

Candidate Name _____

Centre Number	Candidate Number

CAMBRIDGE INTERNATIONAL EXAMINATIONS
Joint Examination for the School Certificate
and General Certificate of Education Ordinary Level

BIOLOGY

5090/3

PAPER 3 Practical Test

OCTOBER/NOVEMBER SESSION 2002

1 hour 15 minutes

Candidates answer on the question paper.

Additional materials:

As listed in Instructions to Supervisors

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **both** questions.

Write your answers in the spaces provided on the question paper.

Use a sharp pencil for your drawings. Coloured pencils or crayons should **not** be used.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
TOTAL	

This question paper consists of 6 printed pages, a Supervisor's Report and 1 blank page.



Instructions to candidates

Read the whole of the question paper carefully before you begin.

Set up the experiment for Question 1 and then go on to Question 2 while you are waiting. Leave at least 15 minutes to complete Question 1 before the end of the examination.

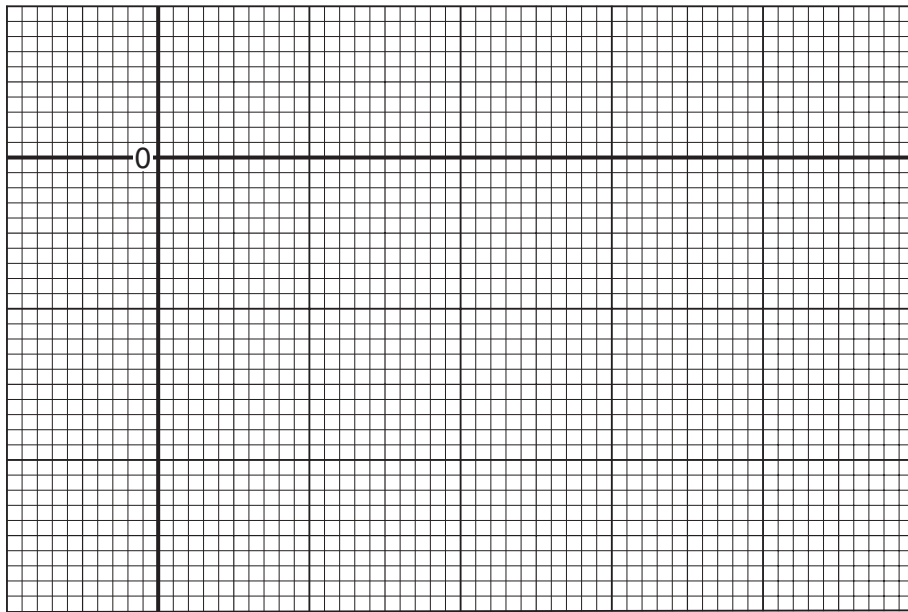
- 1 You are required to investigate the concentration of the cell sap in potato tissue. You are provided with one or more slices of potato tissue.
- (a)
- Remove the potato tissue from the solution and blot it gently to remove surface liquid.
 - Cut 4 strips of potato, exactly 70 mm long by approximately 10 mm wide.
 - Put a strip into each of the salt solutions, **A**, **B**, **C** and **D**, so that the strips are completely covered.
 - **Leave them for at least 25 minutes and, during this time, start Question 2.**
 - After 25 minutes, remove the strip from solution **A**, blot it gently, then measure the length of the strip to the nearest 0.5 mm.
- (i) Record the measurement in Table 1.1.
- Repeat this procedure for the strips from solutions **B**, **C** and **D**.
- (ii) Complete Table 1.1.

Table 1.1

solution	salt concentration / mol per dm ³	initial length / mm	final length / mm	change in length / mm
A	0.2			
B	0.4			
C	0.6			
D	0.8			

[5]

(b) Draw a graph of change in length against salt concentration, using the axes provided.



[6]

(c) From your graph, determine the value at which the salt solution and the potato tissue are in equilibrium.

.....[1]

(d) Describe and explain what would happen to the cells if the potato strip was taken from solution **D** and put in distilled water for about one hour.

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

(e) Suggest three ways in which this investigation could be made more reliable.

1.
.....
 2.
.....
 3.
.....
-[3]

[Total : 19]

[Turn over

- 2 Specimens **W31** and **W32** are slices of two fruits; they show some common features and some differences.
- (a) (i) Make a large, labelled drawing of each specimen in the spaces provided. Detailed structure should be shown for a sector, approximately one third to one quarter of each specimen.

W31

W32

[8]

(ii) List three visible features that are the same in both specimens.

1.
2.
3.[3]

(iii) In Table 2.1, list **five** pairs of contrasting features that are visible in the two specimens.

Table 2.1

	W31	W32
1		
2		
3		
4		
5		

[5]

(b) Estimate, as accurately as you can, the total number of seeds that were present in the fruit from which **W31** was taken, proceeding as follows.

- Cut **W31** into equal quarters.
- Place one of these on the tile and, using the scalpel blade, squeeze out all of its seeds.

(i) Count them and record the number.

number of seeds =

(ii) Repeat for another of the quarters.

number of seeds =

(iii) Calculate the number of seeds in the whole slice. Show your working.

number of seeds in whole slice =

Fig. 2.1 shows, in longitudinal view, the extent of the seed-containing cavity and the position from which **W31** was taken.

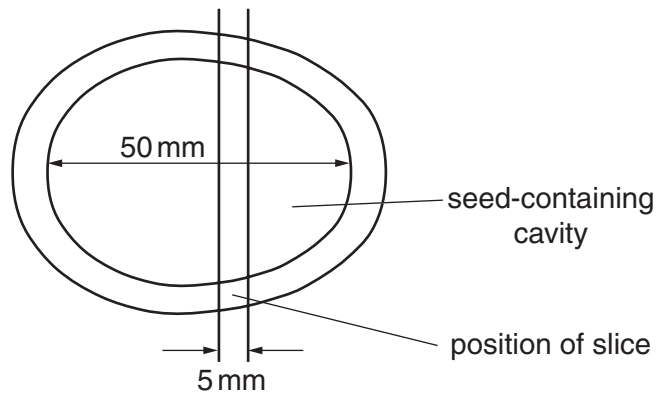


Fig. 2.1 (Not to scale)

- (iv) Use this to calculate the number of slices that could be obtained from one fruit.

number of slices =

- (v) Calculate the total number of seeds in the whole fruit, making and explaining any allowance you may think necessary.

total number of seeds in whole fruit =

[5]

[Total : 21]

SUPERVISOR'S REPORT

**The Supervisor or Teacher responsible for the subject is asked to answer the following questions.*

- 1 Was any difficulty experienced in providing the necessary materials? If so, give brief details.

- 2 Did the candidate experience any difficulty during the course of the examination? If so, give brief details. Reference should be made to
 - (a) difficulties arising from faulty specimens;
 - (b) accidents to apparatus or materials;
 - (c) any information that is likely to assist the Examiner, especially if this cannot be discovered from the scripts.

- 3 Please count the number of seeds in a quarter from a central slice and from a marginal slice of **W31**.

Central slice =

Marginal slice =

Declaration to be signed by the Principal, and completed on the top script from the Centre

The preparation of the practical examination has been carried out so as to fully maintain the security of the examination.

Signed

Name (in block capitals)

***Information that applies to all candidates need only be given once.**

N.B. If scripts are required by CIE to be despatched in more than one envelope, it is essential that a copy of the relevant Supervisor's Results (when requested), the Supervisor's Report and the appropriate seating plan are sent inside each envelope.