Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2606809359

BIOLOGY **5090/22**

Paper 2 Theory **May/June 2015**

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

Section A
Answer **all** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section B
Answer **both** questions in this section.
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.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

This document consists of **16** printed pages.

CAMBRIDGE International Examinations

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 Fig. 1.1 shows the effect of temperature on the rate at which yeast cells in a nutrient solution produce bubbles of a gas.

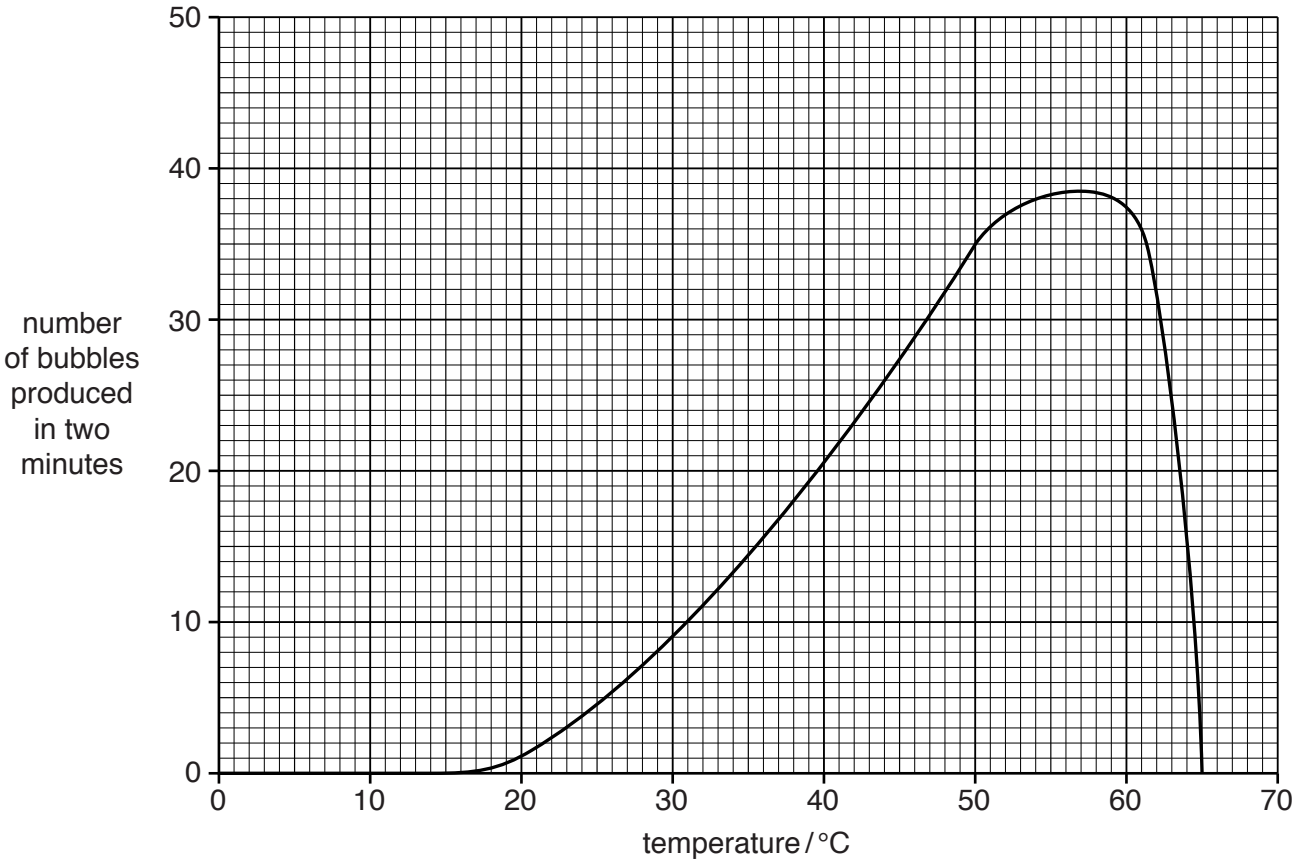

Fig. 1.1

(a) Name each of the following:

- the gas released

.....

- the metabolic process that releases it

.....

- the essential chemical constituents of the nutrient solution.

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

(b) Use Fig. 1.1 to find the optimum temperature for the metabolic process.

..... [1]

(c) Explain the shape of the curve after 60 °C.

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..... [3]

(d) Explain what would happen to the rate at which bubbles of the gas are produced by the yeast if the temperature of the solution is then gradually reduced from 65 °C to 45 °C.

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..... [2]

[Total: 9]

2 Fig. 2.1 shows a plant called the ghost plant and a magnified diagram of its flower. It is called a ghost plant because it is often completely white in colour. Cells of the ghost plant do not contain chloroplasts.

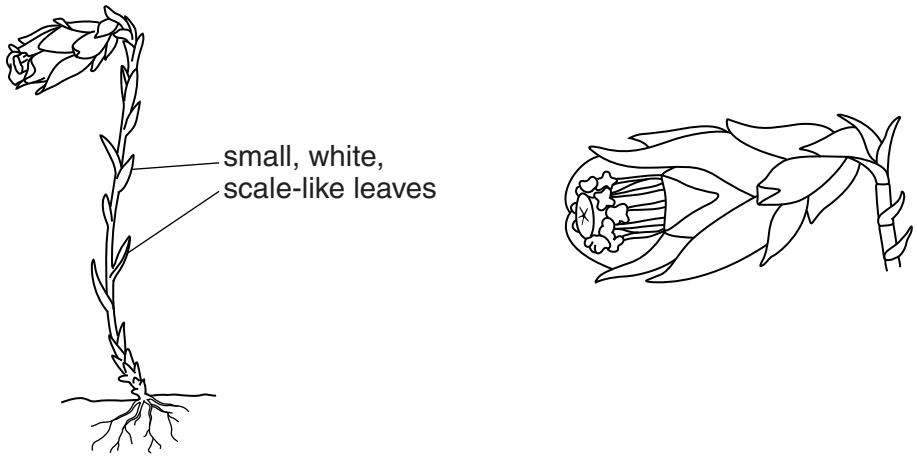

Fig. 2.1

(a) From the appearance of the flower, suggest how it is pollinated. Give a reason for your answer.

how the flower is pollinated .....

reason .....

..... [2]

Question 2 continues on page 6

Question 2 continues over the page

(b) The ghost plant has an unusual feeding relationship with an underground fungus and with a nearby tree, as shown in Fig. 2.2 (opposite).

(i) From the information given in Fig. 2.2, name the producer.

..... [1]

(ii) The flow of nutrients in the feeding relationship is shown by the arrow on Fig. 2.2. Suggest **three** nutrients that flow from the tree to the ghost plant.

1 .....

2 .....

3 ..... [3]

(c) Suggest why the leaves of the ghost plant do not possess stomata or large intercellular spaces.

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..... [5]

[Total: 11]

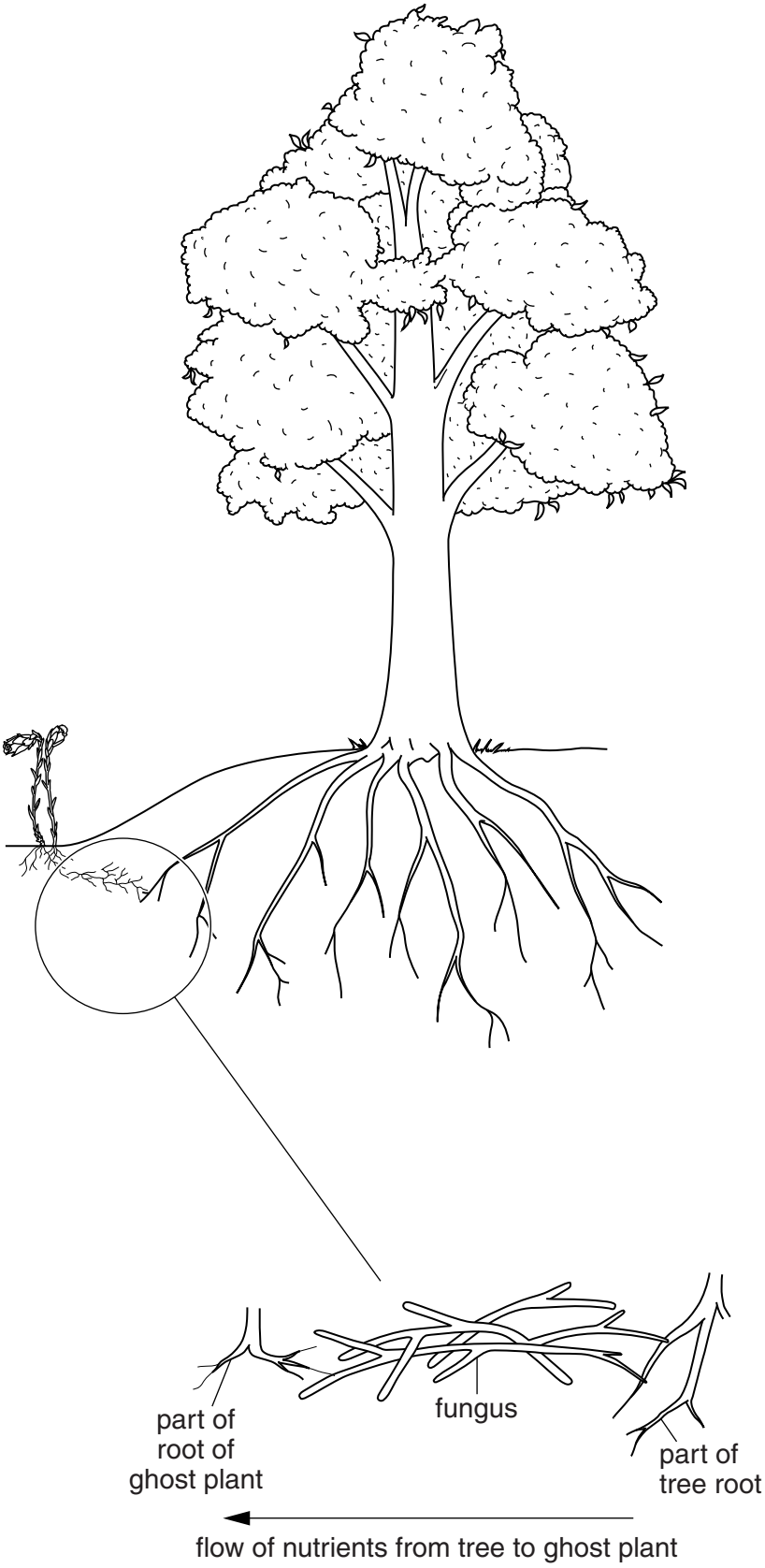

Fig. 2.2

3 Fig. 3.1 shows the blood supply to cells in the liver.

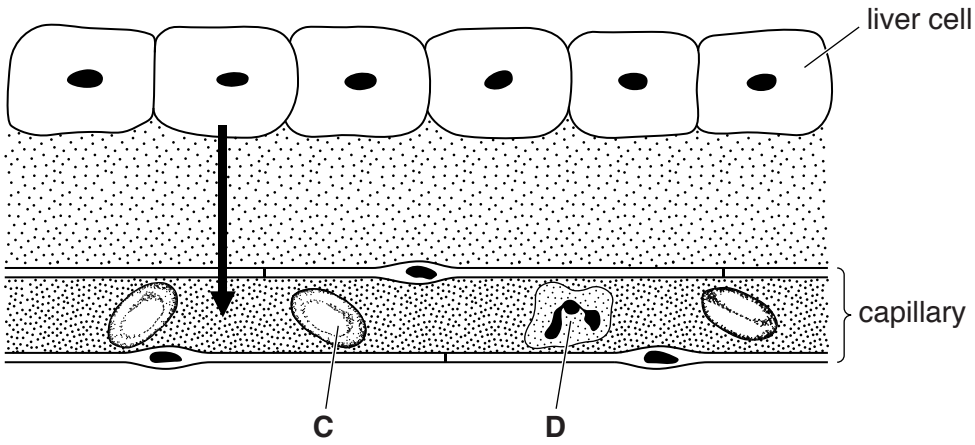

Fig. 3.1

(a) (i) Name the cells labelled **C** and **D** in Fig. 3.1.

C .....

D ..... [2]

(ii) The arrow in Fig. 3.1 shows the movement of substances from the liver cells into the capillary.

Name **three** substances that move in the direction shown.

1 .....

2 .....

3 ..... [3]

(b) (i) Describe the effect of adrenaline on liver cells.

.....

.....

.....

..... [2]

(ii) State a situation in which this might occur.

..... [1]

(c) Sometimes the liver is unable to remove glucose from the blood. This condition is called diabetes.

(i) State **two** symptoms of this condition.

1 .....

2 ..... [2]

(ii) State how this condition is treated.

.....

..... [1]

[Total: 11]

4 The dominant allele for the ability to smell the scent of a particular flower is represented by **A**. The recessive allele, which does not allow a person to smell the scent of the flower, is represented by **a**.

(a) Using these letters, indicate each of the following:

(i) the genotype of a woman who is unable to smell the flower

..... [1]

(ii) the possible alleles found in the gametes of a woman who can smell the flower.

..... and ..... [2]

(b) Fig. 4.1 represents some alleles on part of the sex chromosomes of a woman and of a man.

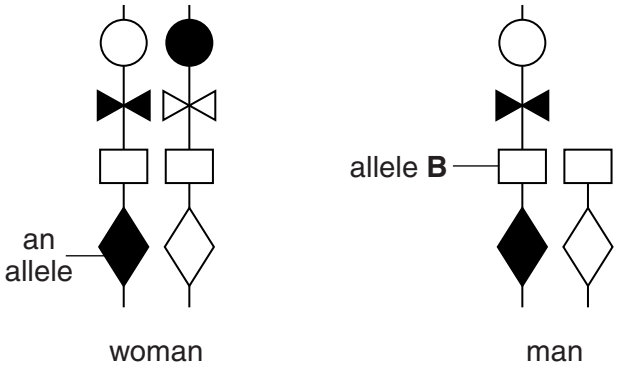

Fig. 4.1

In the space below, draw these alleles as they might appear in a sperm cell that carries the Y chromosome.

[2]

(c) Fig. 4.2 shows how the alleles on one of the chromosomes might appear in a cell taken from somewhere else in the man's body. Allele **B** shows a mutation.

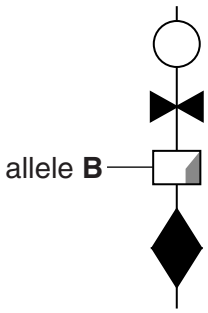

Fig. 4.2

Suggest **two** possible causes of the mutation.

1 .....

2 ..... [2]

(d) Mutated alleles such as that shown in Fig. 4.2 are usually recessive.

Use your knowledge of genetics to explain why society discourages marriage between closely-related people.

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..... [3]

[Total: 10]

5 Table 5.1 shows the mean daily water intake and loss by a person.

Table 5.1

water intake / dm^3		water loss / dm^3	
drinks food	1.50 0.75	faeces sweat urine exhaled air	0.10 0.52 1.50 ……..
Total	2.25	**Total**	2.50

(a) **(i)** Using the information in Table 5.1, calculate the daily loss of water in exhaled air.

..... [1]

(ii) Explain why exhaled air contains water.

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..... [2]

(b) Explain why, even though 2.25 dm^3 of water are taken in through the mouth, the faeces contain only 0.10 dm^3 of water.

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..... [3]

(c) Explain the importance of water in urine.

.....

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..... [2]

(d) The difference between water intake and water loss by a person is accounted for by water produced by a metabolic process in the body. Name this metabolic process.

..... [1]

[Total: 9]

Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

6 **(a)** For a **named** fruit or seed, describe how it is adapted for animal dispersal.

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..... [4]

(b) A student planted seeds from different types of plant in the same area of soil.

(i) Suggest why some of the seeds did not germinate.

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..... [2]

(ii) Explain why several of the seedlings were unable to survive after a few weeks.

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..... [4]

[Total: 10]

7 **(a)** Describe each of the following processes:

(i) active transport

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..... [4]

(ii) osmosis.

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..... [3]

(b) Explain what happens to a red blood cell when it is placed in pure water.

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..... [3]

[Total: 10]

Section C

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

Write your answers in the spaces provided.

8 **(a)** Outline the role of microorganisms in the production of yoghurt.

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..... [6]

(b) Explain how a slice of bread, if left exposed to the air, decomposes due to the growth of fungi.

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..... [4]

[Total: 10]

9 Syphilis and HIV are both spread by sexual contact.

(a) Describe the cause and symptoms of syphilis.

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..... [6]

(b) State how syphilis is treated.

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..... [1]

(c) Discuss how the spread of HIV may be controlled.

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..... [3]

[Total: 10]