

Centre Number	Candidate Number	Name
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**BIOLOGY**

**5090/02**

Paper 2 Theory

May/June 2005

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.

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

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

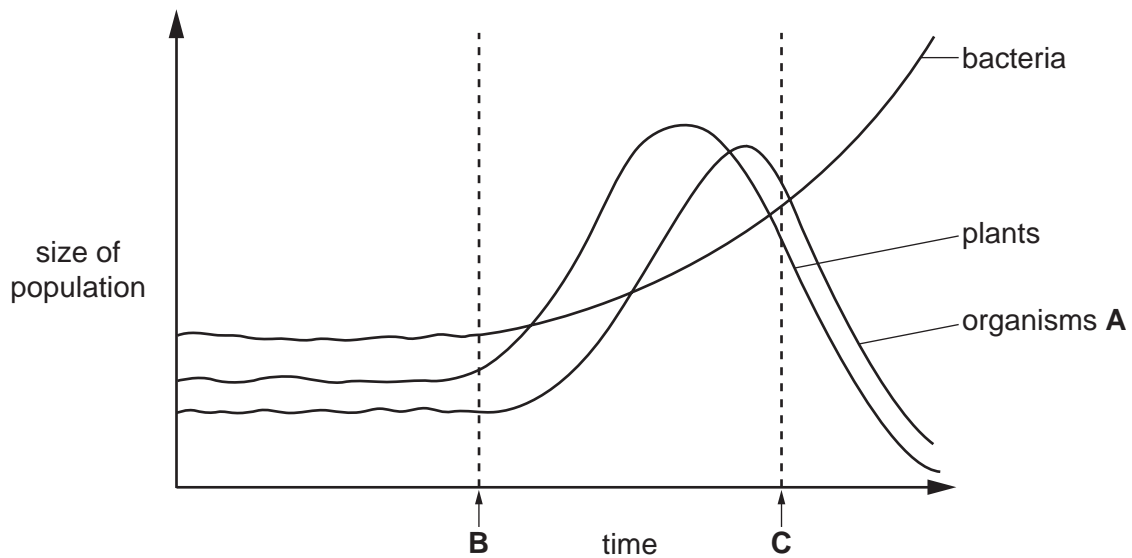


**Section A**

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 Three different populations in a small lake are linked in a food chain. Fig. 1.1 shows the changes in size of these populations over a period of time.



**Fig. 1.1**

(a) Using the information in Fig. 1.1,

(i) identify the producer;

.....

(ii) name the trophic level in the food chain of organisms **A**.

.....

[2]

(b) Suggest what may have entered the lake at time **B** and, by referring **only** to the plant population, explain your answer.

what entered the lake: .....

explanation .....

.....

.....[4]

(c) Explain how the change in the size of the population of bacteria after time **C** is related to the size of the plant population.

.....

.....

.....[2]

(d) Fig. 1.2 is a graph that shows the amount of oxygen in the same lake before time **B**. Complete the graph to show how the oxygen concentration will change over the same time period shown in Fig. 1.1. [2]

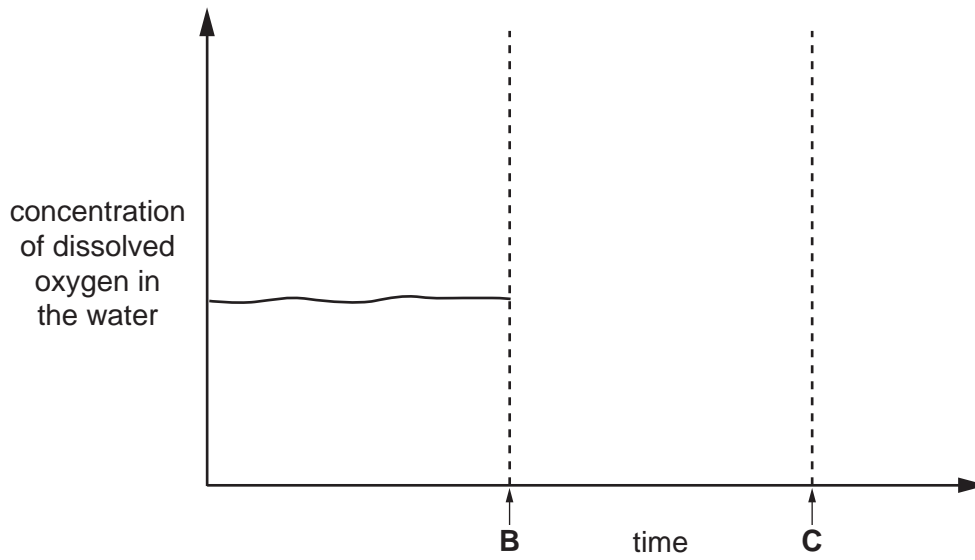


Fig. 1.2

[Total: 10]

2 Fig. 2.1 shows some parts of an insect-pollinated and a wind-pollinated flower.

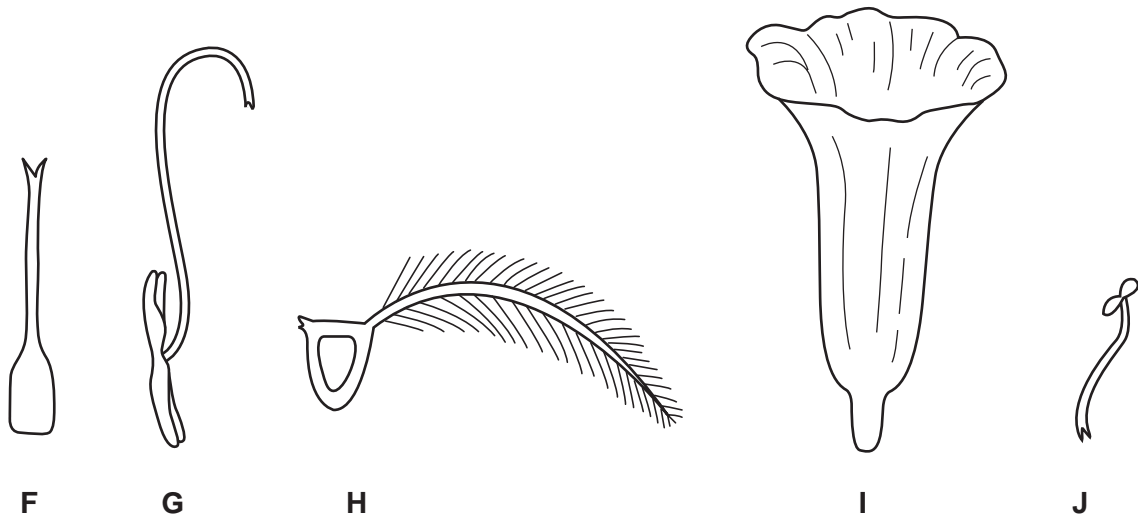


Fig. 2.1

- (a) Using the letters **F**, **G**, **H**, **I** and **J**, list the parts that are from  
the insect-pollinated flower: .....  
the wind-pollinated flower: .....  
[2]

(b) (i) In the table below, identify parts **H**, **I** and **J** and state the function of each.

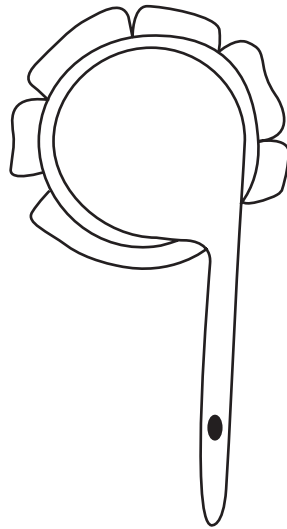
part	name	function
<b>H</b>		
<b>I</b>		
<b>J</b>		

[3]

(ii) Explain how the structure of part **H** helps it to carry out its function.

.....  
.....  
.....[2]

(c) Fig. 2.2 shows a pollen grain with its pollen tube.



**Fig. 2.2**

On Fig. 2.1, use a line labelled **L** to show exactly where the pollen grain as shown in Fig. 2.2 is found. [1]

(d) State and explain the difference between a nucleus in a pollen grain and a nucleus found in a cell in structure **I**.

.....

.....

.....[2]

[Total: 10]

3 Fig. 3.1 shows a section through a leaf with only some of the cells drawn.

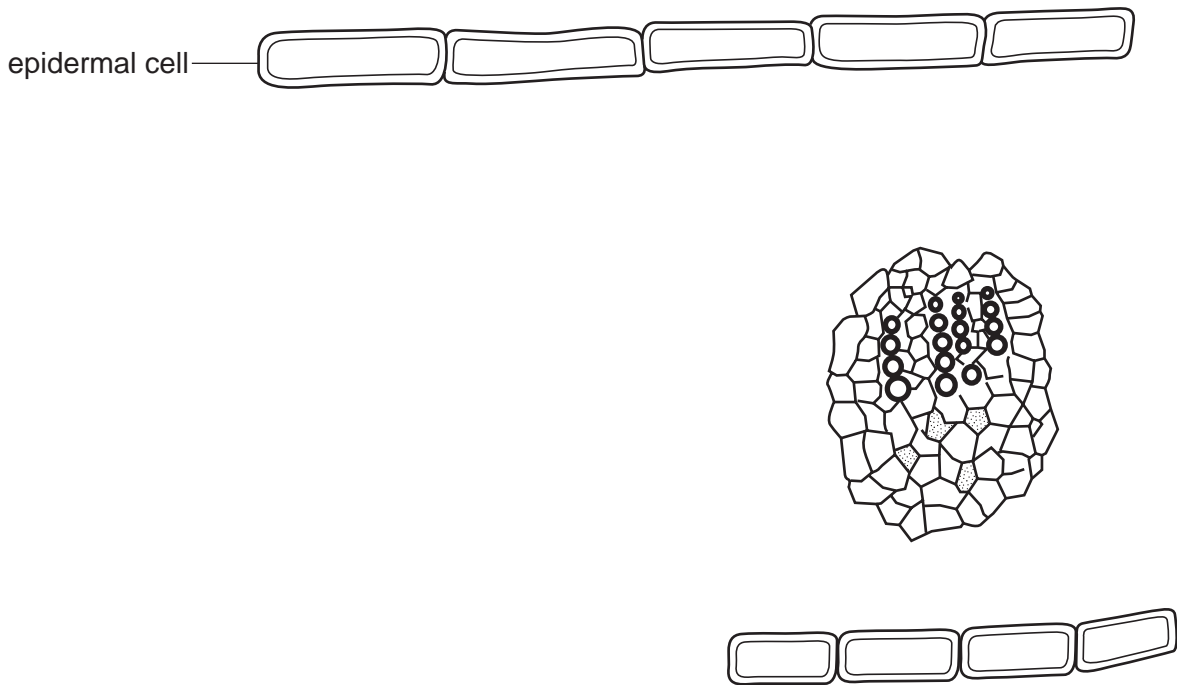


Fig. 3.1

(a) On Fig. 3.1, draw and label in their correct positions:

- (i) a palisade mesophyll cell;
- (ii) a spongy mesophyll cell;
- (iii) a pair of guard cells;
- (iv) a cuticle.

[4]

(b) On Fig. 3.1, label and name the tissue bringing water into the leaf.

[2]

(c) Explain how an increase in atmospheric humidity slows down the process of transpiration.

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

(d) Suggest **one** reason why epidermal cells are important to a leaf.

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

[Total: 10]



4 Fig. 4.1 shows a section through a small surface wound to the skin.

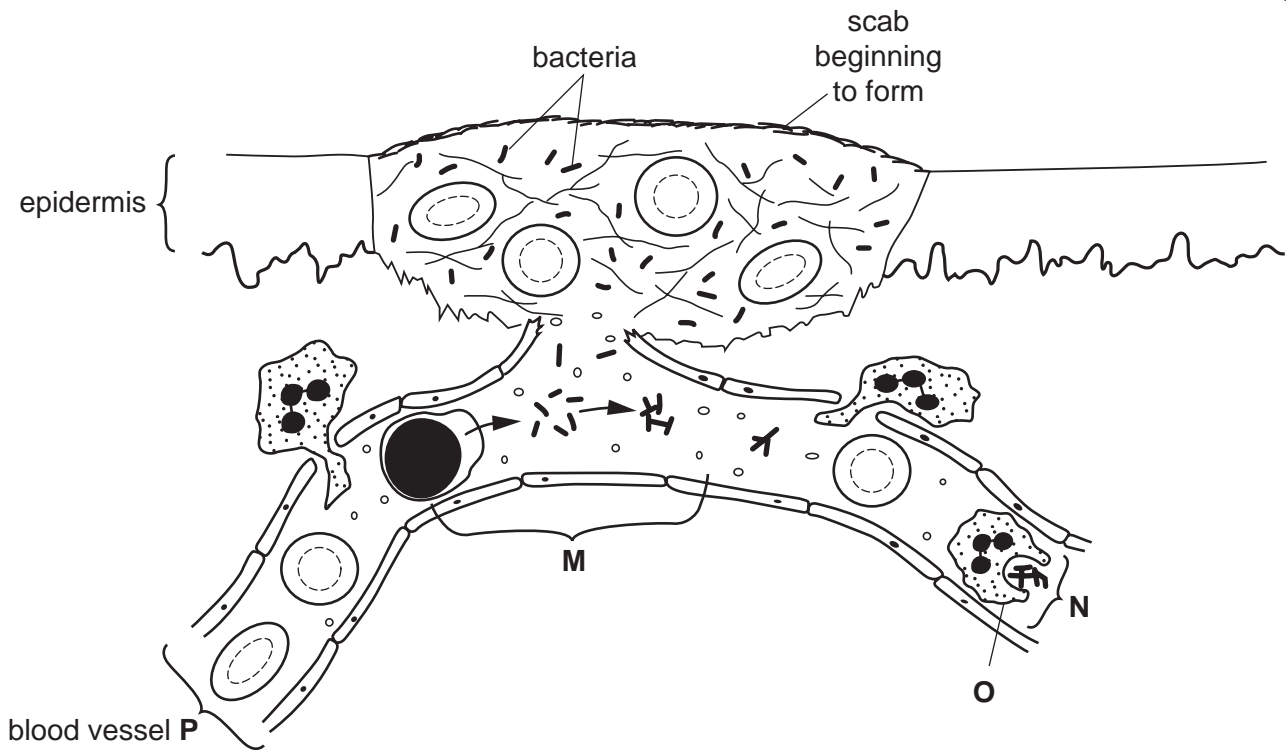


Fig. 4.1

(a) Name structure O and the type of blood vessel P shown in Fig. 4.1.

O .....

P ..... [2]

(b) State two features that are characteristic of the type of blood vessel P.

1. ....

2. .... [2]

(c) Explain what is happening to the bacteria in Fig. 4.1.

(i) at M: .....

.....

..... [2]

(ii) at N: .....

..... [1]



(d) Explain how the wound is being sealed in the region under the scab.

.....

.....

.....

.....

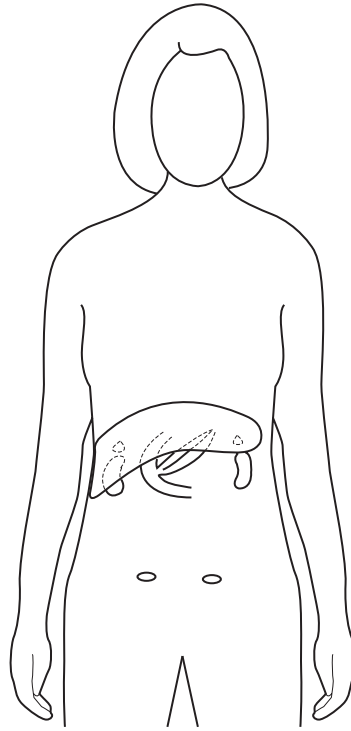
.....[4]

[Total: 11]

- 5 (a) (i) Name the hormone, released after a meal, which controls the level of glucose in the blood.

.....[1]

Fig. 5.1 shows some organs in the body of a woman.



**Fig. 5.1**

- (ii) On Fig. 5.1, label and name the gland which produces the hormone you mention in (i). [2]
- (iii) Name two other substances produced by this gland.

1. ....

2. ....[2]

(b) The hormone in (a)(i) can be manufactured in the laboratory by adding a piece of human DNA to the DNA in a host cell. Fig. 5.2 shows how this is done.

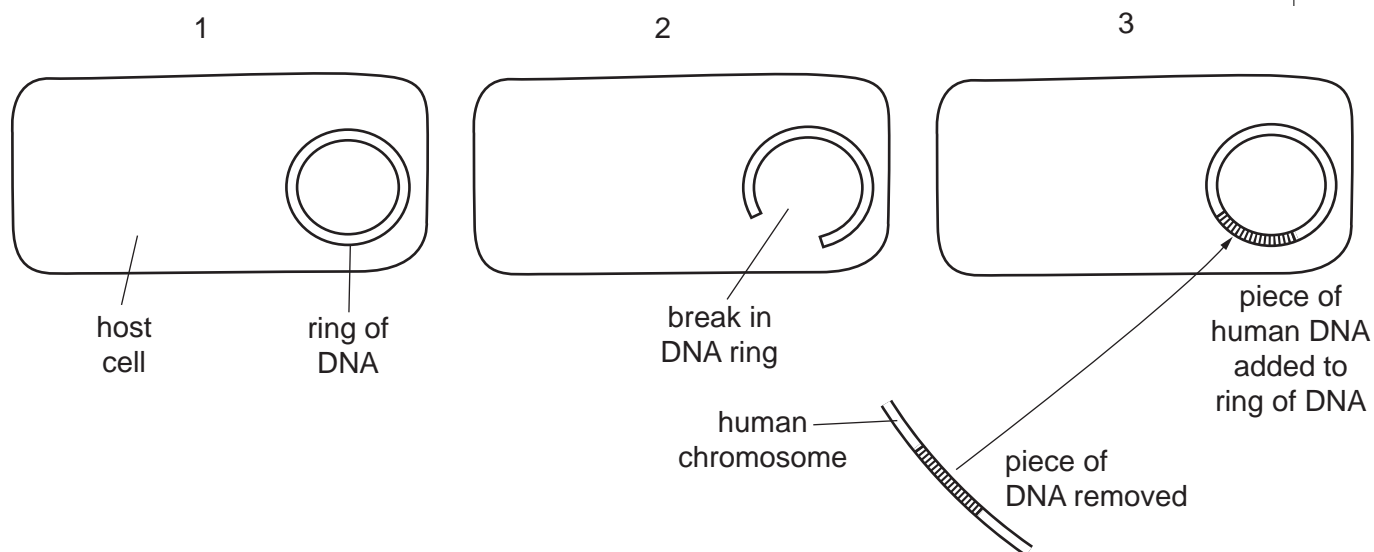


Fig. 5.2

(i) Name the type of host organism used in this process.

.....[1]

(ii) After the process in Fig. 5.2, the host cell will produce the hormone in (a)(i). Describe the piece of human DNA which must be used in this process.

.....  
.....  
.....[2]

(c) Suggest what is used to break and rejoin the DNA molecules.

.....[1]

[Total: 9]

## 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 Describe how the following processes differ from each other:
- (a) diffusion and active transport, [3]
  - (b) excretion and egestion, [3]
  - (c) breathing and respiration. [4]

[Total: 10]

- 7 (a) Explain how a knowledge of genetics has helped breeders to improve the quality of wool produced by sheep. [6]
- (b) Explain how variation can occur in a natural population of organisms. [4]

[Total: 10]

Question 8 is in the form of an **Either/Or** question. Answer only question 8 **Either** or question 8 **Or**. Do **not** answer both parts of question 8.

- 8 **Either** (a) Explain what is meant by an enzyme. [3]
- (b) Describe and explain how
- (i) pH and
  - (ii) temperature
- affect enzyme activity. [7]

[Total: 10]

- Or** (a) Describe
- (i) chlorophyll,
  - (ii) a chloroplast. [4]
- (b) Describe and explain how
- (i) temperature and
  - (ii) light intensity
- affect the rate of photosynthesis. [6]

[Total: 10]

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