UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

4514146363

BIOLOGY **5090/21**

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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Section A

For Examiner's Use

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

Write your answers in the spaces provided.

1 Fig. 1.1 shows what happens to energy as it passes through an herbivorous mammal (an ox).

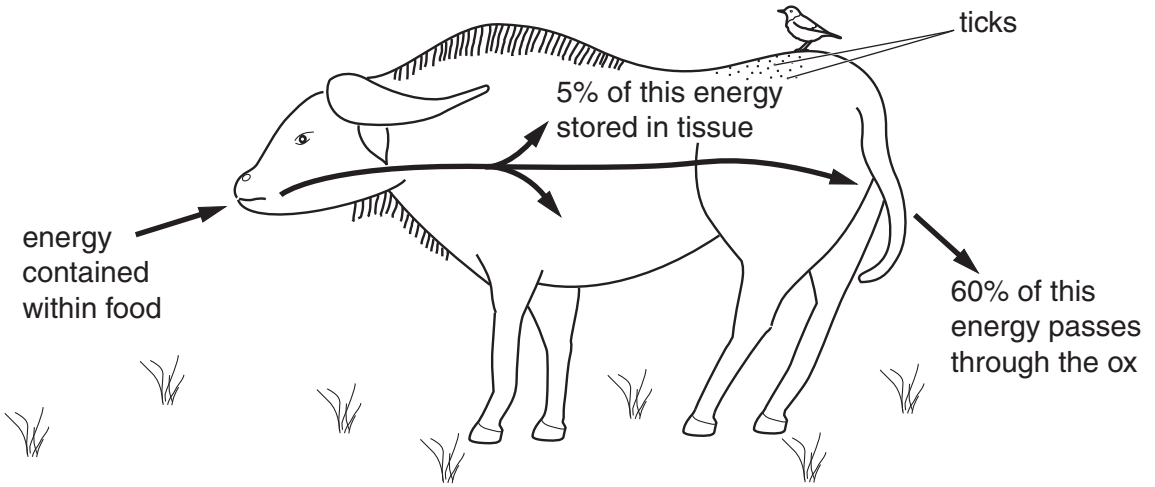


Fig. 1.1

(a) (i) State the source of the energy in the food eaten by the ox.

..... [1]

(ii) State the form in which the energy is present in the carbohydrate eaten by the ox.

..... [1]

(b) (i) Name the process that makes the remaining 35% of the energy in the food available to the ox.

..... [1]

(ii) State three ways in which the energy may be used within the ox.

1. .....

2. .....

3. ..... [3]

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The bird on the ox's back is an oxpecker that feeds both on blood-sucking parasites (ticks) living on the ox, and on blood from the ox's wounds.

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(c) (i) In the space below, draw a food web to show the feeding relationships of the organisms in Fig. 1.1.

[1]

(ii) Explain why there must always be fewer oxpeckers than ticks in this food web.

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.....[3]

[Total: 10]

2 Table 2.1 shows some of the major constituents in a person's sweat on a warm day (in micrograms per 100 cm^3).

For Examiner's Use

Table 2.1

nitrogenous compounds (including urea, amino acids and broken-down hormones)	glucose	sodium chloride
31.5	2.5	3.5

(a) State and explain the effects of sweating on the urine produced during a hotter day.

.....

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.....[4]

To prevent sweating, some people use a spray (antiperspirant) that blocks the sweat ducts.

(b) Explain why it is important to use an antiperspirant **only** on those parts of the body, such as under the arms, that produce the most sweat.

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.....[3]

People who sweat a lot and do not wash regularly may suffer from body odour.

(c) Suggest why the regular use of an antibacterial soap is better than an antiperspirant spray for controlling body odour.

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.....[3]

[Total: 10]

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3 Fig. 3.1 shows a small, deep-rooted bush growing in a warm, dry climate.
Branches **B** and **C** have a similar number of leaves, but the leaves of branch **B** are enclosed in a transparent polythene bag that empties into a container.

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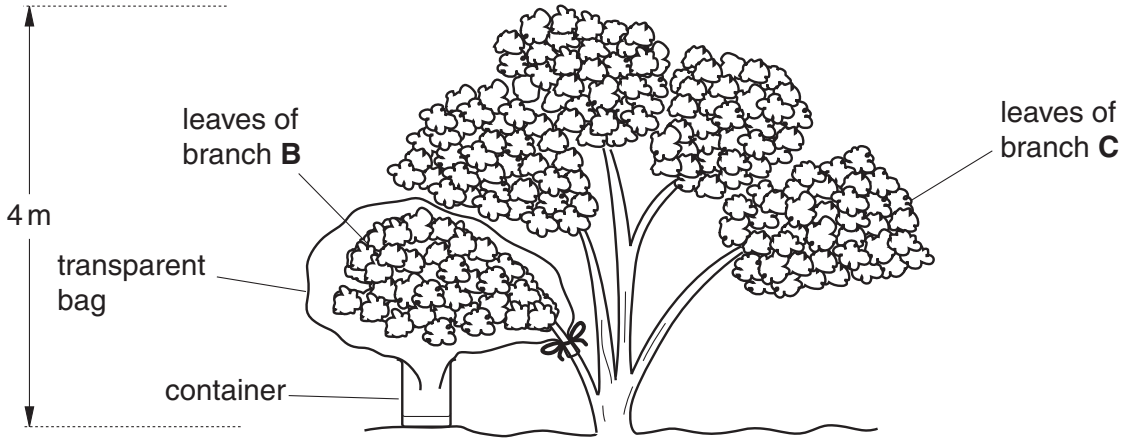


Fig. 3.1

Fig. 3.2 is a graph showing the total volume of water lost by the leaves of each of the two branches during the same day.

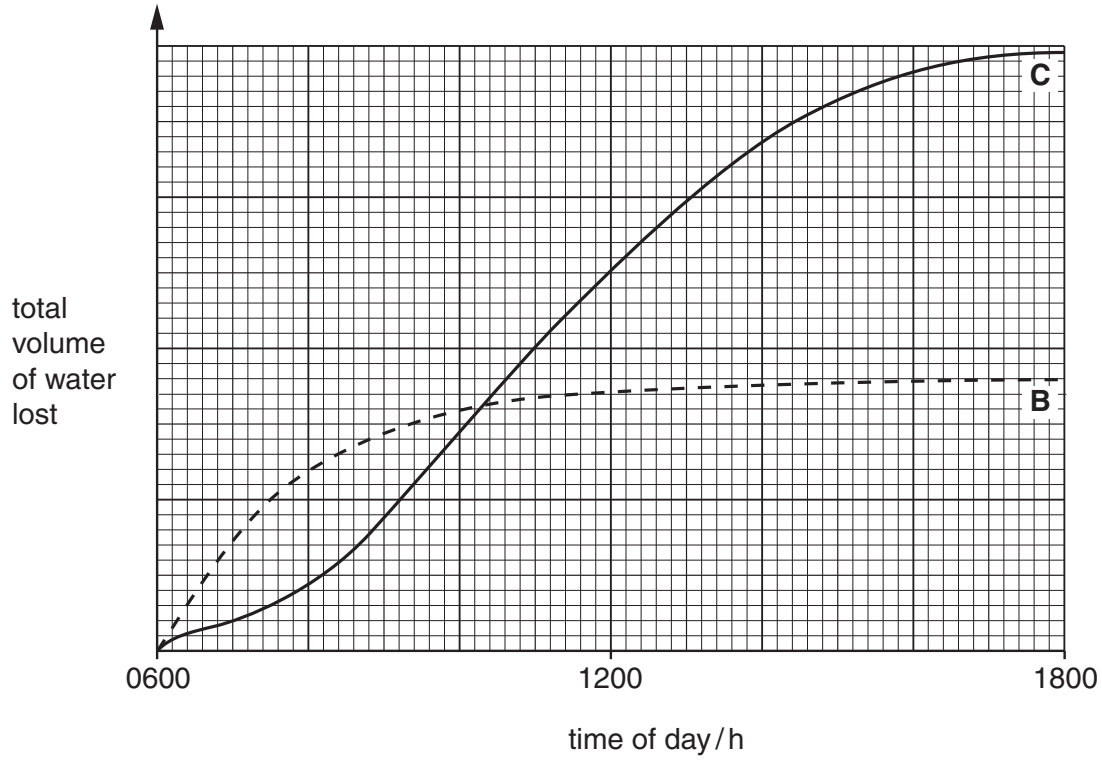


Fig. 3.2

(a) State two environmental factors responsible for the water loss during the day by branch **C**. For each factor, explain how it affects water loss.

For Examiner's Use

factor 1. .....

explanation

.....

.....

factor 2. .....

explanation

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.....[5]

(b) Explain how the volume of water lost from branch **B** is at first greater, then less than that lost from branch **C**.

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.....[2]

(c) Suggest why, even for certain plants that are poisonous to humans, the container in Fig. 3.1 can supply travellers with safe drinking water.

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.....[3]

[Total: 10]

4 Fig. 4.1(a) and Fig. 4.1(b) each shows cells from the lining of the trachea. One is from a smoker and one is from a non-smoker.

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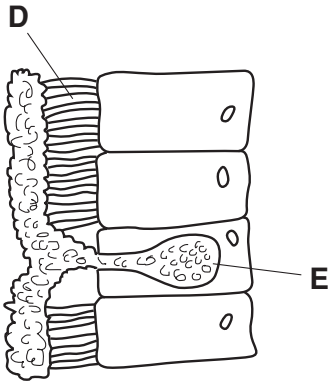


Fig. 4.1(a)

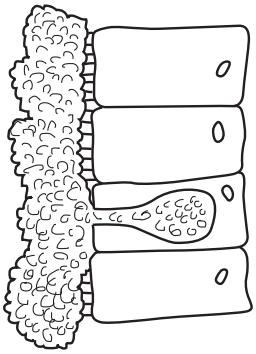


Fig. 4.1(b)

(a) (i) Identify **D** and **E** in Fig. 4.1(a).

D .....

E ..... [2]

(ii) Describe the function of **D**.

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.....[2]

Fig. 4.2(a) and Fig. 4.2(b) show cross-sections through the alveoli of a smoker and of a non-smoker.

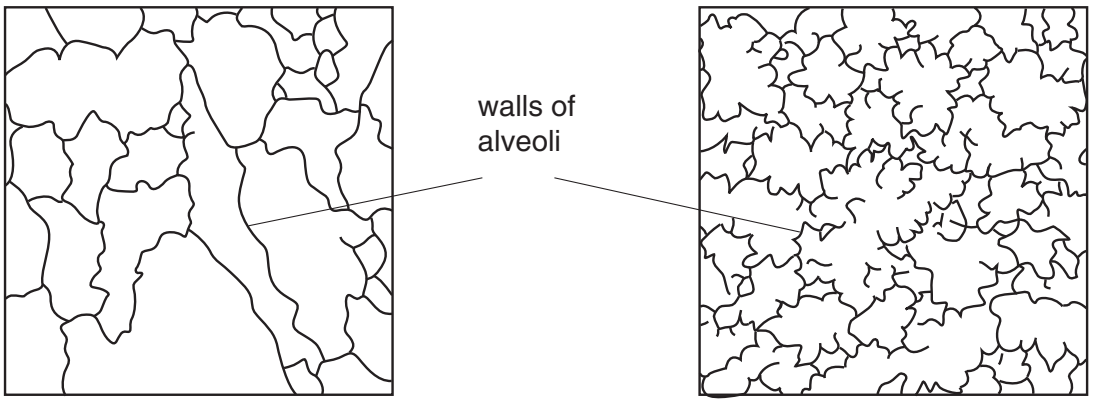


Fig. 4.2(a)

Fig. 4.2(b)

(b) (i) Identify the figures on this page that show the trachea and alveoli of the smoker.

Fig. ..... and Fig. ..... [1]

(ii) Explain how the effect of smoking on the alveoli could affect the general health of a smoker.

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[Total: 10]

5 Fig. 5.1 shows some cells from a root of a plant.

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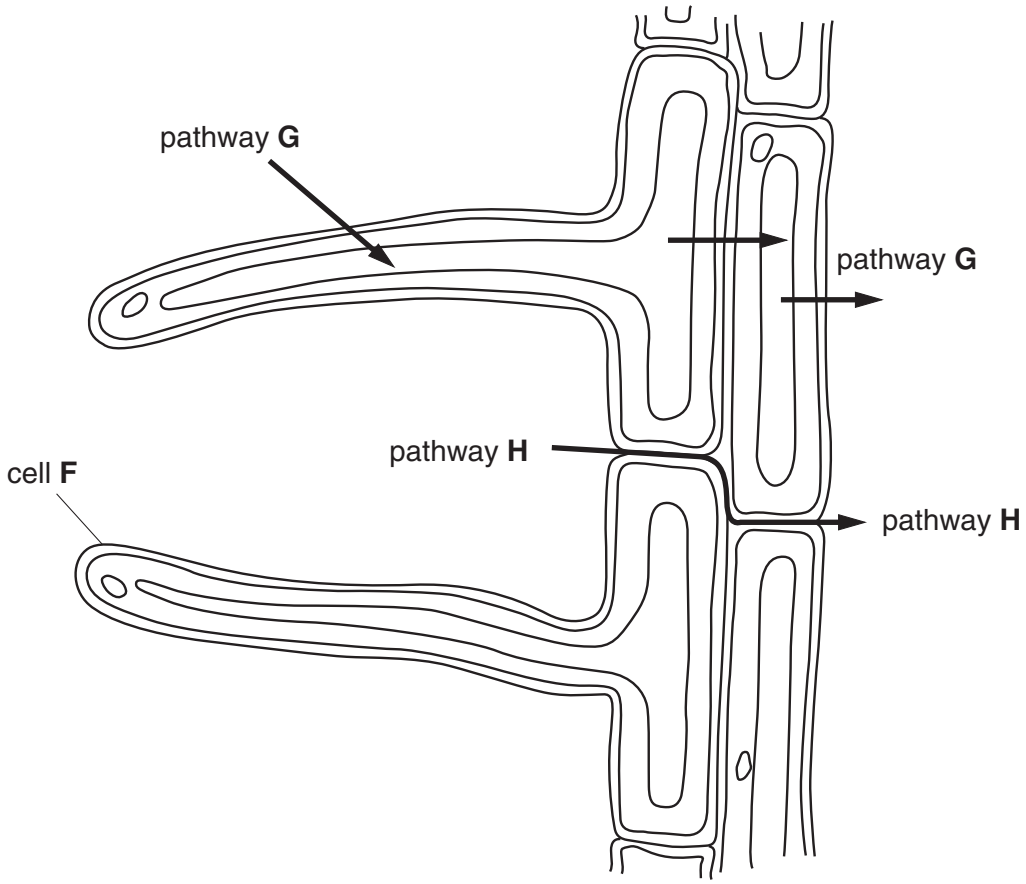


Fig. 5.1

(a) Identify cell **F** in Fig. 5.1.

F ..... [1]

(b) Name the mineral ions absorbed by roots that are essential components of

(i) chlorophyll, ...

(ii) amino acids. ..... [2]

(c) **G** and **H** show two different pathways for the uptake of mineral ions from the soil.

(i) Explain how ions are taken up via pathway **G**, even when their concentration in the surrounding soil is very low.

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.....[3]

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(ii) Suggest and explain why pathway **H** is more suited to the entry of ions that are in high concentration in the soil.

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[Total: 10]

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)** Distinguish between self-pollination and cross-pollination.

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(b) Describe what happens in a flower after pollination up to the time at which a fruit is formed.

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[Total: 10]

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7 Describe the principal functions, in terms of co-ordinating and regulating the body, of

(a) the cerebrum,

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(b) the cerebellum,

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.....[2]

(c) the hypothalamus.

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.....[3]

[Total: 10]

8 Either **(a)** Describe how an amino acid molecule passes from the lumen of the ileum to the liver.

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(b) Describe what could happen to an amino acid molecule from the time it enters the liver to the time its component elements leave the body.

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[Total: 10]

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8 Or **(a)** Define the term *mitosis*.

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.....[2]

(b) Describe the role of mitosis in organisms.

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.....[2]

(c) Explain how the cells of offspring have the same number of chromosomes as the cells of their parents.

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[Total: 10]

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