UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2386107911

BIOLOGY **5090/21**

Paper 2 Theory **October/November 2011**

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** questions.
Write your answers in the spaces provided on the Question Paper.
Section C
Answer **either** question 8 **or** question 9.
Write your answers in the spaces provided on the Question Paper.

You are advised to spend no longer than one hour on Section A.
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	
Section C	
Total	

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

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Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 Fig. 1.1 shows cells from three different types of organism (not drawn to the same scale).

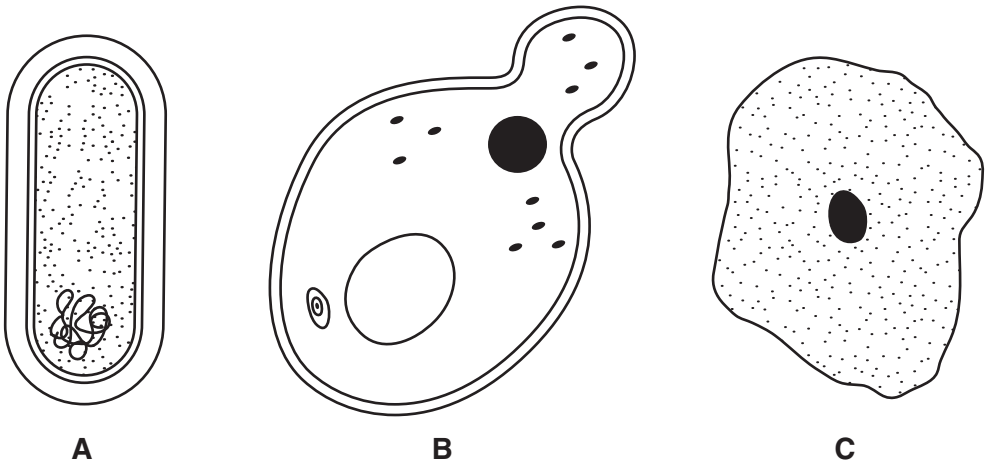


Fig. 1.1

(a) Name the type of organism represented by each of the cells and in each case give a reason for your answer.

*organism **A*** .....

reason .....

*organism **B*** .....

reason .....

*organism **C*** .....

reason .....[3]

(b) Fig. 1.2 shows a one-celled organism that has both plant and animal characteristics.

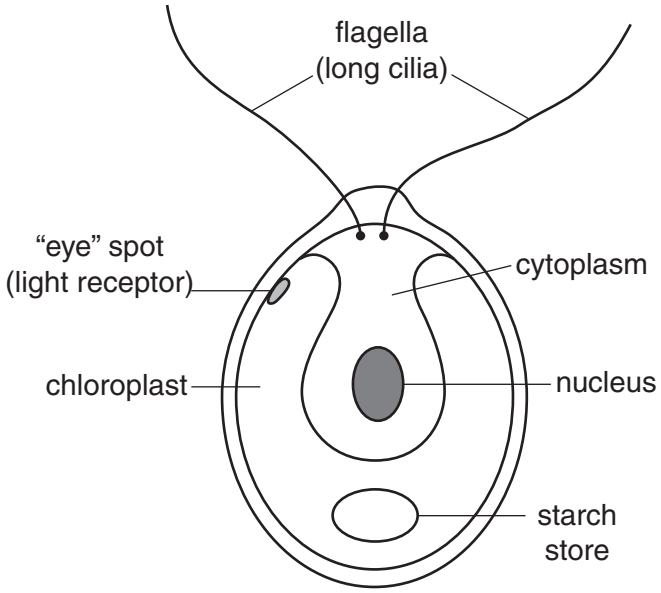


Fig. 1.2

State two reasons in each case why the organism might be identified as

(i) an animal

1. .....

2. .....[2]

(ii) a plant

1. .....

2. .....[2]

[Total: 7]

2 Cultivated banana plants produce fruits with seeds that are infertile (unable to develop). Wild banana plants produce fruits with large, fertile seeds.

(a) Suggest the type of reproduction usually found in

- cultivated bananas .....
- wild bananas .....[2]

(b) State two commercial advantages that result from the type of reproduction found in cultivated bananas.

1. .....

2. .....[2]

'Black sigatoka' is a fungal disease of banana leaves. The hyphae of the fungus spread through the intercellular spaces as shown in Fig. 2.1.

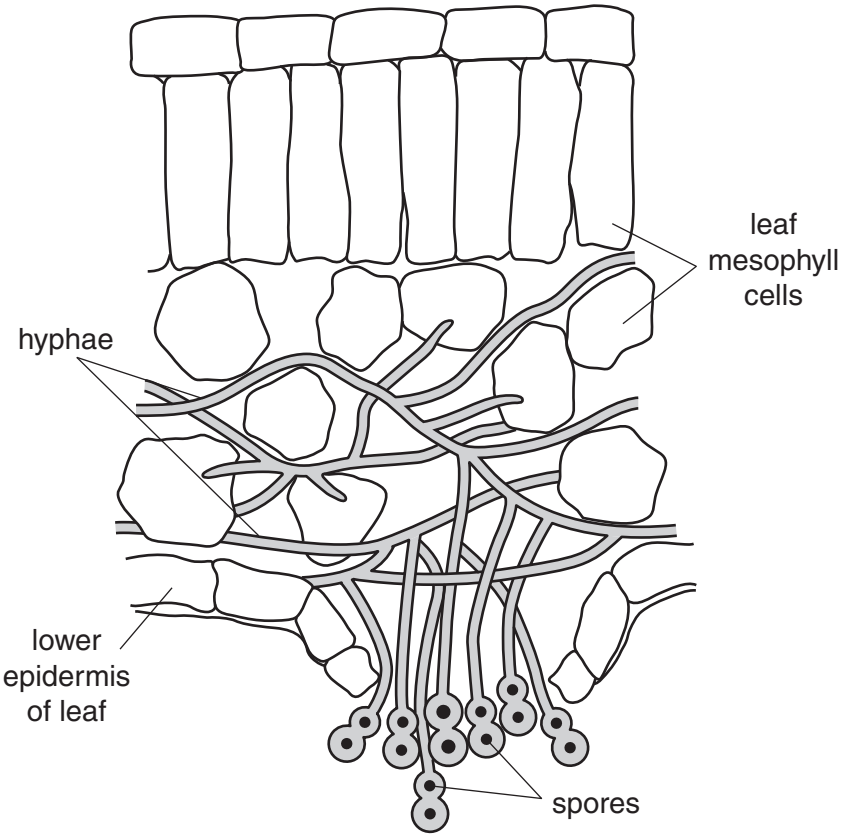


Fig. 2.1

(c) Suggest ways by which the fungus would eventually cause the leaf to die.

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.....[4]

(d) Explain why fungal diseases tend to kill a higher percentage of cultivated than of wild banana plants.

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.....[3]

[Total:11]

3 Fig. 3.1 shows a section through human skin.

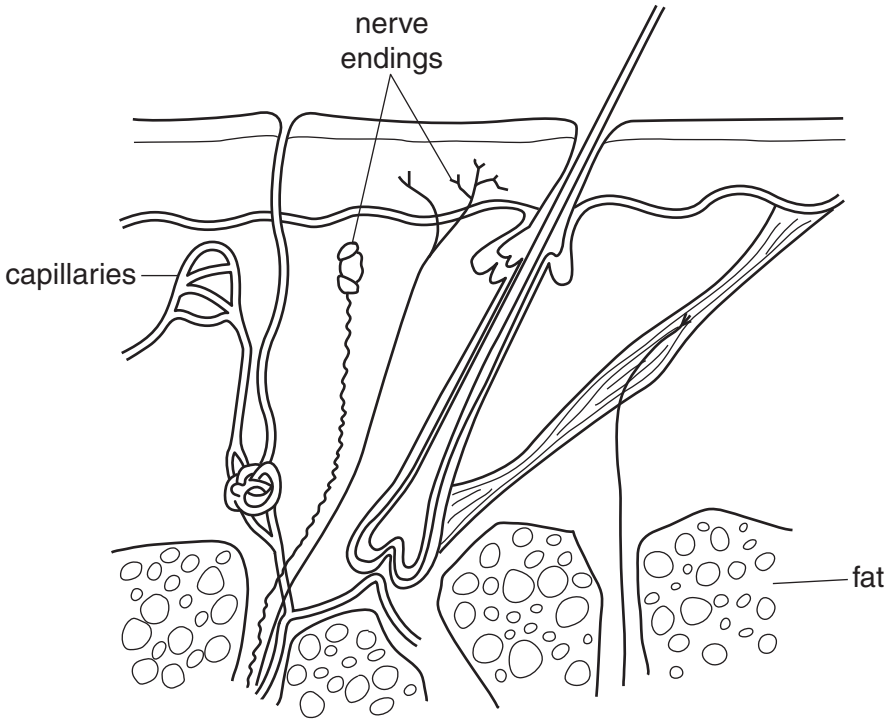


Fig. 3.1

(a) Suggest two possible functions of the nerve endings shown in Fig. 3.1.

1. .....

2. .....[2]

(b) Explain how the capillaries are involved in the loss of heat from the body during exercise.

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.....

.....

.....

.....

.....[3]

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(c) Fig. 3.2 shows a yak. The yak is a large animal that lives at high altitudes (up to 5 500 m).



Fig. 3.2

Suggest why

(i) the sweat glands of this animal are largely non-functional;

.....

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.....[2]

(ii) during those times of the year when food is plentiful, the yak stores a thick layer of fat beneath its skin;

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.....[2]

(iii) the yak has a compact body with small ears and short tail.

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.....[2]

[Total: 11]

4 Fig. 4.1 shows the percentage of plants surviving over many thousands of years. During that time, the environment was becoming drier.

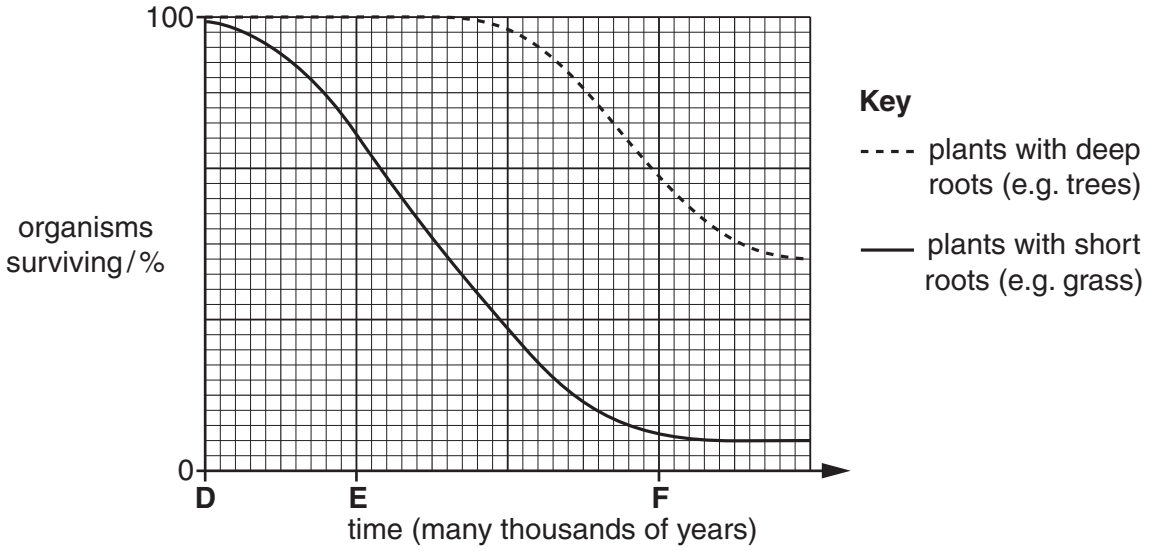


Fig. 4.1

(a) Explain why the number of grass plants is declining more rapidly than the trees at time **E**.

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.....[4]

(b) Explain why the variety of types of herbivore was greatest at time **D**.

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.....[2]

Fig. 4.2 shows the lengths of the necks of a particular species of herbivore at times **E** and **F**.

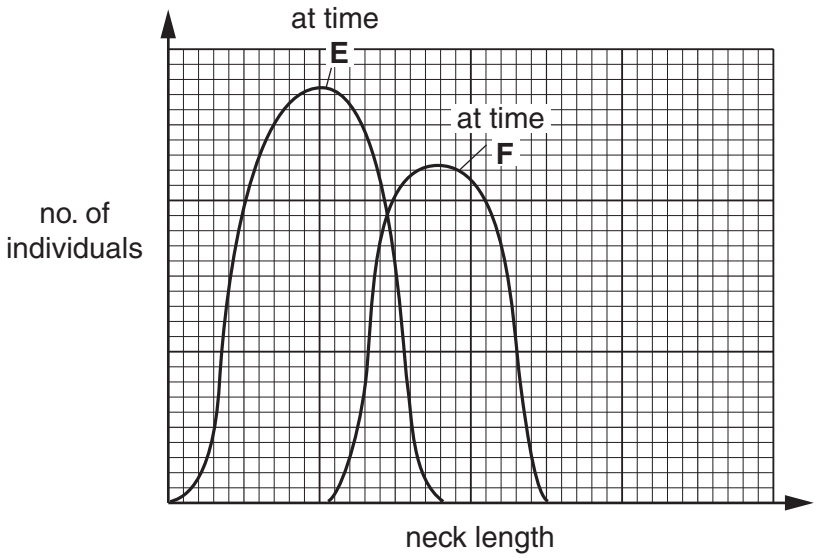


Fig. 4.2

(c) (i) Describe what the graph shows about the herbivores at time **F** compared with those at time **E**.

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.....[2]

(ii) Suggest an explanation for the change in neck length of the herbivore between times **E** and **F**.

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.....[1]

[Total: 9]

5 **(a)** **(i)** Name the structures within the nucleus that are responsible for inheritance.

.....[1]

(ii) Name the chemical in these structures that makes inheritance possible.

.....[1]

A fly was homozygous dominant for each of **two** different characters. It was crossed with a fly showing the recessive phenotypes for both characters. Two of the offspring were then crossed. The result of this cross is shown in Fig. 5.1.

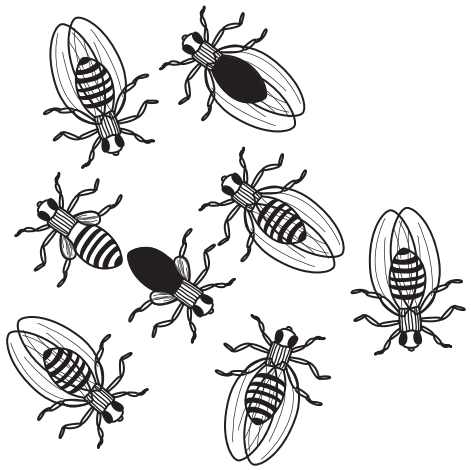


Fig. 5.1

(b) State the two pairs of contrasting characters shown by these flies.

1. .....

2. .....[2]

(c) **(i)** State the recessive phenotype of one of the pairs of characters you have identified in **(b)**.

Give a reason for your answer.

recessive phenotype .....

reason .....[2]

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(ii) Draw fully-labelled genetic diagrams to show the possible outcomes of crossing a fly showing the recessive phenotype, that you have identified in **c(i)**, with one showing the dominant phenotype.

[6]

[Total: 12]

Section B

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

Write your answers in the spaces provided.

6 **(a)** Describe and explain how microorganisms are used to produce a hormone commercially.

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.....[7]

(b) State the advantages of obtaining hormones by this method.

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[Total:10]

7 **(a)** Describe how a fully-formed fetus in the uterus develops from the time of fertilisation.

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.....[7]

(b) Describe the disadvantages of feeding a baby with bottle milk.

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.....[3]

[Total: 10]

Section C

Answer **either** question 8 **or** question 9.

Write your answer in the spaces provided.

8 **(a)** State the chemical substances that are excreted by humans.

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.....[3]

(b) Explain how each of these substances is excreted.

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.....[7]

[Total: 10]

9 **(a)** State the chemical substances released by a plant to the environment.

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(b) For each of the substances, state its origin and how it is removed from the plant.

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.....[7]

[Total: 10]

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