UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

* 6 6 7 5 8 9 2 2 7 6 *

BIOLOGY **5090/31**

Paper 3 Practical Test **May/June 2010**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As specified in the Confidential Instructions.

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.

Answer **both** questions.
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	
1	
2	
Total	

This document consists of **8** printed pages.

DC (SHW 00479 5/09) 15843/4
© UCLES 2010

Read through the whole question before starting.

Do not taste the fruit sections provided.

For Examiner's Use

1 Fruits of banana, *Musa spp*, change as they ripen.

You are provided with two pieces from an unripe banana fruit, labelled **S1**, and two pieces from a ripe banana fruit, labelled **S2**.

(a) (i) Describe the **observable** differences between one piece of **S1** and one piece of **S2**.

.....

.....

.....

..... [3]

- Using forceps, dip the cut surface of one piece of **S1** and one piece of **S2** into the iodine solution for approximately 3 seconds.

(ii) Describe and explain the observable differences between **S1** and **S2** after this test.

.....

.....

.....

..... [2]

(b) (i) Describe a food test that you could carry out to show that the ripe banana **S2** contains more reducing sugar than the unripe banana **S1**, including at least one safety factor.

.....

.....

.....

.....

.....

.....

..... [4]

© UCLES 2010

- Cut the other pieces of **S1** and **S2** each into three equal parts.
- Test one of these pieces of **S1** and one of these pieces of **S2** for reducing sugar.

For Examiner's Use

(ii) Complete the table below by recording your observations and conclusions.

S1	S2
observations	....
conclusions	....

[3]

(c) One of the changes that takes place as a banana fruit ripens is the breakdown of starch to sugar.

How do your results in **(a)(ii)** and **(b)(ii)** support this statement?

.....

.....

.....

..... [2]

- Put one piece of **S1** into an empty beaker and leave this open to the air. Label the beaker **S1**.
- Put the other piece of **S1** into one of the beakers labelled **S3**, which contains a dilute acid. Label this beaker **S1**.
- Put one piece of **S2** into an empty beaker and leave this open to the air. Label the beaker **S2**.
- Put the other piece of **S2** into one of the beakers labelled **S3**, which contains a dilute acid. Label this beaker **S2**.
- Leave these for at least 15 minutes.

For Examiner's Use

While waiting for 15 minutes, begin Question 2.

- Observe the appearance of the pieces of **S1** and **S2** that were left.

(d) (i) Complete the table below by describing the appearance of the two pieces of **S1** and **S2**.

	exposed to the air	in **S3**
S1		
S2		

[3]

(ii) Suggest what may have caused any differences in appearance between the pieces of banana left open to the air and those immersed in dilute acid.

.....

.....

.....

.....

..... [2]

(iii) Outline, but do not carry out, an investigation to find out the effect of pH on the changes you observed.

.....

.....

.....

.....

.....

..... [4]

[Total: 23]

© UCLES 2010

2 Specimen **S4** is a ground-living beetle.

For Examiner's Use

(a) Make a large labelled drawing of this beetle.

[5]

(b) (i) Measure and record the length of **S4** and the length of your drawing.

length of **S4** .....

length of drawing .....

(ii) Calculate the magnification of your drawing.

Show your working.

magnification = ... [3]

For Examiner's Use

It is sometimes useful to know how many living organisms are present in a particular habitat, but impossible to catch and count them. One way of estimating how many ground-living beetles there are in a habitat is to use pitfall traps, similar to that shown in Fig. 2.1.

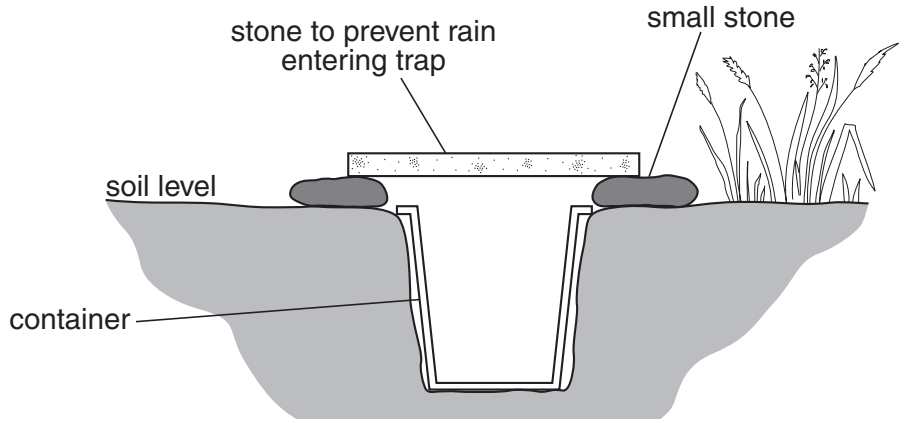


Fig. 2.1

A number of pitfall traps are placed in the habitat and left for a period of time.
The containers in the pitfall traps are collected, any beetles in them are counted and recorded **[A]**, marked and then released back into the same habitat.

The containers in the pitfall traps are replaced after a day and left for the same period of time as before.
Again the containers in the traps are collected and the number of beetles counted and recorded **[B]**.
The number of beetles with marks in this second group are counted and recorded **[C]**.

The formula $\frac{\mathbf{A} \times \mathbf{B}}{\mathbf{C}}$ can then be used to given an estimate of the total number of beetles in the habitat.

(c) (i) You are provided with a bag of beans to represent the beetles, labelled **S5**.

- Remove 12 beans. These represent the beetles in the first sample **[A]** and this figure has been recorded already in Table 2.1.
- Mark each of these 12 beans with a visible dot using the marker pen provided.
- Put these marked beans back into the bag. Shake the bag gently to mix these with the other beans.
- Remove a handful of beans and place on the bench in front of you and count them.
- Record the total number of beans in this handful in Table 2.1 in column **B**.
- Count and record separately the number of beans in this handful that have been marked and record this in column **C** in Table 2.1.

Table 2.1

A	B	C
12		

[2]

© UCLES 2010

For Examiner's Use

(ii) Use the formula $\frac{\mathbf{A} \times \mathbf{B}}{\mathbf{C}}$ to estimate the total number of 'beetles' in the bag.

estimated number = ... [2]

(iii) Count all of the beans in **S5** to find the difference between your estimated number and the actual number.

actual number .....

difference ..... [1]

(d) Some students used pitfall traps to estimate the number of ground-living beetles in two different habitats, an open grassland area and a shady wooded area.

They recorded the numbers of ground-living beetles caught in the traps each day for 5 days, returning the beetles to the same habitat each day. The results are shown in Table 2.2.

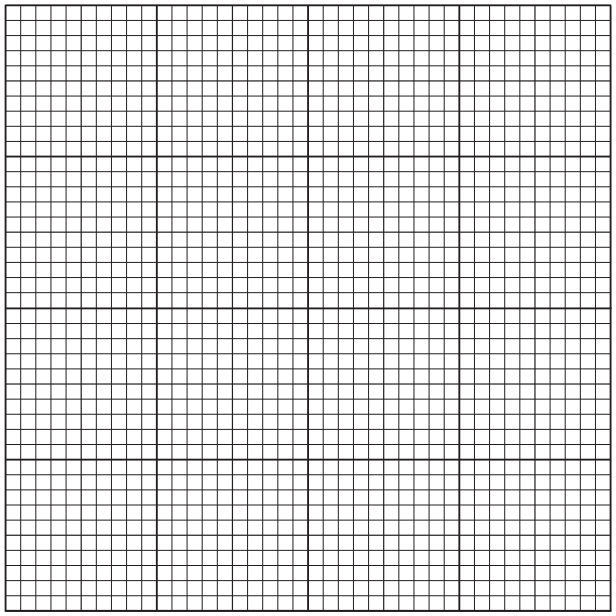
Table 2.2

day	number of ground-living beetles found in the pitfall traps	
	open grassland	shady woodland
1	12	16
2	6	15
3	8	10
4	14	22
5	10	17
	mean 10	mean ……

(i) Complete Table 2.2 by calculating the mean number of ground-living beetles in the shady woodland. [1]

(ii) On the grid provided construct a bar chart of the two mean values.

For Examiner's Use



[2]

(iii) Suggest **one** reason why the results from the open and shady areas differ.

.....

..... [1]

[Total: 17]

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.