

Candidate Name \_\_\_\_\_

Centre Number	Candidate Number

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
**General Certificate of Education Ordinary Level**  
**BIOLOGY**  
**PAPER 2**

**5090/2**

**MAY/JUNE SESSION 2002**

1 hour 45 minutes

Additional materials:  
Answer paper

**TIME** 1 hour 45 minutes

**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

**Section A**

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

**Section B**

Answer **three** questions.

Write your answers on the separate answer paper provided.

At the end of the examination,

1. fasten all separate answer paper securely to the question paper;
2. write an E (for Either) or an O (for Or) next to the number 8 in the grid below to indicate which question you have answered.

**INFORMATION FOR CANDIDATES**

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

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.

FOR EXAMINER'S USE	
Section A	
Section B	
6	
7	
8	
TOTAL	

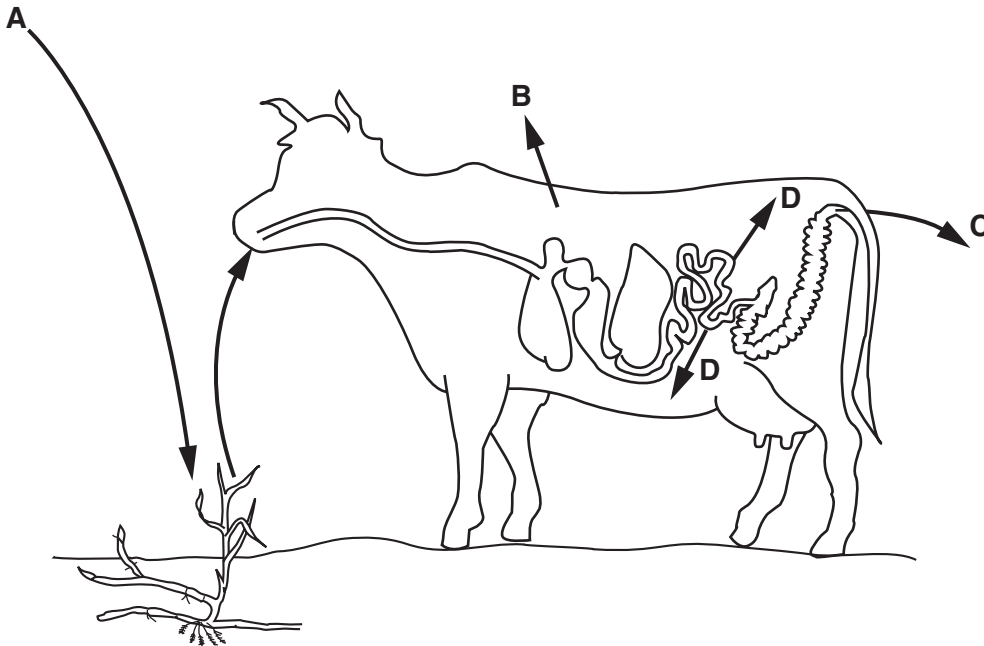
**This question paper consists of 11 printed pages and 1 blank page.**

**Section A**

Answer **all** the questions.

Write your answers in the spaces provided.

- 1 The arrows in Fig. 1.1 show energy flowing through part of a food chain.



**Fig. 1.1**

- (a) (i) Identify the form of energy indicated at **A** on Fig. 1.1.

.....

- (ii) State the form in which energy is lost at **B** and a **different** form in which energy is lost at **C**.

**B** .....

**C** .....

- (iii) State two ways in which the cow can use the energy represented by **D** in Fig. 1.1.

1. ....

2. ....

[5]

(b) (i) State a type of organism that might use the energy lost by the cow at C.

.....

(ii) Explain how the activity of this type of organism could eventually be of benefit to the cow.

.....

.....

.....

[3]

(c) Fig. 1.2 shows a pyramid of biomass.

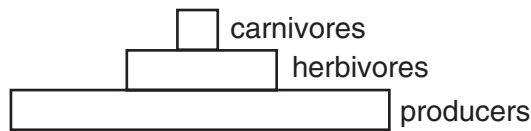


Fig. 1.2

Explain why the carnivores have the smallest biomass in this pyramid.

.....

.....[1]

[Total : 9]

- 2 Fig. 2.1 shows a section through the spinal cord and also some of the muscles and bones of the arm (not drawn to the same scale).

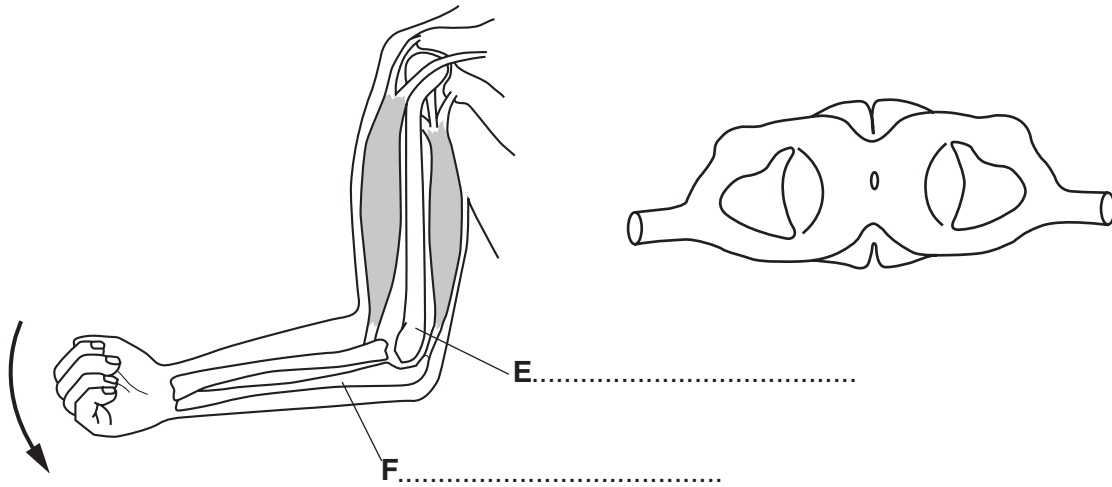


Fig. 2.1

(a) On the diagram,

- (i) label bones **E** and **F**;
- (ii) draw in the neurone carrying impulses from the spinal cord to the triceps muscle.

[5]

(b) Describe how the structures shown in Fig. 2.1 bring about movement of the arm in the direction of the arrow.

.....

.....

.....

.....[3]

(c) Fig. 2.2 shows the legs of an athlete as he starts a race.

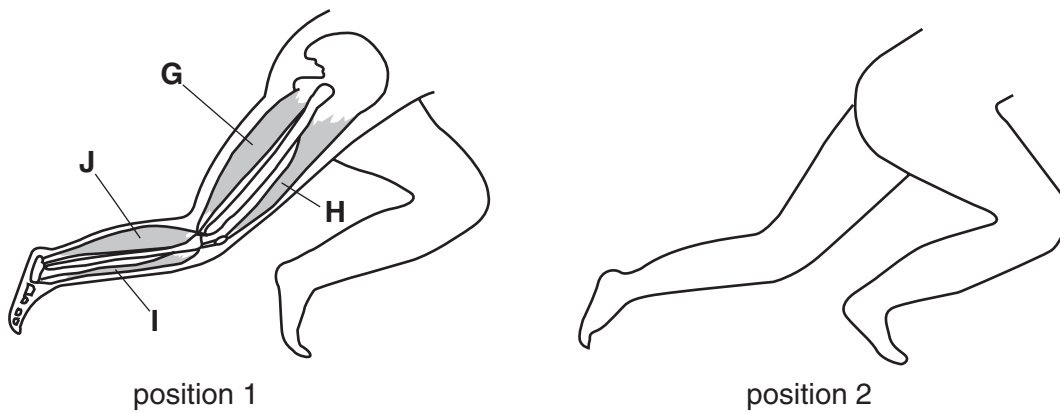


Fig. 2.2

(i) Identify, by letter, two extensor muscles in Fig. 2.2.

1. ....

2. ....

(ii) Suggest which muscles will contract as the athlete's right leg moves from position 1 to position 2.

..... [4]

[Total : 12]

- 3 Fig. 3.1 shows some chemical molecules found in the human body and how they join to form larger molecules.

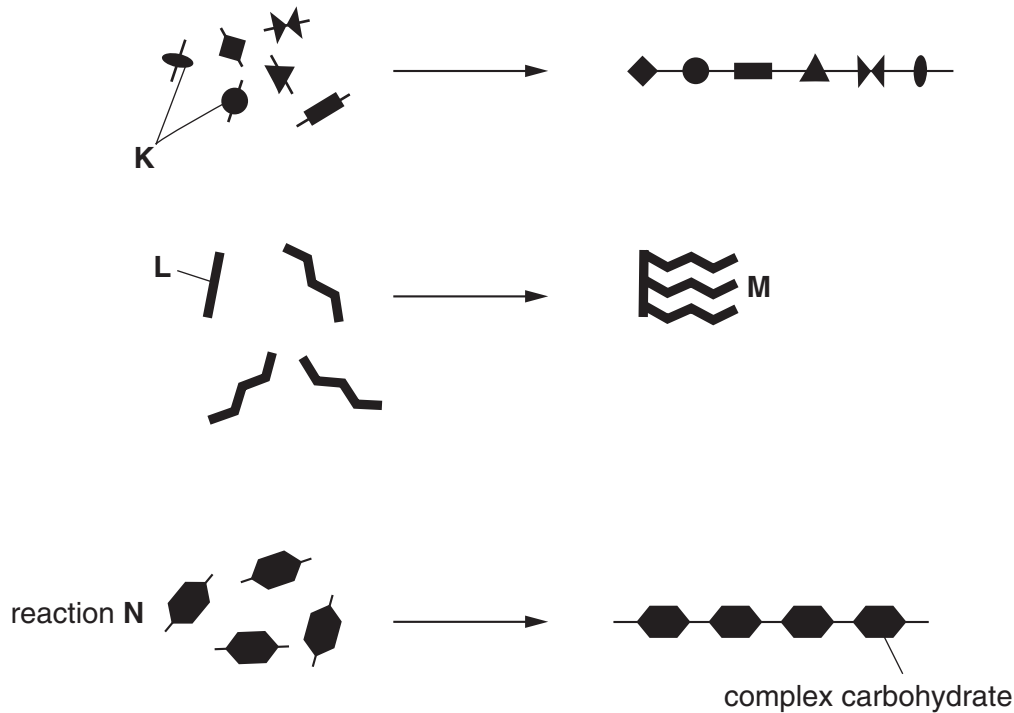


Fig. 3.1

- (a) Identify molecules **K**, **L** and **M**.

**K** .....

**L** .....

**M** .....

[3]

- (b) Reaction **N** occurs in the liver.

- (i) Name the complex carbohydrate manufactured by this reaction.

.....

- (ii) Some people develop a disease as a result of which this reaction does **not** occur.

Name the disease and explain why this reaction does **not** take place.

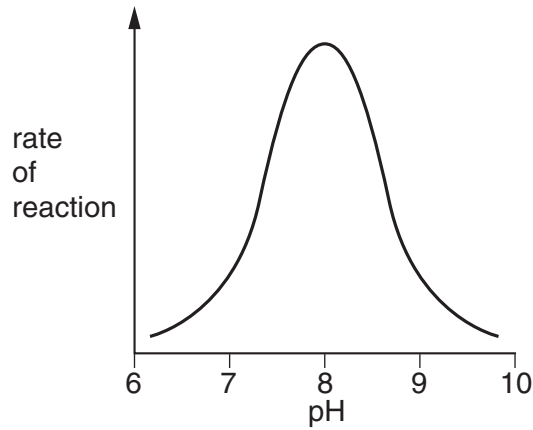
*disease* .....

*explanation* .....

.....

[4]

(c) Complex carbohydrates are digested in the duodenum. Fig. 3.2 shows the effect of pH on the enzyme that controls this reaction.



**Fig. 3.2**

- (i) Name this enzyme. ....
- (ii) Explain how the optimum pH for this enzyme is maintained in the duodenum.

.....

.....

.....

[3]

[Total : 10]

4 Fig. 4.1 shows a cross-section through a leaf.

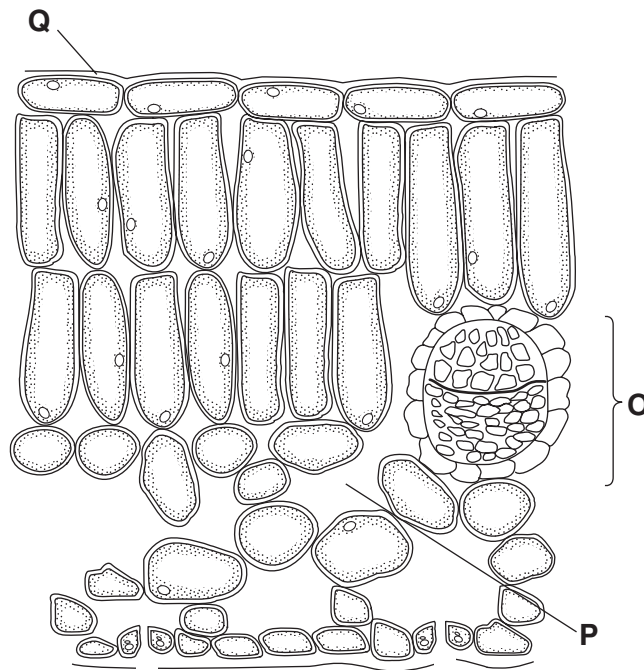


Fig. 4.1

(a) Identify parts **O** and **P**.

**O** .....

**P** .....

[2]

(b) (i) On Fig. 4.1, draw chloroplasts in the cytoplasm of **three** different types of cell in which they are found.

(ii) Name the region of cells that, in most leaves, contains the greatest number of chloroplasts.

.....

(iii) State a function of the film of water present on the walls of the cells named in (ii).

.....

.....

.....

[5]



(c) State two properties of layer **Q** in Fig. 4.1 and explain the importance of each.

*property 1* .....

*importance* .....

.....

*property 2* .....

*importance* .....

.....[4]

[Total : 11]

5 Fig. 5.1 summarises the early stages of sexual reproduction in an animal.

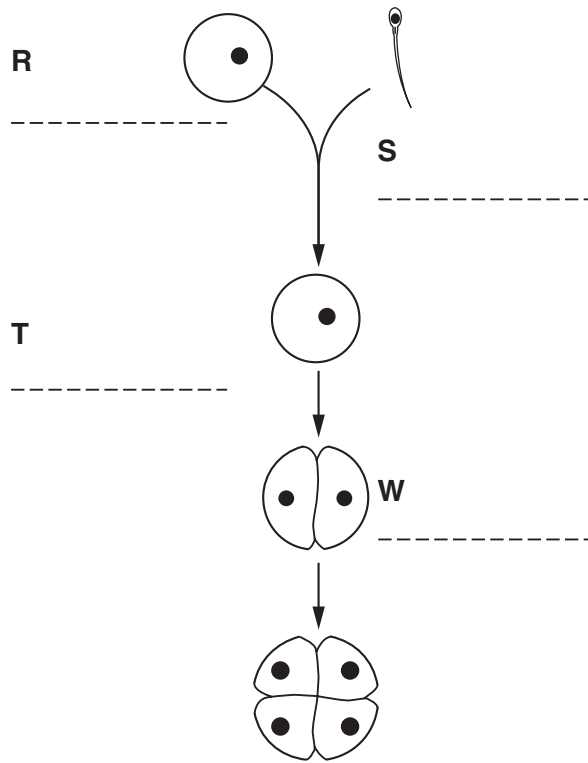


Fig. 5.1

- (a) (i) Name the type of cells shown at **R**. .....
- (ii) Name the process occurring at **S**. .....
- (iii) Name the type of cell shown at **T**. ..... [3]

(b) Suggest what happens after stage **W** in Fig. 5.1 when two genetically identical offspring are produced.

.....  
 .....[1]

(c) Explain how twins could be

(i) both girls;

.....  
 .....

(ii) one of each sex.

.....  
 .....

[4]

[Total : 8]

**Section B**

Answer **three** questions.

Question **8** is in the form of an **Either/Or** question. Only one part should be answered.

Write your answers on the separate answer paper provided.

**6 (a)** Explain the part played by the cell membrane in the movement of substances into and out of a cell. [5]

**(b)** Describe a suitable method for preparing a cell for viewing under a microscope. [5]

[Total : 10]

**7 (a)** Distinguish between *self-pollination* and *cross-pollination*. [4]

**(b)** With reference to its structural features, describe how pollination occurs in a **named** insect-pollinated flower. [6]

[Total : 10]

**8 Either (a)** Explain how structure is related to function in the following parts of the circulatory system:

**(i)** arteries,

**(ii)** veins.

[6]

**(b)** Explain how a diet high in animal fat may cause coronary heart disease. [4]

[Total : 10]

**Or (a)** Explain how **named** excretory substances in the blood are removed by

**(i)** the lungs,

**(ii)** the kidneys,

**(iii)** the skin.

[8]

**(b)** Explain why the loss of oxygen from a leaf of a plant may be described as excretion. [2]

[Total : 10]

