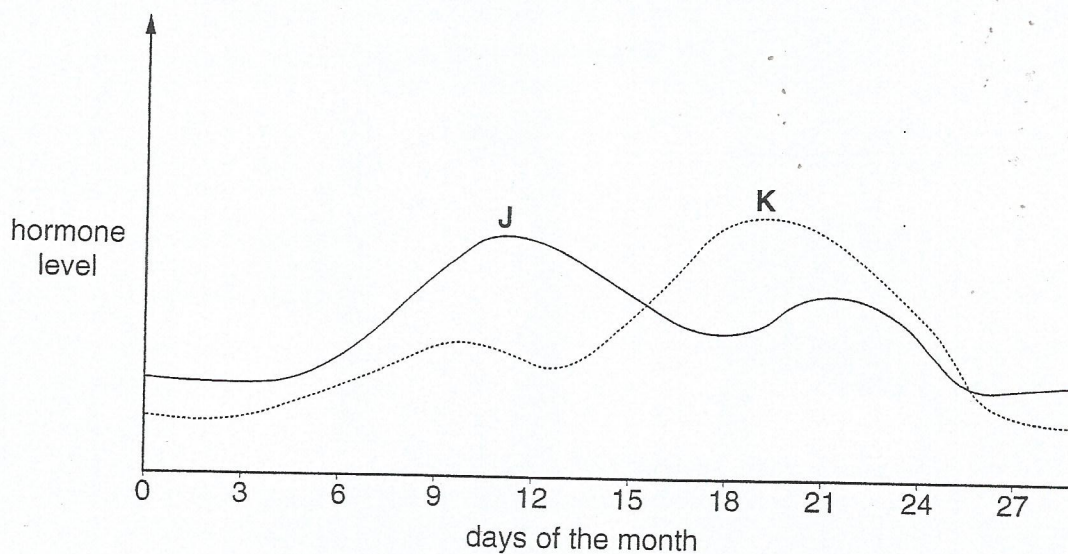


Fig. 3.1

(a) (i) Identify hormones J and K.

J

K [2]

(ii) Describe the role played by hormone J in a woman's menstrual cycle.

.....

.....

..... [2]

(b) Suggest why women aged between 15 and 45 years need more iron in their diet than those aged above 45 years.

.....

.....

..... [3]

[Total: 7]

4 Fig. 4.1 shows a simple kidney machine.

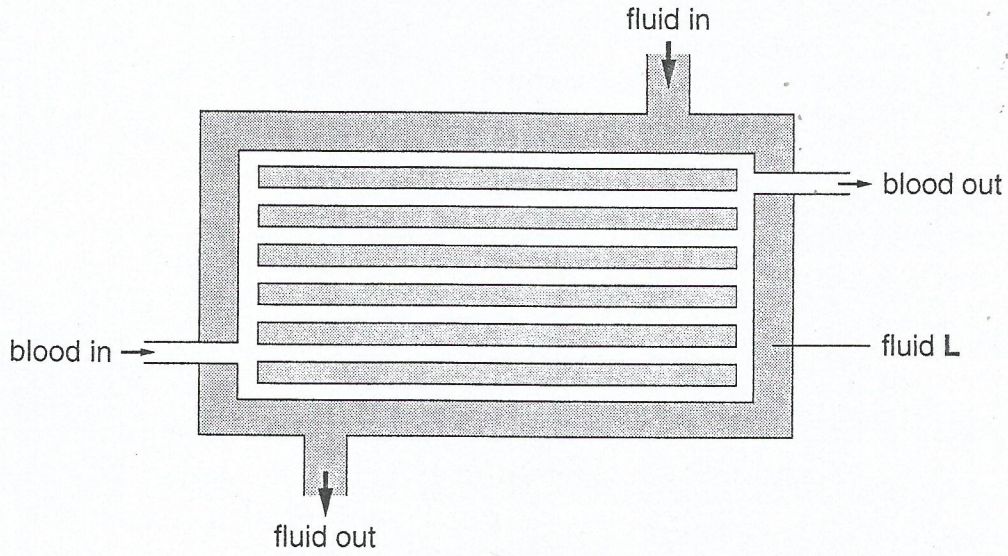


Fig. 4.1

(a) Identify fluid L.

..... [1]

(b) Explain how the design of the kidney machine in Fig. 4.1 is suited for its function.

.....
.....
.....
.....
..... [4]

- (c) Table 4.1 shows information about fluid L and the blood that enters and leaves the kidney machine.

Table 4.1

<i>factor analysed</i>	<i>blood entering kidney machine</i>	<i>fluid L</i>	<i>blood leaving kidney machine</i>
glucose concentration / mg per dm ³	1.5	1.5
salt concentration / mg per dm ³	8.0	11	11
temperature / °C	36.9	36.4	36.4

- (i) Complete Table 4.1 to show the concentration of glucose in the blood leaving the kidney machine. [1]
- (ii) Suggest and explain how fluid L could be changed in order to improve the efficiency of the kidney machine.

.....

.....

.....

..... [3]

[Total: 9]

- 5 Fig. 5.1 shows the concentration of antibodies in the body of a person who was injected with some dead cholera bacteria and later given a booster injection.

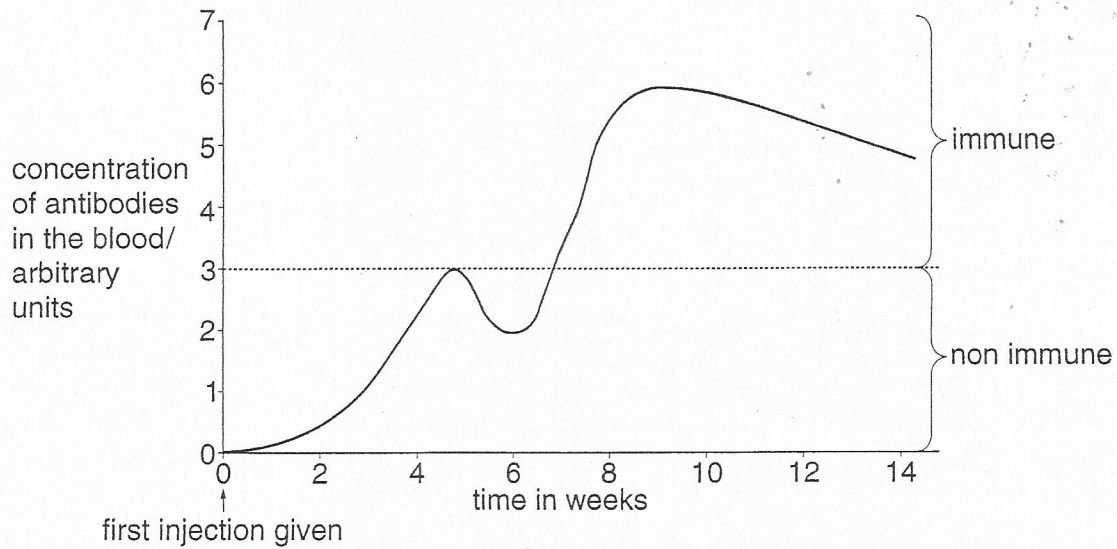


Fig. 5.1

- (a) (i) What term is given to this type of injection which stimulates antibody production?

..... [1]

- (ii) On Fig. 5.1, mark with the letter X to indicate when the second injection was given. [1]

- (iii) When did the person develop immunity?

..... [1]

- (iv) By how much did the antibody concentration drop between weeks 10 and 14?

..... [1]

(b) Fig. 5.2 shows some human blood components, W, X, Y and Z.

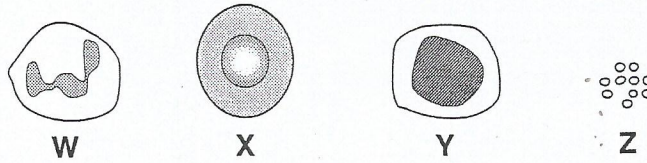


Fig. 5.2

(i) Use the letters W, X, Y and Z to identify the component responsible for

1. oxygen transport;
2. conversion of fibrinogen to fibrin;
3. engulfing bacteria. [3]

(ii) The HIV virus destroys cell Y.

How does this result in a person becoming ill?

.....

.....

..... [2]

[Total: 9]

Section B

Answer **both** questions.

Write your answers on the separate answer paper provided.

6 Fig. 6.1 shows the gaseous exchange system.

The arrows show direction of air movement when breathing in.

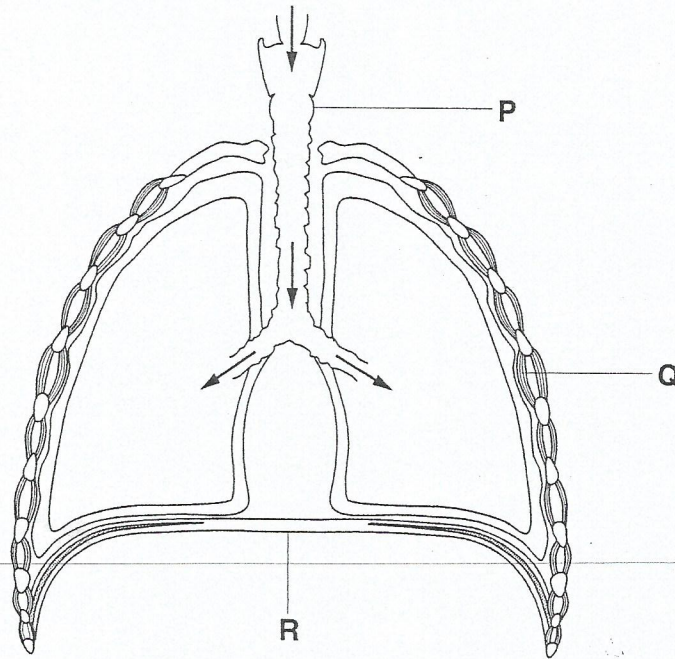


Fig. 6.1

- (a) Name structures **P**, **Q** and **R** on Fig. 6.1, and describe how air is breathed in. [10]
- (b) Describe how the alveoli in the lungs and villi in the small intestine are similar in structure and function. [5]

[Total: 15]

7 (a) Distinguish between the following pairs of terms:

(i) phenotype and genotype;

(ii) meiosis and mitosis;

(iii) continuous and discontinuous variation. [6]

(b) Explain using alleles I^A , I^B and I^O in a genetic diagram, how a blood group **A** mother and a blood group **B** father can have a blood group **O** child. [5]

(c) State **four** ways in which artificial selection in crop production benefits humans. [4]

[Total: 15]