**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**
General Certificate of Education Ordinary Level

| CANDIDATE NAME | |
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| CENTRE NUMBER | | | | | | | CANDIDATE NUMBER | | | | |

**BIOLOGY** **5090/33**

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.

UNIVERSITY *of* CAMBRIDGE
International Examinations

**[Turn over**

**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**.

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• 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.

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**(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.

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- 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.

| S1 | S2 |
|---|---|
| *observations* <br><br> ...................................................... <br><br> ...................................................... | <br><br> ...................................................... <br><br> ...................................................... |
| *conclusions* <br><br> ...................................................... <br><br> ...................................................... <br><br> ...................................................... | <br><br> ...................................................... <br><br> ...................................................... <br><br> ...................................................... |

[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?

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- 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.

**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.

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

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.......................................................................................................................... [4]

[Total: 23]

**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-living beetles there are in a habitat is to use pitfall traps, similar to that shown in Fig. 2.1.
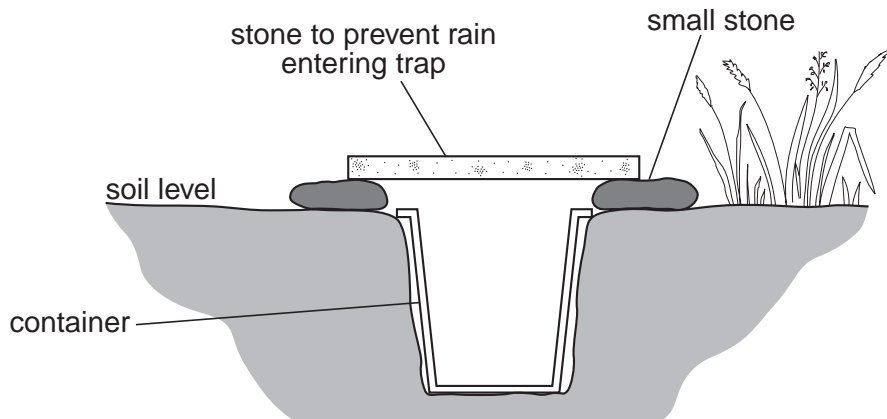


**Fig. 2.1**

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 $\dfrac{A \times B}{C}$ 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]

**(ii)** Use the formula $\dfrac{A \times B}{C}$ 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.
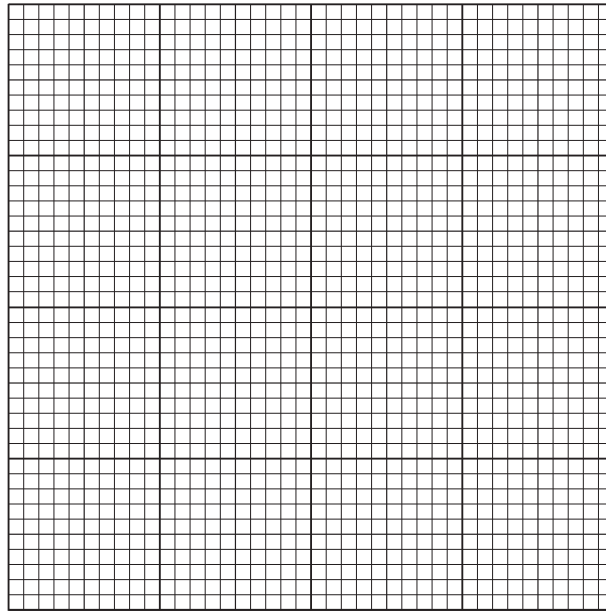
[2]

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

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[Total: 17]