UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

9831504489

BIOLOGY **5090/22**

Paper 2 Theory **May/June 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 **one** question.
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 **11** printed pages and **1** blank page.

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UNIVERSITY of CAMBRIDGE International Examinations

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

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

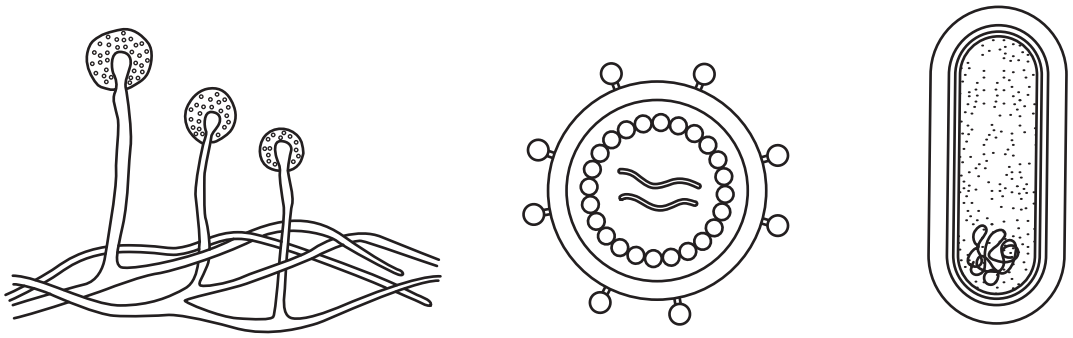


Fig. 1.1

(a) Identify the three types of organism shown in Fig. 1.1.

A .....

B .....

C ..... [3]

(b) **(i)** List the organisms in Fig. 1.1 in order of their actual size, starting with the largest.

.....[1]

(ii) State which of these organisms might bring about decay of organic matter.

.....[2]

(c) On Fig. 1.1, label

- a structure (**N**) that is always made mostly of DNA,
- a structure (**P**) that is made only of protein. [2]

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(d) A microorganism, similar to one shown in Fig. 1.1, is used commercially to make human insulin. Name the microorganism and suggest why this process is referred to as *genetic engineering*.

microorganism name .....

why the process is called genetic engineering

.....

.....

.....

.....[3]

[Total: 11]

2 Table 2.1 shows the masses of various substances in 100 g of banana fruit and in 100 g of avocado fruit.

Table 2.2 shows a person's recommended daily intake for calcium, iron and vitamin C.

Table 2.1

substance	banana	avocado
fat	0.33 g	14.60 g
cholesterol	0.00 g	0.00 g
carbohydrate	22.80 g	8.53 g
fibre	2.60 g	6.70 g
protein	1.10 g	2.00 g
calcium	5.00 mg	12.00 mg
iron	0.26 mg	0.55 mg
vitamin C	8.70 mg	10.00 mg

Table 2.2

calcium	500 mg
iron	13 mg
vitamin C	62 mg

Bananas form a significant part of the diet of some communities.

(a) Explain why bananas can be a valuable part of a person's diet.

.....

.....

.....

.....[4]

(b) Explain why a diet of only bananas is not suitable for a growing child.

.....

.....

.....

.....

.....[3]

(c) Explain which of the two fruits, banana or avocado, it would be better to eat just before running a race.

.....

.....

.....

.....[3]

[Total: 10]

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3 Fig. 3.1 shows energy flow in a habitat.

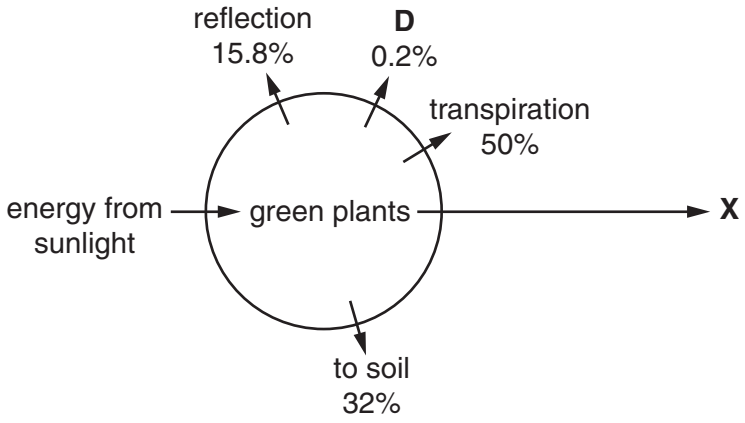


Fig. 3.1

(a) (i) Suggest the identity of **X** in Fig. 3.1. .....[1]

(ii) State the form in which energy passes from the green plants to **X**.

.....[1]

(iii) Calculate the percentage of energy passing to **X**.

.....[1]

(b) State the name of the process **D** in Fig. 3.1 .....[1]

(c) (i) Describe how energy passes into the soil and is then released.

.....

.....

.....

.....

.....[3]

(ii) Suggest how the release of this energy is useful to seeds in the soil.

.....

.....

.....

.....[2]

[Total: 9]

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4 Fig. 4.1 shows a plant cell.

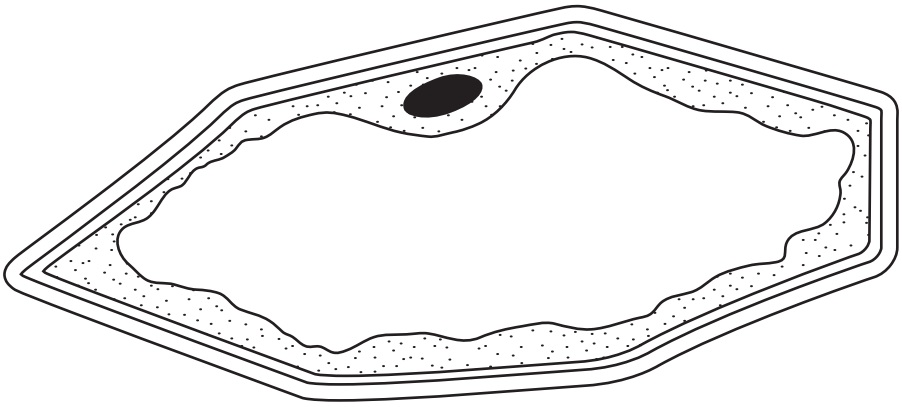


Fig. 4.1

(a) On Fig. 4.1, label a partially permeable membrane. [1]

(b) It is possible to remove the cell wall of a plant cell by using an enzyme. Suggest and explain what would happen if a cell that had been treated in this way, and also an untreated cell, were both put into distilled water for an hour.

treated cell .....

.....

.....

untreated cell .....

.....

.....[5]

(c) Cells are taken from one plant, treated with the enzyme described in **(b)**, and then grown on a culture medium. There, each of these cells divides to form a group of cells. Each group of cells then develops into a new plant.

(i) State the type of division that the nuclei of these cells have undergone.

.....[1]

(ii) Suggest and explain a possible commercial use of this procedure.

.....

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.....

.....

.....[3]

[Total: 10]

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5 Fig. 5.1(a) and Fig. 5.1(b) show graphs of the pulse and breathing rates of two students, **E** and **F**, during and after one minute's vigorous exercise.

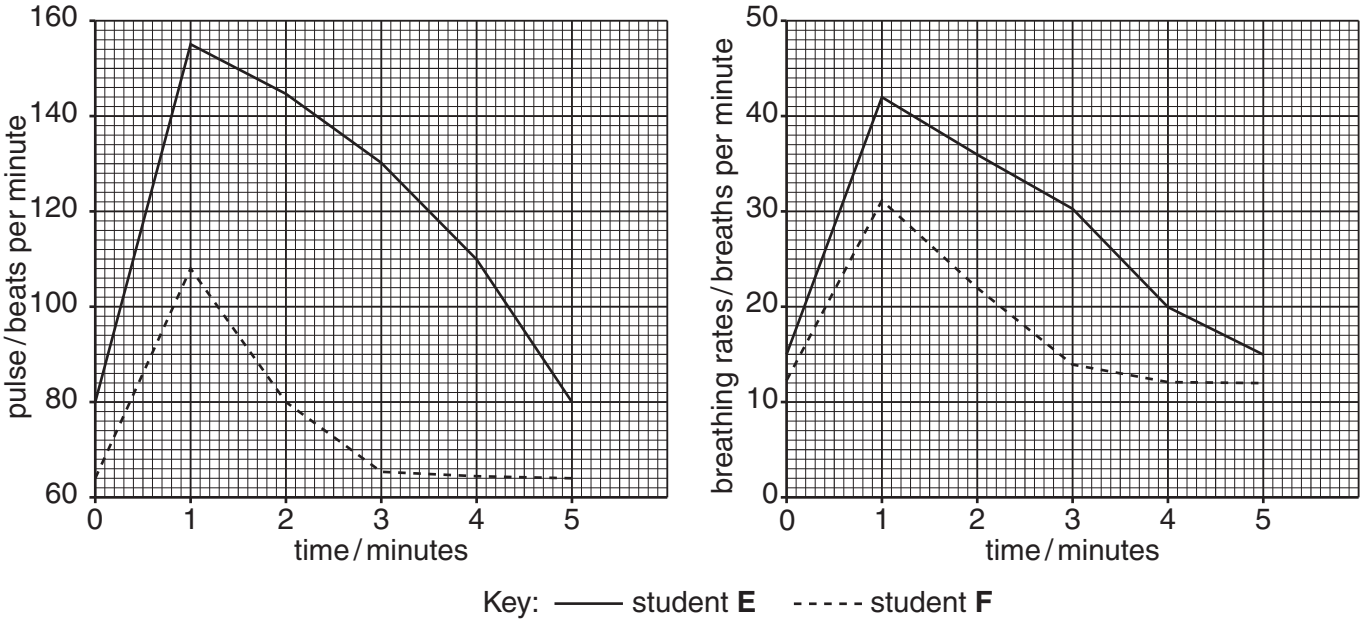


Fig. 5.1(a) **Fig. 5.1(b)**

(a) State how long it took for student **F**'s pulse and breathing rates to return to their original levels after the student had finished exercising.

pulse rate .....

breathing rate ..... [2]

(b) Explain why the pulse and breathing rates of both students increased during exercise.

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.....[4]

(c) Suggest and describe possible reasons for the differences in the effect of vigorous exercise on these two students.

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.....[4]

[Total: 10]

Section B

Answer **all** questions in this section.

Write your answers in the spaces provided.

6 **(a)** **(i)** State what is meant by *transpiration*.

.....

.....

.....[3]

(ii) Explain how the transpiration stream is important for the production of proteins in a plant.

.....

.....

.....[2]

(b) Describe and explain how tissues in the stem of a plant become stained when a plant is carefully removed from the soil and placed in a solution of dye for a few hours.

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.....

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.....

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.....[5]

[Total: 10]

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7 **(a)** Describe the functions of the kidneys.

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.....[4]

(b) Describe and explain the ways in which a person may be kept alive even when both of their kidneys have stopped functioning.

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.....[6]

[Total: 10]

Section C

Answer **one** question from this section.

Write your answers in the spaces provided.

8 **(a)** Define the term *drug*.

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.....[3]

(b) Describe the possible effects of the abuse of a named drug.

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.....[7]

[Total: 10]

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9 **(a)** Explain why there are approximately equal numbers of babies born of each sex.

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.....

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.....[3]

(b) With the aid of a genetic diagram, describe the possible genotypes and phenotypes of the offspring of two parents who both have codominant alleles for a named character.

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[7]

[Total: 10]

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