UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

1248590445

BIOLOGY **5090/22**

Paper 2 Theory **May/June 2010**

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 **14** printed pages and **2** blank pages.

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UNIVERSITY of CAMBRIDGE International Examinations

Section A

For Examiner's Use

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

Write your answers in the spaces provided.

1 (a) (i) Name a hormone that is commonly produced using genetic engineering.

..... [1]

(ii) Name the organ that produces this hormone in the human body, and state two functions of the hormone in the body.

organ .....

functions of the hormone

1. .....

2. ..... [3]

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Fig. 1.1 shows how genetic engineering can be used to manufacture an enzyme (chymosin) that clots milk in the stomachs of young mammals.

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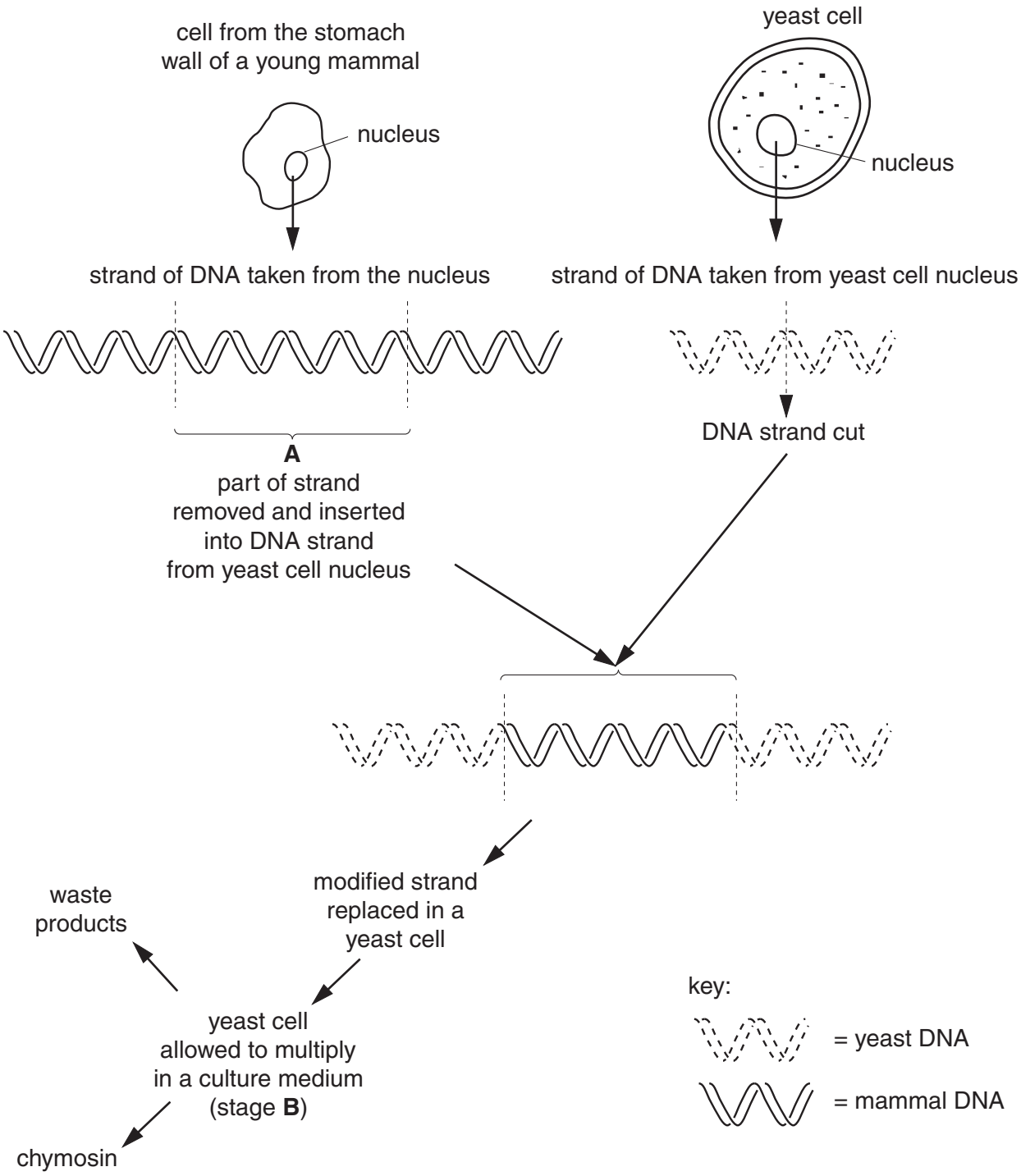


Fig. 1.1

(b) (i) Name the thread-like structure of which the DNA strand is a part.

..... [1]

(ii) Name the part of the strand labelled **A** in Fig. 1.1.

..... [1]

(c) Suggest

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(i) how the yeast could be cultured during stage **B**,

.....

.....

.....

..... [3]

(ii) the identity of the waste products that may be formed during this process.

.....

.....

..... [2]

[Total: 11]

2 A container is filled with water. Nutrient salts and several floating water plants are then added to the water. Fig. 2.1 shows a graph of the concentration of nitrate ions in the water over the following ten days.

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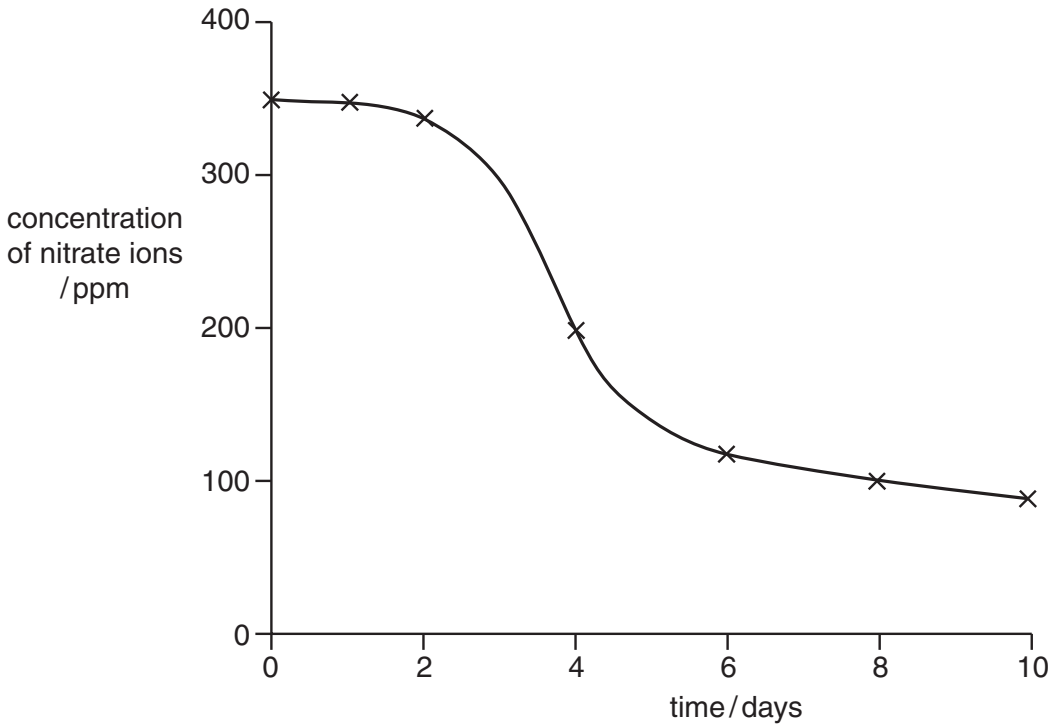


Fig. 2.1

(a) Use the graph to estimate the concentration of nitrate ions on day 5.

..... [2]

The plants in the container grew at their fastest rate between days 2 and 5.

(b) (i) Explain why they grew fastest during this time.

.....

.....

..... [3]

(ii) Suggest **one** way in which the rate of growth could have been further increased during this time.

..... [1]

(c) A second container was set up in exactly the same way except that a chemical that slows down the rate of respiration was added to the water.

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Suggest and explain the effect that this chemical would have on the rate of growth of the plants.

.....

.....

.....

..... [3]

[Total: 9]

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3 *Skimming* is a process by which the constituents that collect at the top of fresh milk are removed. Skimmed milk has had all these constituents removed.

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Table 3.1 shows the nutritional contents of 100 cm^3 of skimmed milk and 100 cm^3 of unskimmed milk.

Table 3.1

	skimmed milk	unskimmed milk
energy	146 kj	267 kj
protein	3.4 g	3.4 g
carbohydrate	5.0 g	4.6 g
saturated fat	0.04 g	2.3 g
unsaturated fat	0.06 g	1.3 g
sodium	0.1 g	0.1 g
calcium	124 mg	119 mg

(a) Name two constituents of a healthy diet, not listed above, and state their importance to a person's health.

constituent 1 .....

importance

.....

.....

constituent 2 .....

importance

.....

..... [5]

(b) Using the information in Table 3.1, suggest why skimmed milk is considered to be better for the circulatory system than unskimmed milk.

..... [2]

(c) Explain why a mother's milk is better for her baby than milk from another species of mammal.

.....

.....

.....

..... [4]

[Total: 11]

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[Turn over

For Examiner's Use

4 Fig. 4.1 shows some structures in a section through human skin.

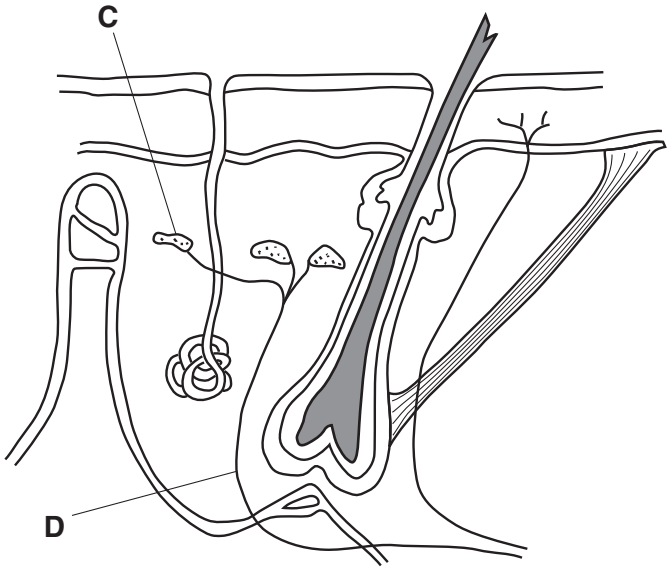


Fig. 4.1

(a) The body is able to maintain its internal environment within narrow limits. State the term for this process.

..... [1]

(b) Structures **C** and **D**, in Fig. 4.1, are involved in the process of temperature regulation.

Identify structures **C** and **D** and state the part they play in the process.

C .....

part played .....

.....

D .....

part played .....

..... [4]

(c) The consumption of alcohol causes the muscles in artery walls to relax.

Taking this into consideration, suggest why people who work in environmental temperatures below 5 °C might be advised not to drink alcohol before or during work.

.....

.....

.....

..... [3]

[Total: 8]

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5 Fig. 5.1 shows a section through a microscopic, one-celled organism often found growing on the bark of trees.

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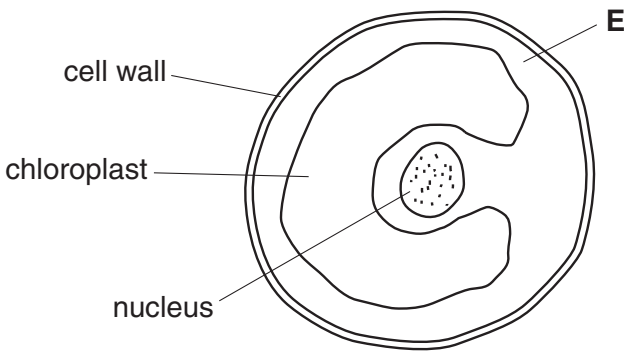


Fig. 5.1

(a) Suggest the identity of the region labelled **E** in Fig. 5.1.

..... [1]

(b) **(i)** List the structures visible in Fig. 5.1 which suggest that this organism might be a plant.

.....

..... [2]

(ii) List the ways in which this cell differs from a palisade cell in a plant leaf.

.....

.....

.....

..... [4]

Fig. 5.2 shows the same cell reproducing.

For Examiner's Use

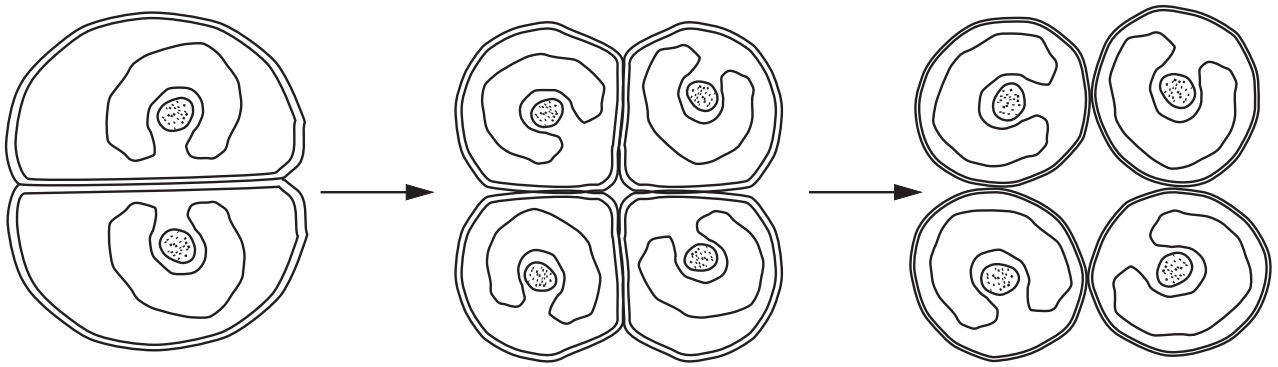


Fig 5.2

(c) Explain why successive generations of this organism have remained unchanged in appearance for many thousands of years.

.....

.....

..... [4]

[Total: 11]

Section B

For Examiner's Use

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

Write your answers in the spaces provided.

6 **(a)** Describe how a molecule of carbon dioxide in the air becomes part of a carbohydrate molecule stored in a leaf of a plant.

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..... [7]

(b) Describe how a carbohydrate molecule stored in a leaf of a plant can become a starch molecule stored in the root.

.....

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.....

.....

..... [3]

[Total: 10]

For Examiner's Use

7 Several insects, males and females from the same herbivorous species, were carried by air currents to a distant island. Although the island had an established food web, it did not include insects of this species.

(a) In terms of the food web on the island, suggest and explain what could happen over the next few years.

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..... [6]

(b) Explain why it is important to conserve species.

.....

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..... [4]

[Total: 10]

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

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8 Either

A person cuts their hand on a piece of glass that they are picking up from the ground.

(a) Describe how the body's defence mechanisms protect the person from infection.

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..... [8]

(b) Explain how the person would know if the cut had damaged an artery.

.....

.....

..... [2]

[Total: 10]

8 Or

For Examiner's Use

Potatoes contain starch. Describe and explain what happens to a piece of potato, that has been fried in oil, as it passes through the mouth (buccal cavity) and small intestine.

mouth (buccal cavity)

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small intestine

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[Total: 10]

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