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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

2639108572

BIOLOGY **5090/02**

Paper 2 Theory **May/June 2009**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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 pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

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 in the spaces provided on the Question Paper.
Write an **E** (for Either) or an **O** (for Or) next to the number 8 in the Examiner's grid below to indicate which question you have answered.

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
Section A	
Section B	
6	
7	
8	
Total	

This document consists of **15** printed pages and **1** blank page.

UNIVERSITY of CAMBRIDGE International Examinations

[Turn over

Section A

Answer **all** the questions in this section.

Write your answers in the spaces provided.

1 Fig. 1.1 shows a plant at 08.00 hours and Fig. 1.2 shows the same plant at 18.00 hours on the same day.

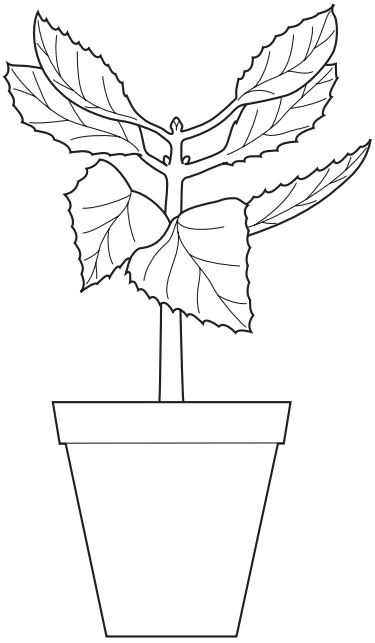

Fig. 1.1

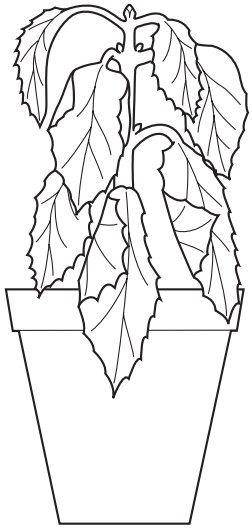

Fig. 1.2

(a) Name the condition shown by the plant in Fig. 1.2.

..... [1]

(b) **(i)** State two environmental conditions that may have led to the change in appe... of the plant.

1. .....

2. ..... [2]

(ii) Explain how environmental conditions have brought about this change.

.....

.....

.....

.....

..... [4]

(c) In the space below, draw and label guard cells and stomata as they would appear in the leaves of the plant in Fig. 1.1 and in Fig. 1.2.

in Fig. 1.1 **in Fig. 1.2**

[3]

[Total: 10]

2 In the inheritance of the colour of mouse fur, the allele for yellow fur (**D**) is dominant to the allele for grey fur (**d**).

(a) Two heterozygous yellow-coloured mice produce offspring. Use a fully labelled genetic diagram to show how the colour of mouse fur is inherited by the offspring.

State the expected ratios of genotypes and phenotypes in the offspring.

[6]

A particular combination of these alleles is known as a 'lethal' combination. Young that inherit this combination die in the uterus during the very early stages of development. This results in a 2:1 ratio of fur colour in the surviving offspring.

(b) Identify the lethal combination of alleles and explain how you reached this answer.

lethal combination .....

explanation .....

.....

..... [3]

[Total: 9]

3 Fig. 3.1 is a graph of the temperature in a heap of decomposing organic matter (compost) over a period of a month. The temperature changes are caused by the activities of microorganisms in the compost.

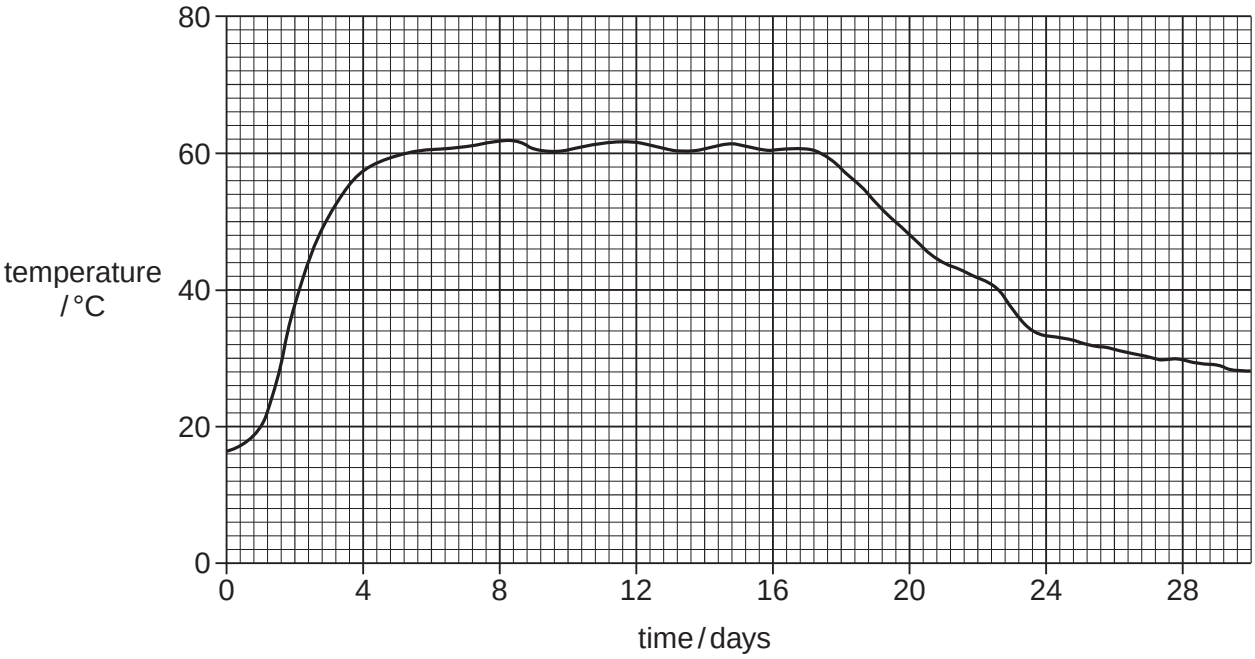

Fig. 3.1

(a) (i) Name two different types of microorganisms that could cause the changes of temperature shown in Fig. 3.1.

1. .....

2. ..... [2]

(ii) Name a type of microorganism that could **not** be responsible for the temperature changes and give a reason for your answer.

microorganism .....

reason ..... [2]

(b) Name a chemical that would be found in the compost in higher concentration at day 30 than at day 1 and explain your answer.

chemical .....

explanation ..... [2]

(c) **(i)** The external temperature remained below 30 °C.

Explain why the temperature of the compost heap changes between day 0 and day 4.

.....

.....

..... [2]

(ii) Suggest reasons for the temperature changes between days 16 and 28.

.....

.....

..... [2]

[Total: 10]

4 Fig. 4.1 shows a pair of kidneys and some associated structures.

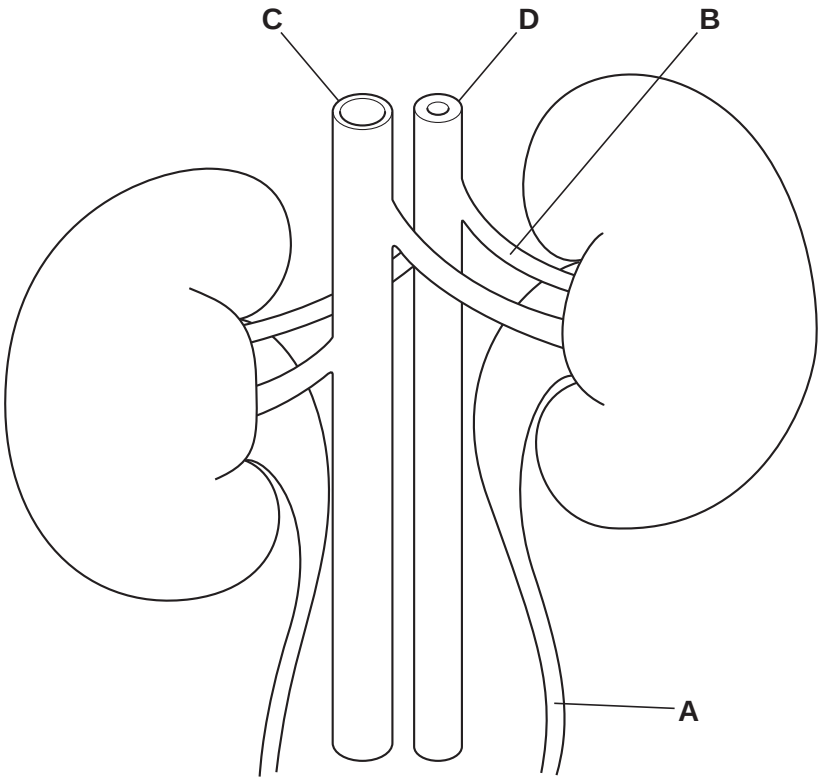

Fig. 4.1

(a) **(i)** Identify structure **A** in Fig. 4.1.

..... [1]

(ii) Peristalsis occurs continually in structure **A**. Describe and explain how this helps the structure to carry out its function.

.....

.....

..... [3]

(b) Identify structure **B** on Fig. 4.1 and state how the structural features of **C** and **D** enabled you to make your identification.

structure **B** .....

structural features of **C** and **D** .....

..... [3]

(c) On a hot day, a person consumed **only** meat before a day of energetic work. Exp... likely changes in the composition of the person's urine during the day.

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.....

.....

..... [3]

[Total: 10]

5 Over a period of ten years, an antibiotic was used in a hospital to treat an infection. [illegible] shows the amount of antibiotic used and the proportion of bacteria that survived treatment with the antibiotic over this period of time.

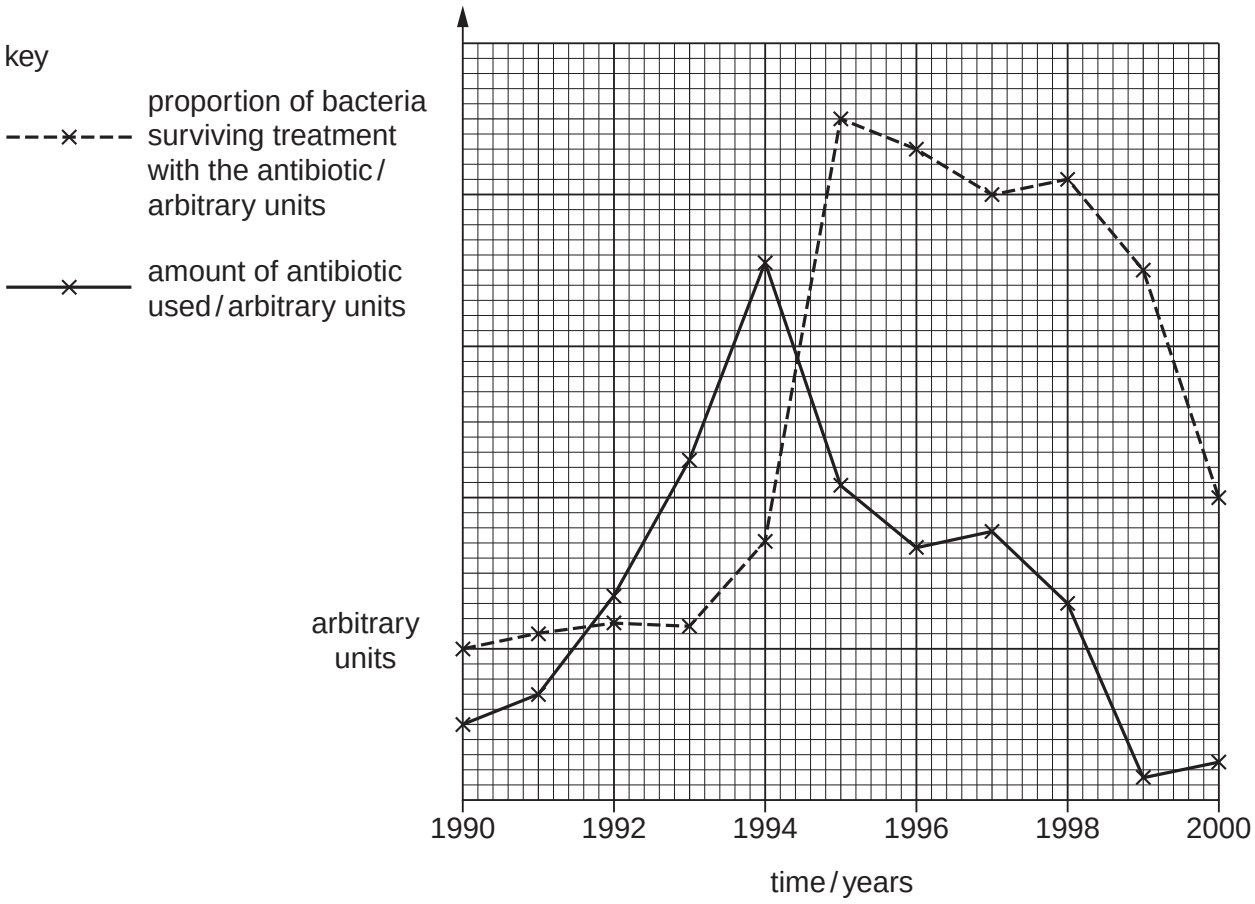

Fig. 5.1

(a) Name an antibiotic.

..... [1]

(b) State the period of time during which the antibiotic was most effective at treating the infection in the hospital.

..... [1]

(c) Suggest and explain possible causes for the increase in the proportion of bacteria that survived treatment with the antibiotic after 1994.

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..... [5]

(d) Suggest

(i) two reasons for the decreased use of this antibiotic after 1997,

1. .....

2. ..... [2]

(ii) two possible ways of controlling the infection in the hospital after 1997.

1. .....

2. ..... [2]

[Total: 11]

Section B

Answer **all** the questions. Question 8 is in the form of an **Either/Or** question.

Write your answers in the spaces provided.

6 **(a)** List the chemical elements that make up

(i) fats, ...

(ii) proteins. .....
[2]

(b) Explain why each of the following are important constituents of a balanced diet.

(i) carbohydrates

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(ii) vitamins

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(iii) water

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[8]

[Total: 10]

7 **(a)** State the equation for anaerobic respiration in yeast.

[2]

(b) **(i)** Describe and explain the changes that occur in breathing and heartbeat as a person climbs a mountain.

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..... [4]

(ii) Explain how these changes affect the working of the leg muscles during the

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..... [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)** State the effect on a plant of the lack of

(i) nitrates,

.....

.....

(ii) magnesium.

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..... [3]

(b) Explain the significance of leaf structure in the process of photosynthesis.

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..... [7]

[Total: 10]

8 Or **(a)** Explain how root hair cells are suited to the functions they perform.

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..... [4]

(b) Explain the significance of leaf structure in the process of transpiration.

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..... [6]

[Total: 10]

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