



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

CANDIDATE  
NAME

CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**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	
<b>Section A</b>	
<b>Section B</b>	
6	
7	
8	
<b>Total</b>	

This document consists of **14** printed pages and **2** blank pages.

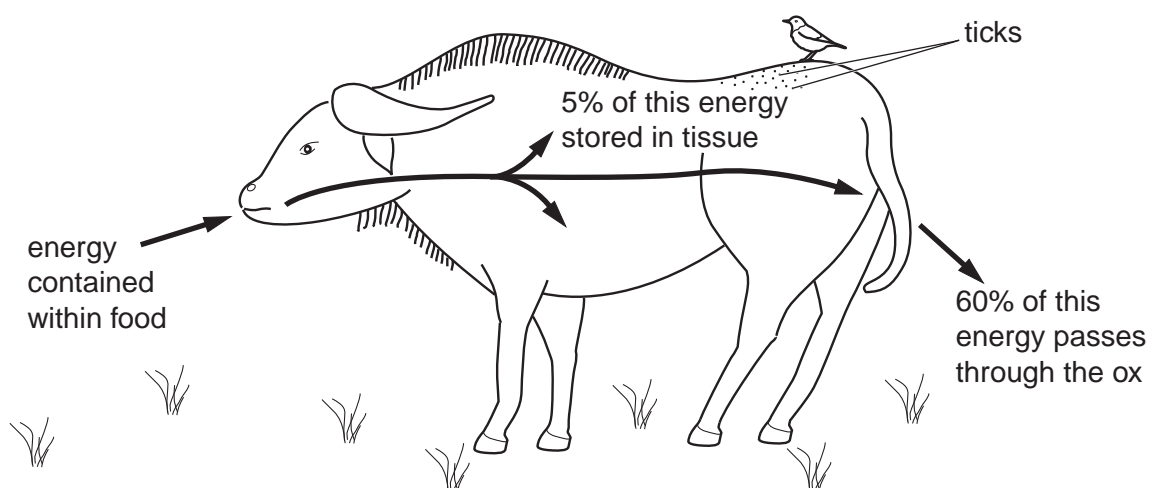


## Section A

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

Write your answers in the spaces provided.

- 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]

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

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

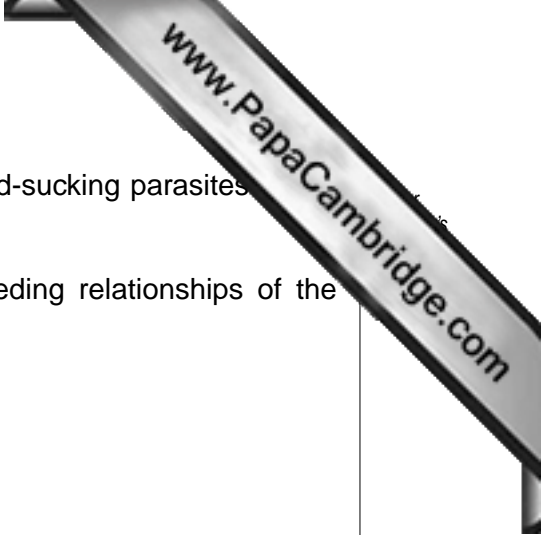
[1]

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

.....  
.....  
.....  
.....

[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<sup>3</sup>).

**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.

.....

.....

.....

.....

..... [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.

.....

.....

.....

.....

..... [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.

.....

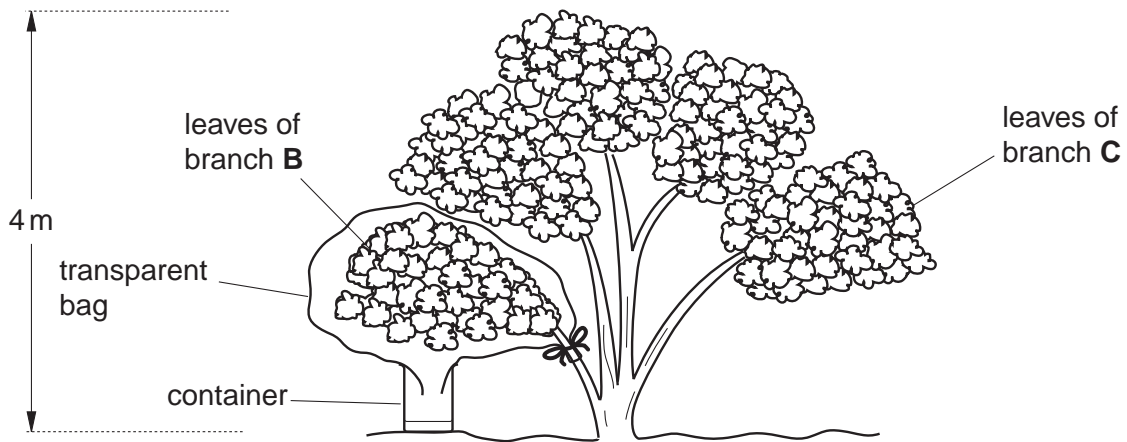
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..... [3]

[Total: 10]

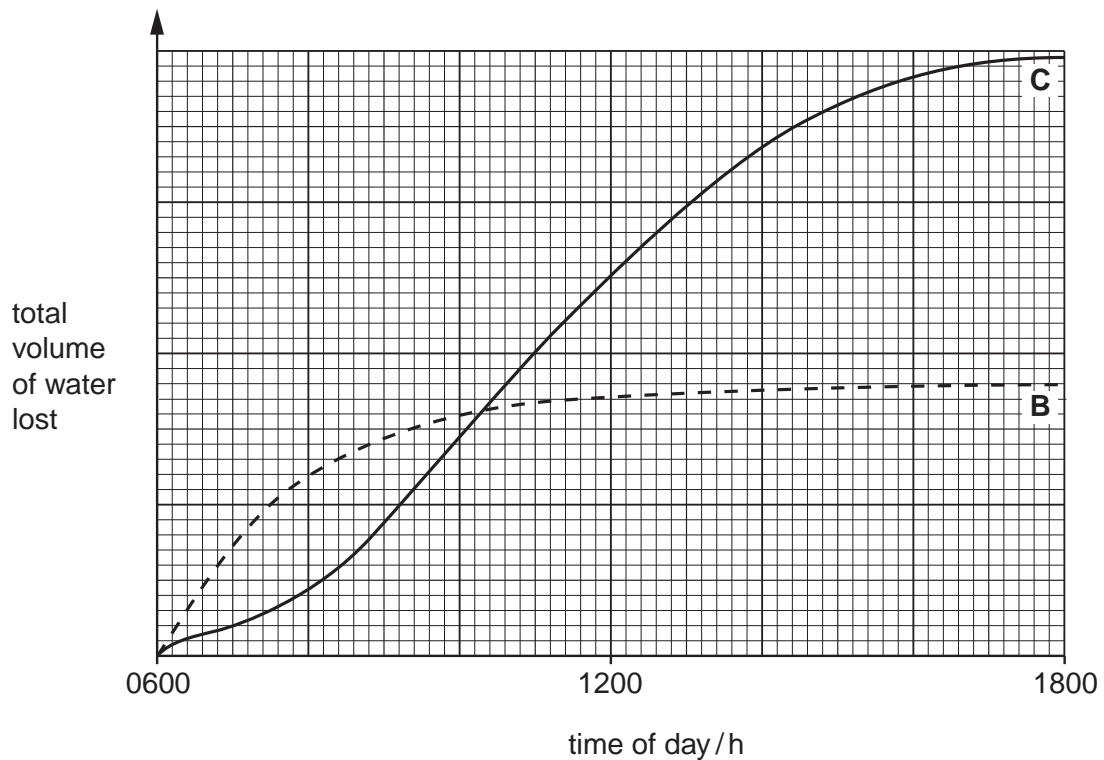


- 3 Fig. 3.1 shows a small, deep-rooted bush growing in a warm, dry climate. Branches **B** and **C** have a similar number of leaves, but the leaves of branch **B** are enclosed in a transparent polythene bag that empties into a container.

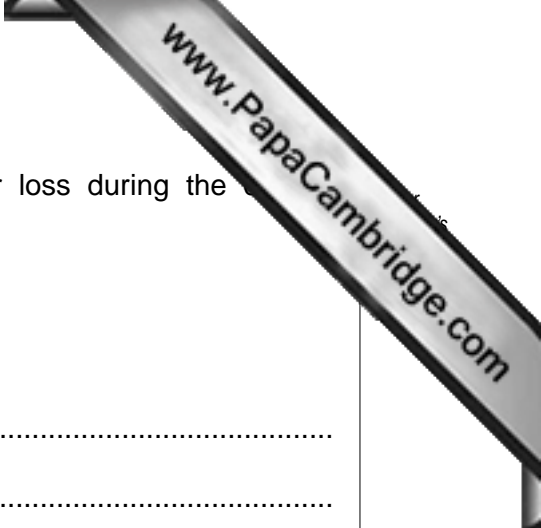


**Fig. 3.1**

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 branch **C**. For each factor, explain how it affects water loss.

factor 1. ....

explanation

.....  
.....

factor 2. ....

explanation

.....  
..... [5]

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

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

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

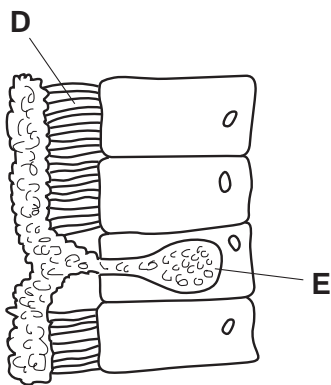


Fig. 4.1(a)

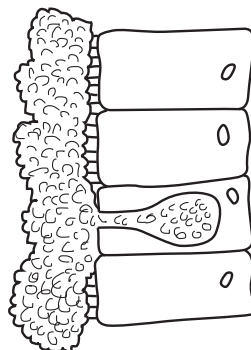


Fig. 4.1(b)

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

**D** .....

**E** .....

[2]

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

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

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

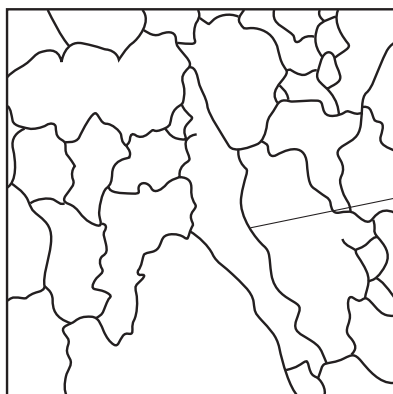


Fig. 4.2(a)

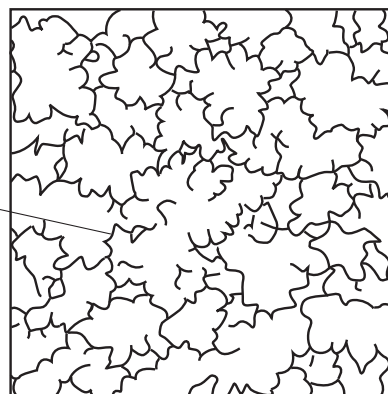


Fig. 4.2(b)

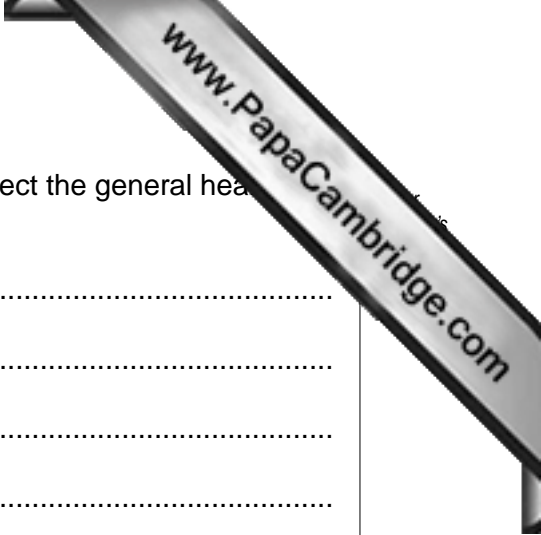
walls of alveoli

- (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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..... [5]

[Total: 10]

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

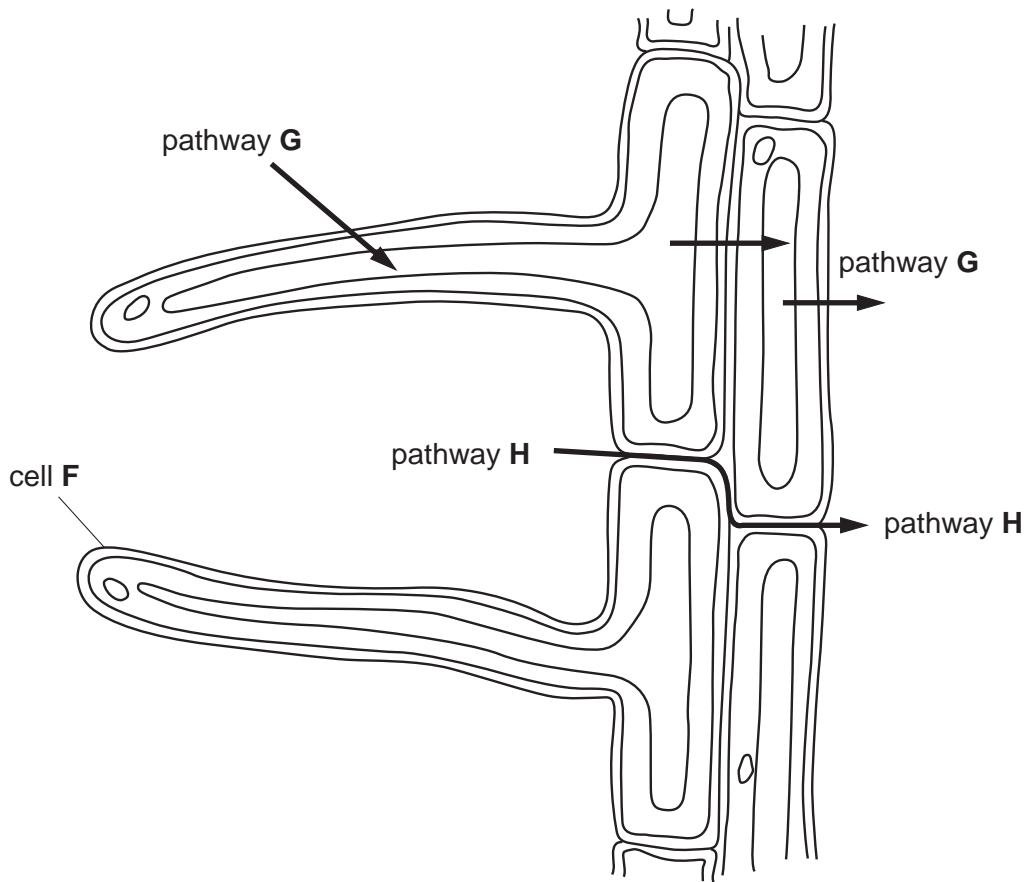


Fig. 5.1

(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.

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



**Section B**

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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.....[4]

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

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.....[6]

[Total: 10]

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

(a) the cerebrum,

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..... [5]

(b) the cerebellum,

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..... [2]

(c) the hypothalamus.

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

[Total: 10]





