



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**

**5090/31**

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	
<b>Total</b>	

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



Read through the whole question before starting.

Do not taste the fruit sections provided.



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]

- 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.

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

<b>S1</b>	<b>S2</b>
<i>observations</i> ..... .....	 ..... .....
<i>conclusions</i> ..... ..... .....	 ..... ..... .....

[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?

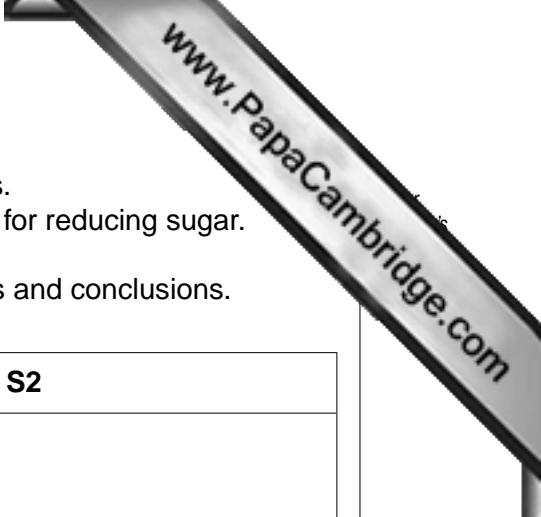
.....

.....

.....

.....

[2]



- Put one piece of **S1** into an empty beaker and leave this open to the air. Label this 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.

**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 <b>S3</b>
<b>S1</b>		
<b>S2</b>		

[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]

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

(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** .....

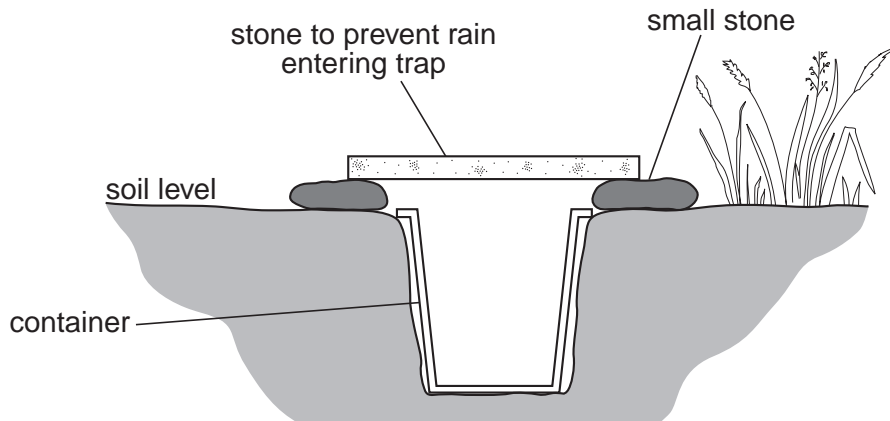
length of drawing .....

(ii) Calculate the magnification of your drawing.

Show your working.

magnification = ..... [3]

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-dwelling 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  $\frac{A \times B}{C}$  can then be used to give 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**

<b>A</b>	<b>B</b>	<b>C</b>
12		

- (ii) Use the formula  $\frac{A \times B}{C}$  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.

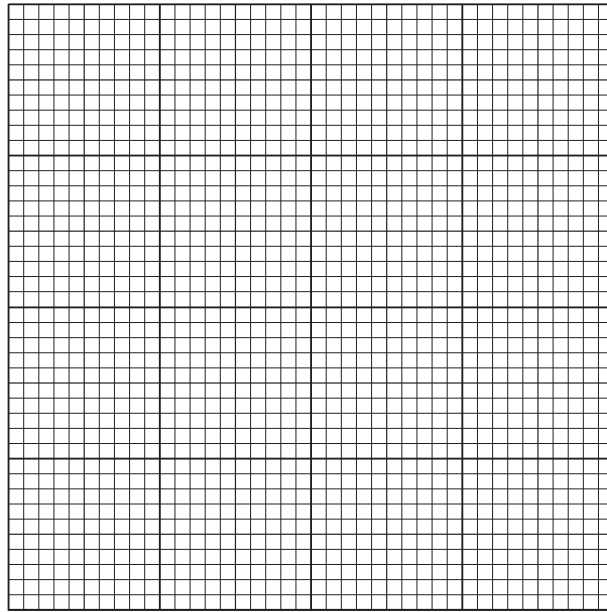
They recorded the numbers of ground-living beetles caught in the traps each day for 5 days, returning the beetles to the same habitat each day. The results are shown in Table 2.2.

**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.



[2]

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

.....  
..... [1]

[Total: 17]