UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

BIOLOGY **5090/31**

Paper 3 Practical Test **May/June 2011**

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 ink.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use red ink, staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** 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	
3	
Total	

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

Read through the whole question before starting.

Do not taste the fruit sections provided.

For Examiner's Use

1 **(a)** **(i)** Describe how you would carry out a test for reducing sugars using Benedict's solution and the results you would expect if reducing sugars were present.

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..... [3]

You are provided with a solution labelled **S1**.

(ii) Carry out the test you have described on a sample of **S1** and record what you conclude about the solution.

..... [1]

You are provided with some potato tissue covered in polythene.

- Remove the polythene.
- Cut the potato tissue into small pieces and place these in a clean test-tube.
- Add some distilled water and shake the test-tube.

(iii) Carry out the test you described in **(a)(i)** on this mixture.
State your result and conclusion.

result .....

conclusion ..... [1]

You are provided with three dishes, each containing a similar piece of potato and a solution. Each potato strip was cut exactly 5.0 cm in length before being placed in the solution at least an hour before the start of the examination.

Dish **A** – contains **S1** solution.
Dish **B** – contains half **S1** and half distilled water.
Dish **C** – contains distilled water.

- Remove the potato strip from dish **A**.
- Blot the strip carefully on a paper towel.

(b) **(i)** Accurately measure the longest length of this potato strip and record the length in Table 1.1.

- Repeat the procedure with the potato strips in dishes **B** and **C** and record their lengths in Table 1.1.

(ii) Calculate the change in length between the initial and your measured length and complete Table 1.1.

Table 1.1

	length of potato strip / cm		
	A	**B**	**C**
initial length	5.0	5.0	5.0
measured length			
change in length			

[2]

(iii) Describe and explain the changes in length.

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..... [4]

[Total: 11]

2 The blue dye, DCPIP (dichlorophenolindolphenol) will lose its colour when vitamin C solution is added to it.

(a) (i) You are provided with a standard solution of vitamin C. You will need to determine the volume of this needed for the blue colour to disappear in a known volume of the blue dye.

- Put 10 cm^3 of blue dye into a clean test-tube.
- Fill a clean syringe with the standard vitamin C solution and record this initial volume in Table 2.1.
- Keep the end of the syringe near to the surface of the blue dye in the test-tube and take care not to shake the test-tube. Add the standard vitamin C solution **drop by drop** until the colour of the blue dye disappears.
- Record in Table 2.1 the volume of the standard vitamin C solution remaining in the syringe as the final volume.
- Repeat the procedure twice more.

Table 2.1

	volume of vitamin C solution / cm^3		
	1st reading	2nd reading	3rd reading
initial volume			
final volume			
volume used to make the blue colour disappear.			

[3]

(ii) Subtract the final volumes from the initial volumes to calculate the volume of standard vitamin C solution needed to make the blue colour of the dye disappear, then complete Table 2.1. [1]

(iii) Explain why readings were taken three times.

.....

..... [1]

(iv) Calculate the mean volume of standard vitamin C solution needed to make the blue colour of the blue dye disappear.

..... [1]

You will now test the fruit juice, **S2** to compare its vitamin C content within the standard vitamin C.

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(b) (i) Repeat the procedure in **(a)(i)** with **S2** instead of the standard vitamin C solution. Record your results in Table 2.2.

Table 2.2

	volume of **S2** / cm^3		
	1st reading	2nd reading	3rd reading
initial volume			
final volume			
volume of **S2** used to make the blue colour disappear			

[3]

(ii) Subtract the final volumes from the initial volumes to calculate the volume of fruit juice **S2** needed to make the blue colour of the dye disappear, then complete Table 2.2. [1]

(iii) Calculate the mean volume of fruit juice, **S2** needed to make the blue colour of the dye disappear.

..... [1]

(iv) State which solution, the standard vitamin C solution or the fruit juice **S2** has the higher vitamin C content.

..... [1]

[Turn over

Some students investigated the vitamin C content of 100 g of each of six different fruits. Their results are shown in Table 2.3.

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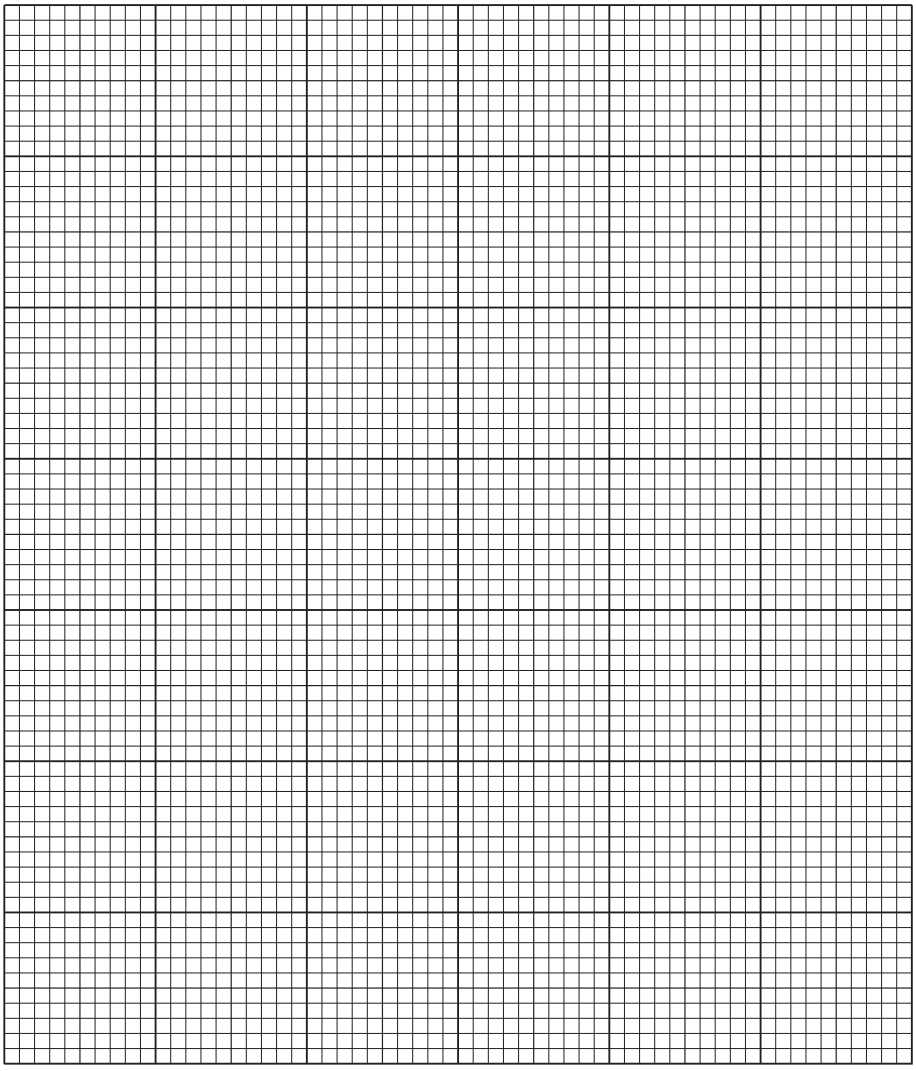
Table 2.3

fruit	kakadu plum	camu camu	gojiberry	blackcurrant	kiwifruit	orange
vitamin C / mg per 100 g	3100	2800	2500	200	90	50

(c) (i) Draw a bar chart of the vitamin C content of the fruits in Table 2.3.



[4]

(ii) Calculate how many times greater the vitamin C content of 100 g of kakadu plum is than that of 100 g of an orange. Show your working.

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..... [1]

Fresh fruit and vegetables contain the highest levels of vitamin C.

(d) Describe how you would investigate how the length of time oranges are stored affects their vitamin C content.

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..... [5]

(e) Explain why humans need vitamin C in their diet.

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..... [1]

[Total: 23]

3 **S3** is a preserved specimen of an adult insect.

For Examiner's Use

(a) **(i)** Make a large drawing of one back leg of this insect.

[4]

(ii) Calculate the ratio of the length of one front leg to the length of one back leg on specimen **S3**.

length of front leg .....

length of back leg .....

ratio .....

[2]

[Total: 6]