Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

6807684767

BIOLOGY **5090/22**

Paper 2 Theory **October/November 2014**

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.
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.

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

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Section A

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

Write your answers in the spaces provided.

1 Fig. 1.1 shows a kidney and its associated structures. The arrows show the direction of flow of fluids in these structures.

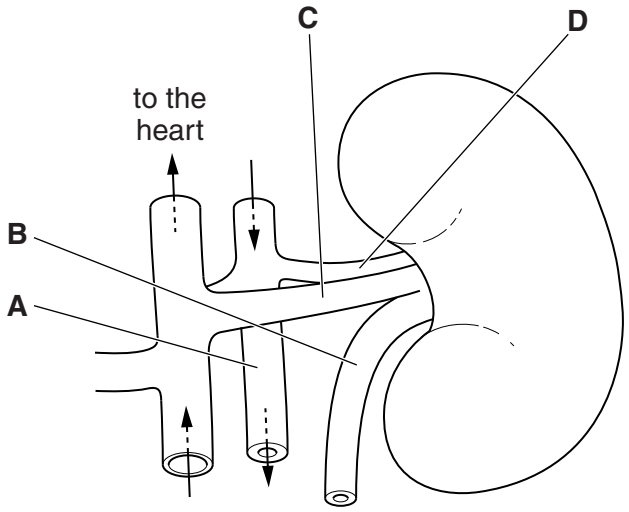


Fig. 1.1

(a) (i) Name the structure labelled **A** in Fig. 1.1. ..... [1]

(ii) Name the chamber of the heart through which blood in structure **A** last passed.

..... [1]

(b) Table 1.1 shows the relative concentrations of various substances in structures **B** and **C**. Complete the table to show the possible concentrations of these substances in structure **D**.

Table 1.1

substance	relative concentration in structure		
	B	**C**	**D**
amino acids	0.00	0.05	
glucose	0.00	0.10	
mineral ions	1.50	0.72	
proteins	0.00	8.00	
urea	2.00	0.03	

[5]

(c) Explain how the relative concentrations of glucose might change in structures **B**, **C** and **D** in a person with diabetes.

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..... [3]

[Total: 10]

2 Fig. 2.1 shows parts of the alimentary canal that lie in the upper part of the human body.

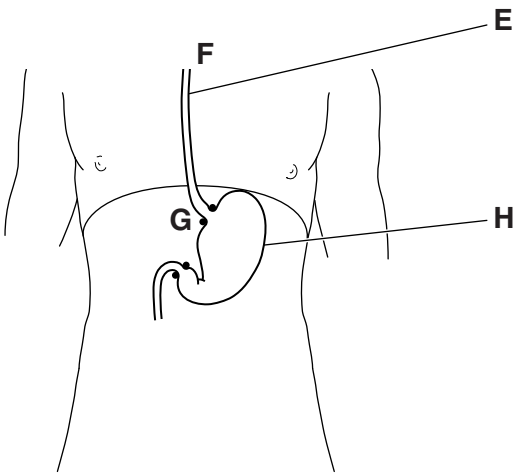


Fig. 2.1

(a) (i) Name the part labelled **E**. ..... [1]

(ii) Name the process that carries food from **F** to **G**. ..... [1]

(b) Suggest why the walls of part **H** are normally coated with mucus.

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(c) Sometimes, particularly when a person is lying flat, partly digested food returns into structure **E** through the valve at **G**. This can cause discomfort known as heartburn.

(i) Suggest why heartburn is not a biologically accurate name for this condition.

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..... [1]

(ii) Suggest and explain why medications for this condition are often alkaline in nature.

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[Total: 10]

3 Pitcher plants, similar to the one shown in Fig. 3.1, trap insects in their pitchers and digest them to supplement their nutritional requirements.

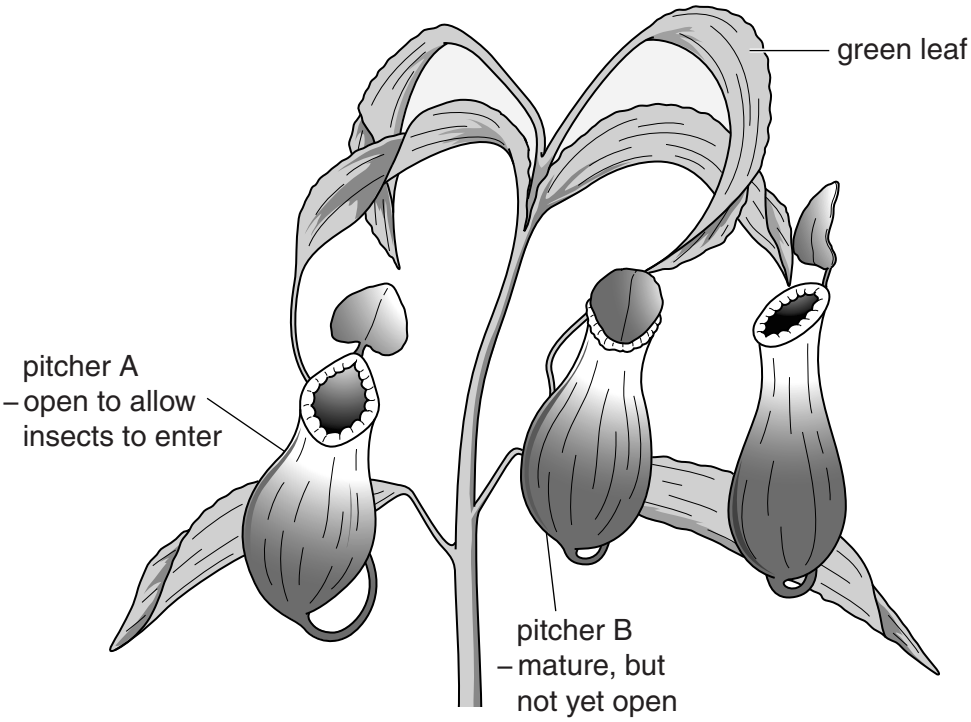


Fig. 3.1

Some pitcher plants attract small mammals such as bats to spend their resting hours comfortably in the opening to their pitchers. Others attract small tree shrews by releasing a sweet, nectar-like substance from glands on the pitcher lids, as shown in Fig. 3.2.

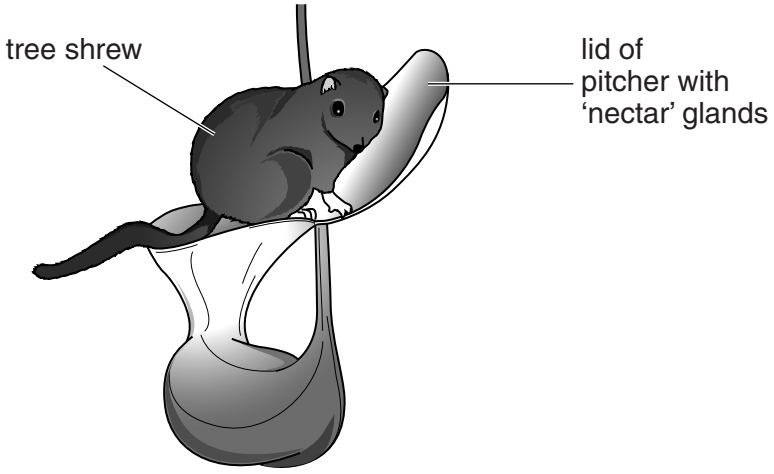


Fig. 3.2

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(a) **(i)** Name the process used by the pitcher plant to manufacture the nectar-like substance before it is released.

..... [1]

(ii) Describe how that substance is translocated to the glands on the pitcher lids.

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..... [2]

(b) The pitcher plant that attracts the tree shrew is called the lavatory plant. These pitcher plants that attract small mammals rarely catch and digest many insects.
Suggest and describe how these plants may benefit from the presence of tree shrews and bats.

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..... [5]

[Total: 8]

4 Fig. 4.1 is an incomplete flow chart of the process of anaerobic respiration in yeast and in muscles.

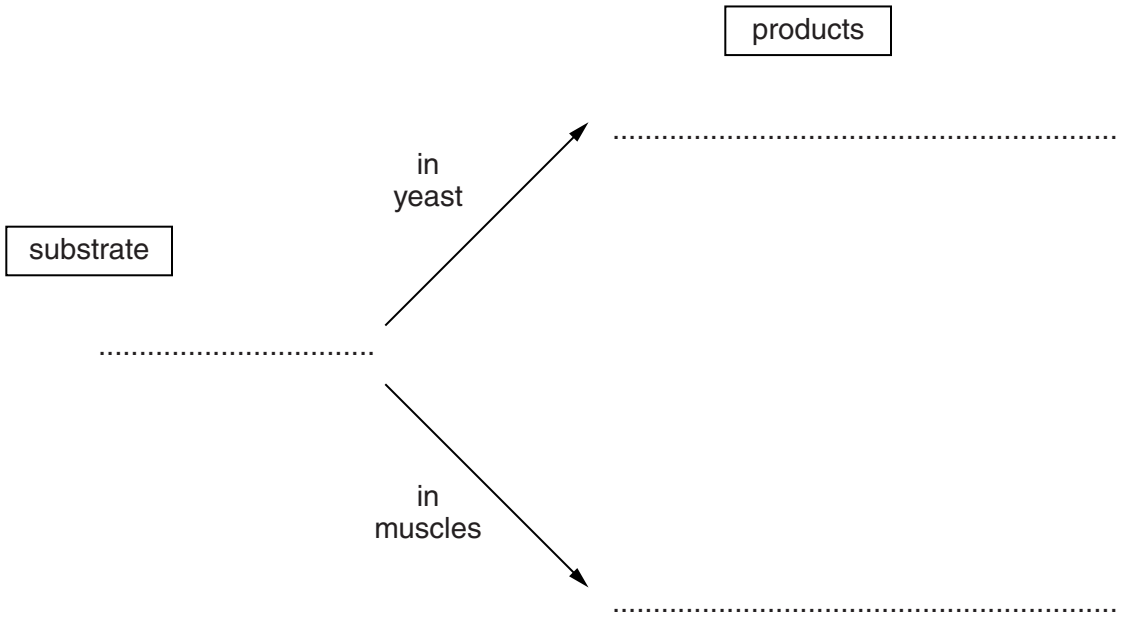


Fig. 4.1

(a) Complete Fig. 4.1 to show the substrate and products for anaerobic respiration in yeast and in muscles. [4]

(b) Yeast cells may be killed by their use in food biotechnology. Explain what causes the death of the yeast in each of the following.

(i) brewing

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..... [2]

(ii) making bread

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..... [1]

(c) Explain why muscle cells are not killed by anaerobic respiration in a healthy person.

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..... [2]

(d) Suggest why anaerobic respiration does not release as much energy as aerobic respiration for each molecule of the same substrate.

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..... [2]

[Total: 11]

5 There are many different drugs available to treat high blood pressure. Fig. 5.1 shows the mean heart rates of two groups of people, **J** and **K**, over a five-year period.
From the start, and throughout the period, group **K** were treated with a drug called a beta-blocker.
Group **J** did not take any form of medication.

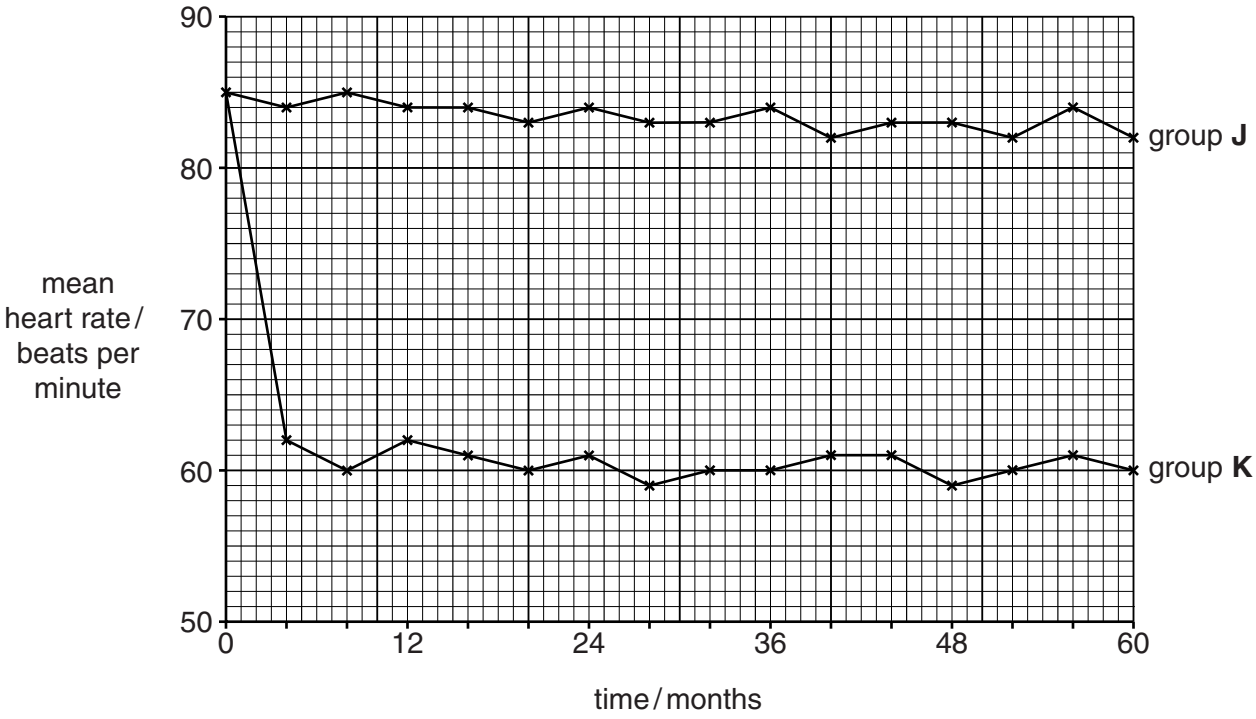


Fig. 5.1

(a) (i) State the term used to describe group **J**. ..... [1]

(ii) Using information from Fig. 5.1, describe the effect on the heart of taking beta-blockers.

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..... [3]

(b) On Fig. 5.1, draw a curve to show the expected effect on the mean heart rate of Group **J** if, after three years, half of them started to take beta-blockers. [3]

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(c) Some other drugs reduce blood pressure by having an effect on blood vessels. Suggest how these drugs may cause a decrease in blood pressure.

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..... [4]

[Total: 11]

Section B

Answer **all** questions in this section.

Write your answers in the spaces provided.

6 **(a)** Describe the differences between an ovule, a seed and a fruit.

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(b) Explain how fruits or seeds may be modified for dispersal by wind.

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..... [4]

[Total: 10]

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7 **(a)** Explain what is meant by the term *reflex action*.

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(b) **(i)** Name a reflex action and explain how it is brought about.

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(ii) Explain its value to the human body.

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..... [2]

[Total: 10]

Section C

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

Write your answers in the spaces provided.

8 **(a)** **(i)** Give an example of a food chain involving **four** named organisms.

(ii) Draw and label a pyramid of numbers for your food chain.

[4]

(b) Explain how energy is lost along a food chain.

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[Total: 10]

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9 **(a)** Explain what is meant by the term *double circulation*.

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..... [4]

(b) Explain how the heart is adapted to keep blood flowing in a double circulation.

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[Total: 10]

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