

Centre Number	Candidate Number	Name
---------------	------------------	------

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**BIOLOGY**

**5090/02**

Paper 2 Theory

May/June 2004

Additional Materials: Answer Paper

**1 hour 45 minutes**

**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.

**Section B**

Answer **all** the questions including questions, 6, 7 and 8 **Either** or **8 Or**.

Write your answers 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 8 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.

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	
<b>Section A</b>	
<b>Section B</b>	
<b>6</b>	
<b>7</b>	
<b>8</b>	
<b>Total</b>	

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.

This document consists of **9** printed pages and **3** blank pages.



## Section A

Answer **all** the questions.

Write your answers in the spaces provided.

- 1 Fig. 1.1 shows the main bones of a human forelimb.

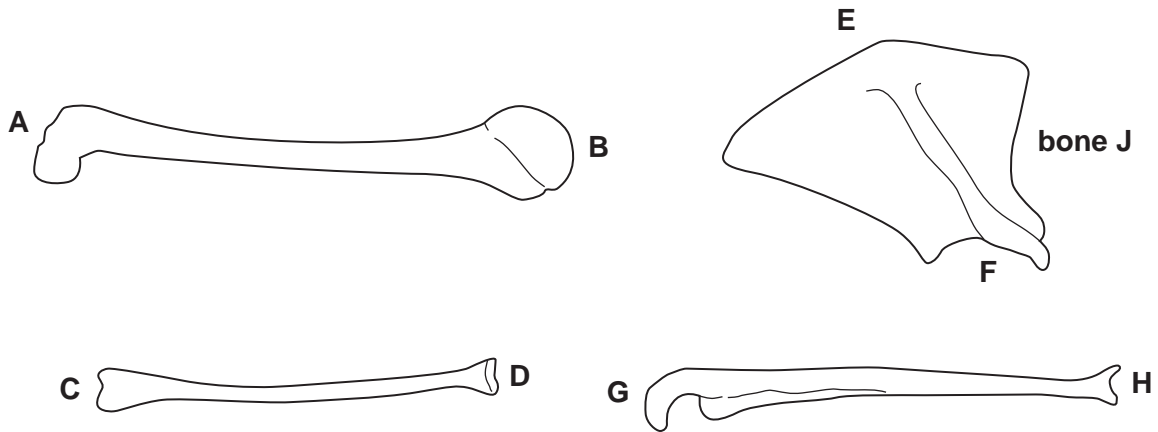


Fig. 1.1

- (a) Identify bone J. .... [1]
- (b) By using the letters **A** to **H** from Fig. 1.1, write down which parts of the bones meet at each of the following:
- (i) the shoulder, ..... [2]
- (ii) the elbow. .... [2]

(c) Damaged joints may be replaced with metal or plastic.

Fig. 1.2 shows a replacement joint in a person's arm.

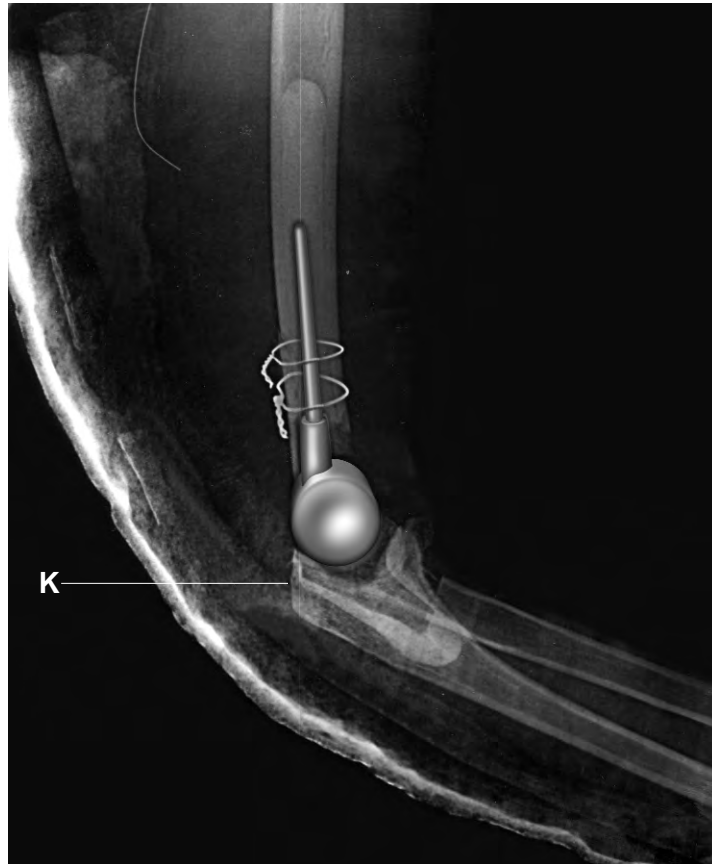


Fig. 1.2

(i) State the type of movement allowed by the joint that has been replaced.

.....

(ii) There is a structure that attaches a muscle to point **K** in Fig. 1.2. Name this structure and explain its importance in the movement of the forearm.

*name of structure* .....

*importance* .....

.....

.....

[5]

[Total: 10]

2 In an experiment to investigate starch production by a plant, three similar plants, each with variegated (green and white) leaves were set up as shown in Fig. 2.1.

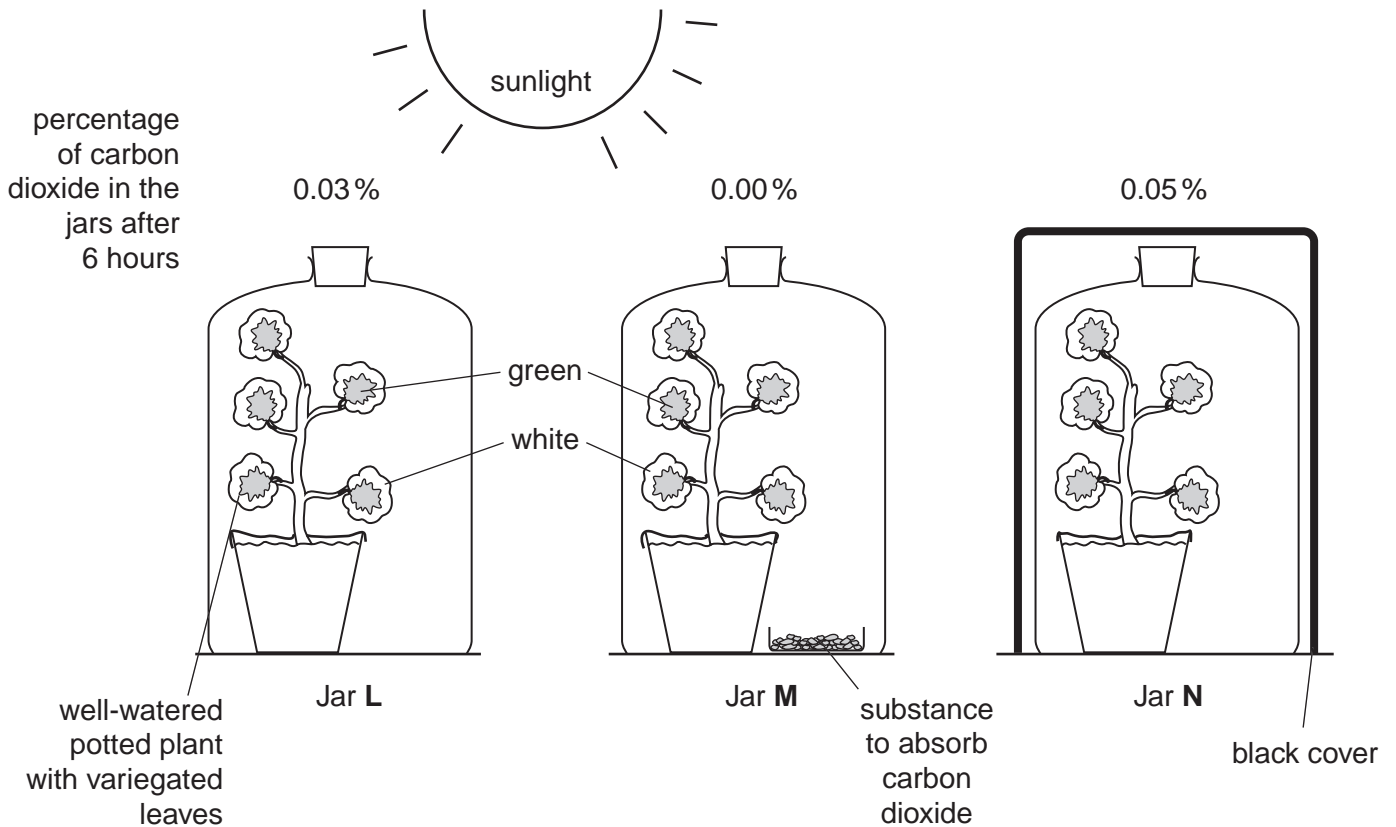


Fig. 2.1

(a) Name the process that produces starch in the leaves.

..... [1]

(b) At the start of the experiment, each jar contained atmospheric air.

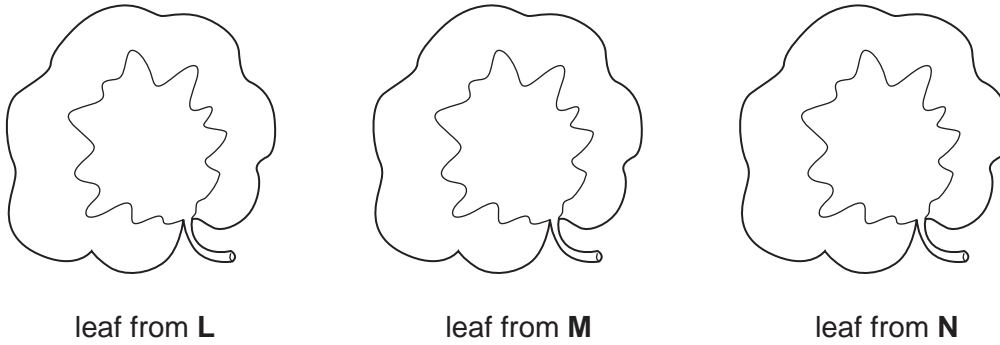
Name a gas, other than oxygen and carbon dioxide, which was present in the air inside the jars.

..... [1]

(c) Explain how the conditions in Jar L make it a control.

..... [1]

(d) At the end of the experiment, a leaf was taken from each plant and tested for the presence of starch. On the outlines in Fig. 2.2, **clearly label** the colours of each leaf after the starch test. Do **not** colour in the leaves.



**Fig. 2.2**

[3]

(e) When the air was first trapped under the jars, it contained 0.04% carbon dioxide. For each of the jars, explain why this percentage has changed by the end of the experiment.

Jar L .....

.....

Jar M .....

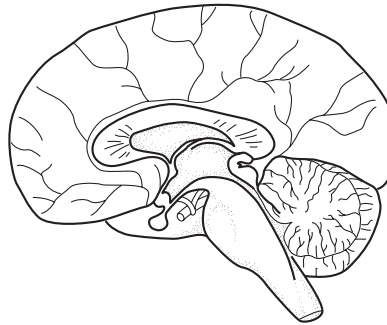
.....

Jar N .....

.....[6]

[Total: 12]

- 3 Fig. 3.1 shows a diagram of the human brain and Table 3.2 shows the functions of some parts of the brain.



**Fig. 3.1**

**Table 3.1**

part of brain	function
<b>P</b>	controls body temperature
<b>Q</b>	is the master hormone-producer
<b>R</b>	controls unconscious activities such as heart-beat
<b>S</b>	helps to control balance and give co-ordination
<b>T</b>	memory storage and conscious behaviour

- (a) Label Fig. 3.1 using the letters **P** to **T** from Table 3.1. [5]

- (b) One of the hormones produced by **Q** regulates growth and the development of the reproductive organs.

- (i) Explain how a hormone made in the brain can have its effect in the reproductive organs.

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

- (ii) Suggest possible effects on a child of the region **Q** producing unusually high amounts of this hormone.

.....  
 .....  
 .....[3]

[Total: 9]

4 Fig. 4.1 is a flow-diagram showing the pathways taken by oxygen and carbohydrate from their absorption into a mammal's blood to their use in the liver.

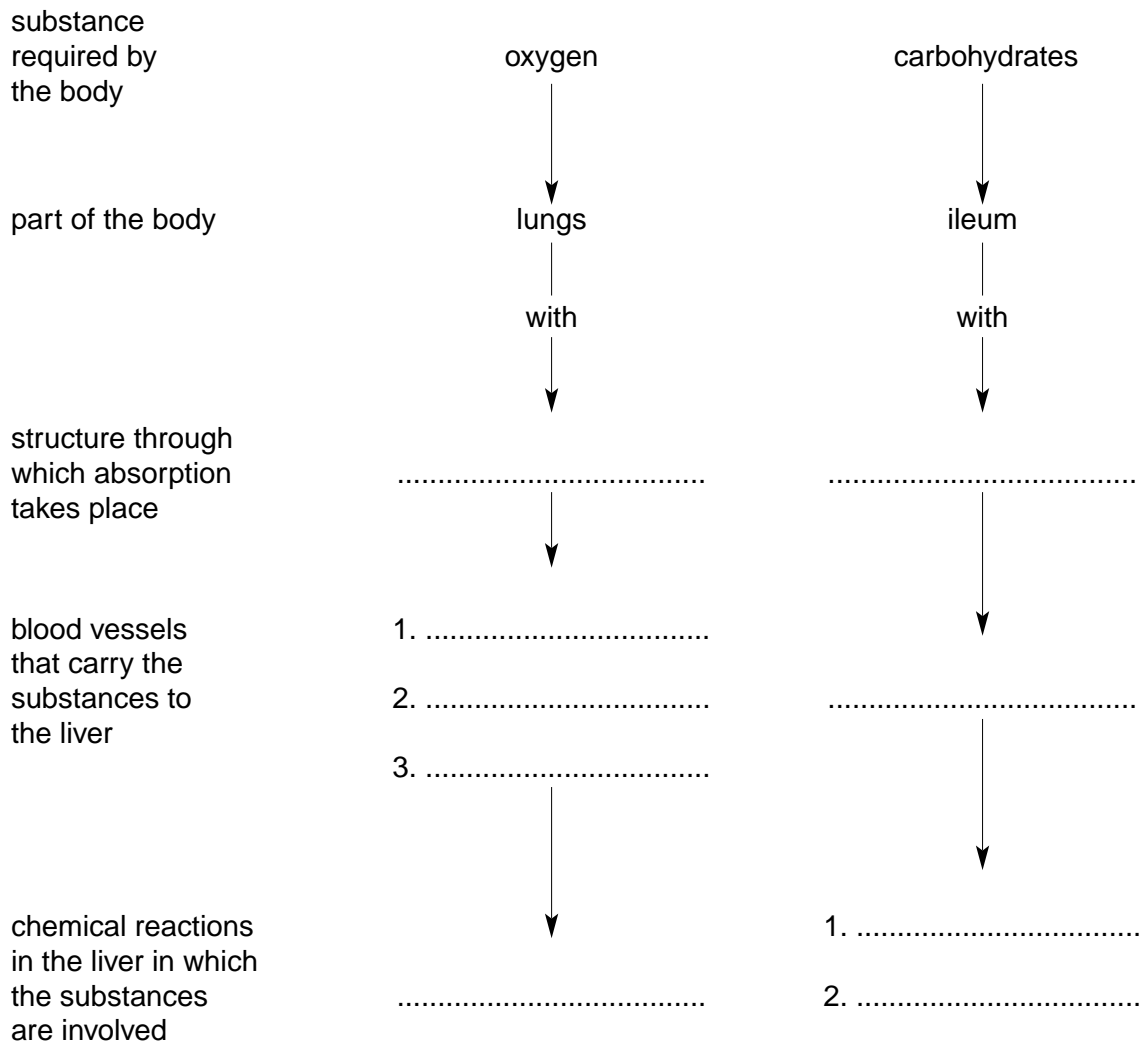


Fig. 4.1

(a) By filling in the spaces, complete Fig. 4.1 to state

- the structures involved
- the blood vessels used
- what happens in the liver cells.

[8]

(b) State a waste product formed from proteins in the liver. ....[1]

(c) Suggest

(i) a chemical element present in the waste product you mention in (b) that is also present in a fat;

.....

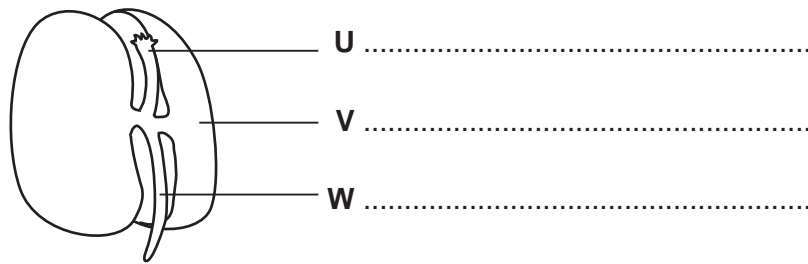
(ii) a chemical element present in the waste product that is **not** normally found in a fat.

.....

[2]

[Total: 11]

5 Fig. 5.1 shows part of the structure of a seed which is in the early stages of germination.



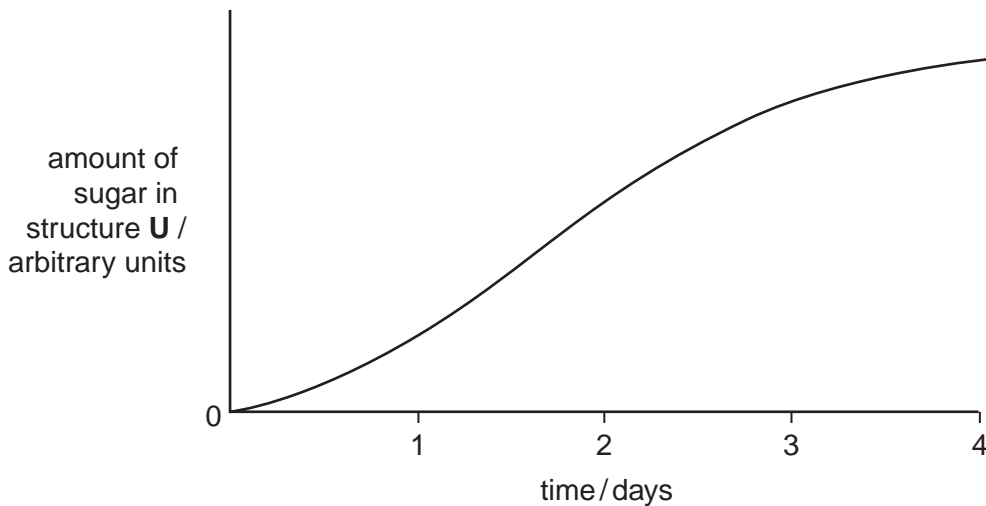
**Fig. 5.1**

(a) On Fig. 5.1, label structures **U**, **V** and **W**. [3]

(b) Name the part of the seed which has been removed to show the structures shown in Fig. 5.1.

..... [1]

Fig. 5.2 shows the change in the amount of sugar in structure **U** during the four days immediately after the start of germination.



**Fig. 5.2**

(c) In food tests carried out on similar seeds before germination, no sugar was found in any part of the seed.

Describe and explain how the amount of sugar in structure **U** changes over the first four days of germination.

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

[Total: 8]



## Section B

Answer **all** the questions including questions 6, 7 and 8 **Either** or 8 **Or**.

Write your answers on the separate answer paper provided.

- 6 (a) Explain how xylem is suited to its functions in a plant. [7]
- (b) Suggest why some insects that are parasitic on plants obtain their food from the phloem, rather than from the xylem. [3]

[Total: 10]

- 7 (a) Explain how the lungs are provided with a continuous supply of clean, atmospheric air. [6]
- (b) Describe and explain what might happen to a person's breathing as they climb up a mountain. [4]

[Total: 10]

Question 8 is in the form of an **Either/Or** question. Answer only question 8 **Either** or question 8 **Or**.

- 8 **Either** (a) Explain how nitrogen in the muscle protein of a herbivore may be re-cycled to form protein in another herbivore some years later. [7]
- (b) Explain how the activities of some bacteria form a part of both the carbon and nitrogen cycles. [3]

[Total: 10]

- Or** (a) Explain what is meant by the terms
- (i) *gene*;
- (ii) *allele*. [4]

- (b) Describe the part played by genes in the process of evolution. [6]

[Total: 10]





