



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE
NAME

CENTRE
NUMBER

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

CANDIDATE
NUMBER

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|



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.



Section A

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

Write your answers in the spaces provided.

*For
Examiner's
Use*

- 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]

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

For
Examiner's
Use

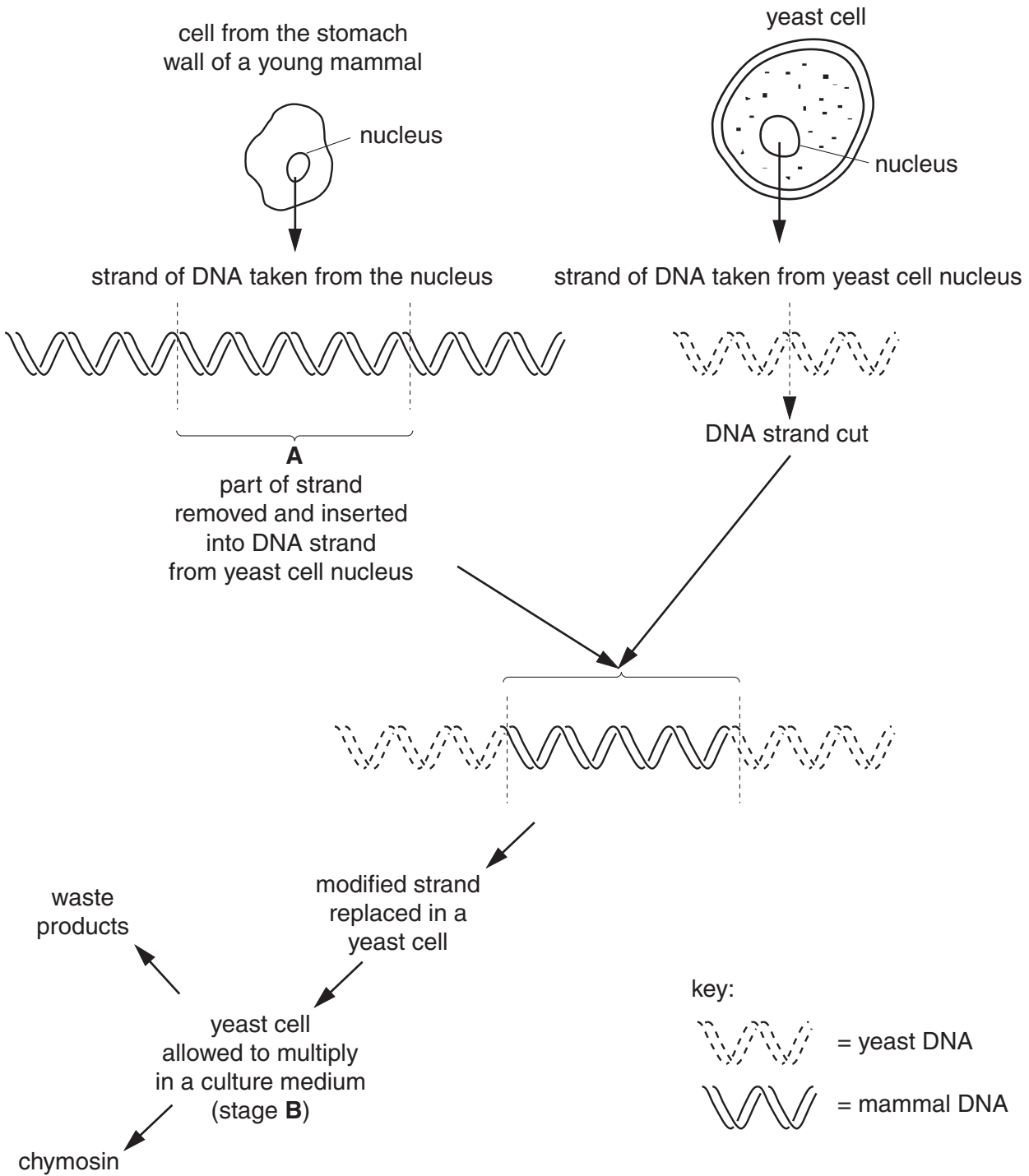


Fig. 1.1

(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

(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.

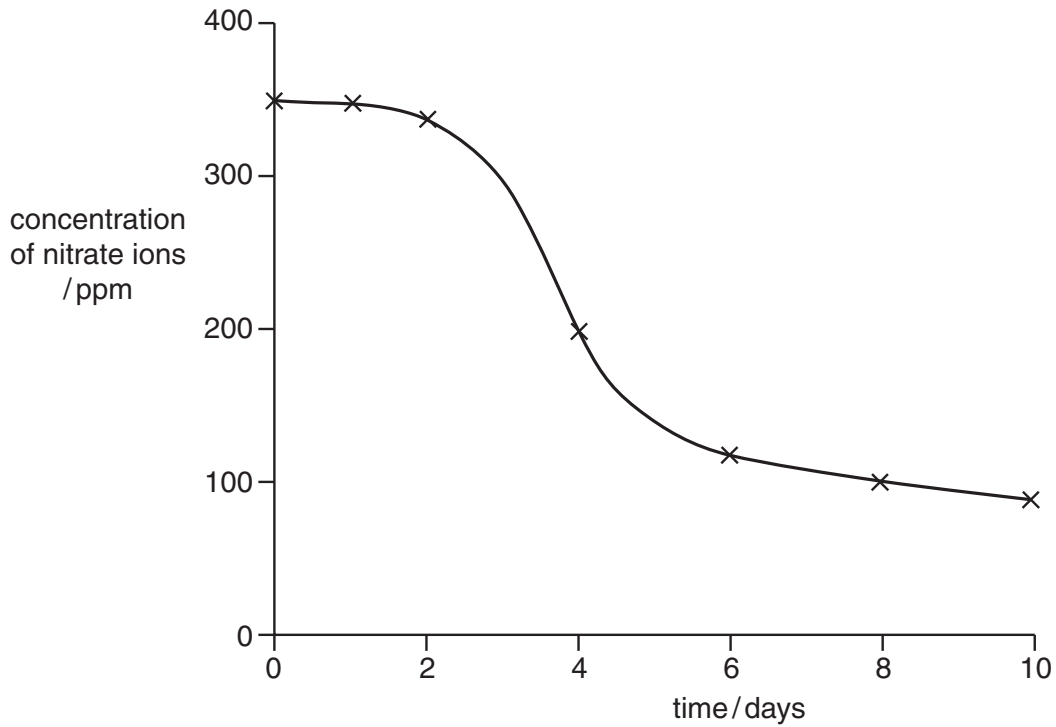


Fig. 2.1

- (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.

*For
Examiner's
Use*

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

.....

.....

.....

..... [3]

[Total: 9]

- 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.

Table 3.1 shows the nutritional contents of 100cm³ of skimmed milk and 100cm³ 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]

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

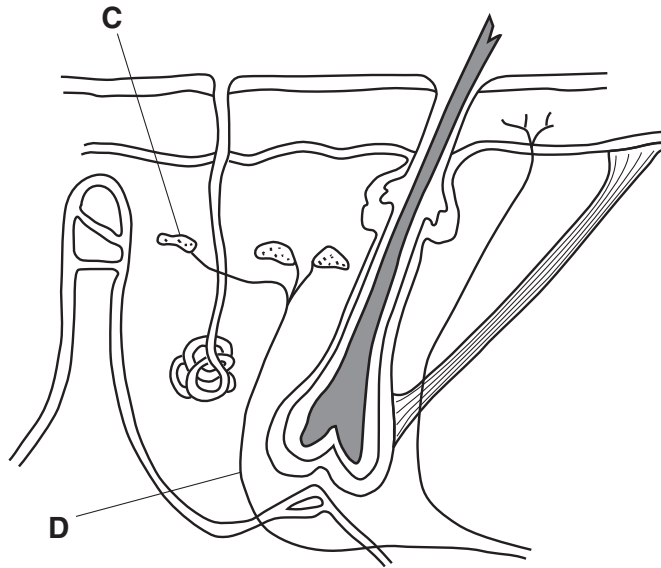


Fig. 4.1

(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]

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

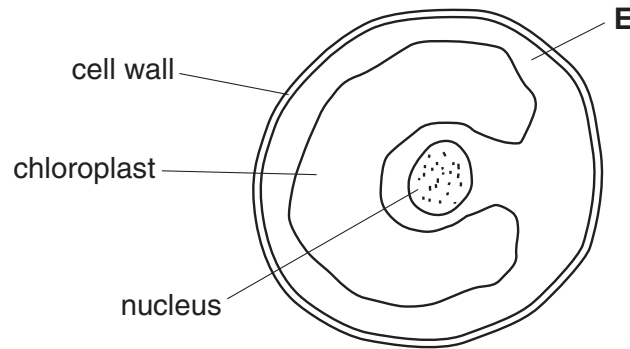


Fig. 5.1

- (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

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

*For
Examiner's
Use*

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.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
..... [7]

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

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

[Total: 10]

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.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
..... [6]

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

.....
.....
.....
.....
.....
..... [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 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.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [8]

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

.....

.....

..... [2]

[Total: 10]

8 Or

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)

.....

.....

.....

.....

.....

small intestine

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[Total: 10]

BLANK PAGE

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.