



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE
NAME

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BIOLOGY

5090/03

Paper 3 Practical Test

October/November 2009

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed 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 **7** printed pages and **1** blank page.



1 You need to plan your answer before you start; read and follow the instructions carefully.

- (a) (i) Measure, and record in the grid provided, the lengths of twenty of the bean seeds in specimen W1.

[1]

- (ii) Using your results, complete Table 1.1.

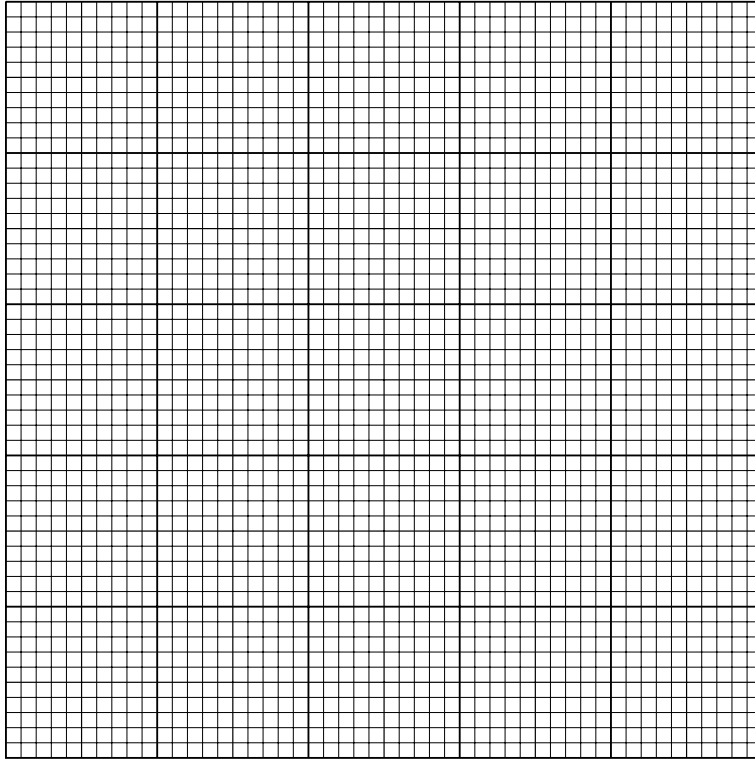
Table 1.1

	length	number of seeds	number of seeds, in group
shortest			
longest			

[3]

- (iii) Construct a frequency diagram (bar chart or histogram) of the groups in the last column of Table 1.1.

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[5]

- (b) 'Shorter bean seeds are the result of genetic inheritance rather than of the environmental conditions in which the parent plants were grown.'
Outline, giving practical details, an investigation to show if this is true.

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[4]

- (c)
- Take one of the soaked bean seeds, **W2**, carefully cut through the outer cover of the seed and remove this outer layer.
 - Apply enough pressure to separate the two parts of the seed.
 - Examine the inner surface of each piece and select the one that shows most of the embryo.
 - Examine the embryo with the hand lens.
- (i) Make a large, labelled drawing of the embryo, but do not include the cotyledon.

[5]

- (ii) Calculate the magnification of your drawing in (c)(i). Rule a line across your drawing to show where you measured. Record your measurements and show all working clearly.

Magnification = [3]

- (d)
- Remove and discard the cotyledon from the rest of the embryo.
 - Chop and crush the embryo into small pieces on a white tile.
 - Repeat these two steps for the second specimen, **W2**, and add it to the first crushed material on the tile.
 - Carry out the biuret test on the material on the tile by adding a few drops of Biuret reagent.
 - Place a similar number of drops of Biuret reagent on the tile so that you can compare the reagent on its own with the material being tested.

(i) State the result of this test.

.....[1]

(ii) State your conclusion.

.....[1]

(iii) Suggest the significance of your conclusion for the growth of the embryo.

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

[Total: 25]

- 2 (a) (i) Describe how you can carry out the test for fat on specimens **W3** and **W4**.
Give practical details.

.....

 [3]

- (ii) Carry out the test on **W3** and **W4**.
Complete Table 2.1.

Table 2.1.

	observations	conclusions
W3		
W4		

[4]

- (b) Outline, but do not attempt to carry out, an experiment to show which of the specimens **W3** and **W4** contains the most energy.

.....

 [5]

(c) **W3** and **W4** have the same starch content.
Use your conclusion in section **(a)(ii)** to explain the difference in energy content of **W3** and **W4**.

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..... [3]

[Total: 15]

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