www.XtremePapers.com

Centre Number | Candidate Number

Candidate Name ______________________

CAMBRIDGE INTERNATIONAL EXAMINATIONS

General Certificate of Education Advanced Subsidiary Level and Advanced Level

BIOLOGY 9700/3

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 **all** parts of the question.

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

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	
TOTAL	

This question paper consists of 5 printed pages, 2 blank pages and a Report Form.

SP (SM) S24283/3
© CIE 2002
UNIVERSITY of CAMBRIDGE Local Examinations Syndicate

1 You are provided with 10 sticks of potato tissue that have been placed either in distilled water or in one of four concentrations of sucrose solution overnight.
You are required to determine the water potential of the potato tissue.

The potato sticks were initially cut to a length of exactly 50 mm and two sticks were placed into each of five boiling tubes containing 20 cm^3 of either 0.0 mol dm^{-3} (distilled water), 0.25 mol dm^{-3}, 0.5 mol dm^{-3}, 0.75 mol dm^{-3} or 1.0 mol dm^{-3} sucrose solution and labelled as such.

(a) The four sucrose solutions were all made up from a stock solution of 1.0 mol dm^{-3} sucrose solution.

Complete Table 1.1 to show the volumes of 1.0 mol dm^{-3} sucrose solution and distilled water you would have used to make 20 cm^3 of the four concentrations of sucrose solution.
The first one has been completed for you.

Table 1.1

	1.0 mol dm^{-3} sucrose solution	distilled water
0.25 mol dm^{-3}	5 cm^3	15 cm^3
0.5 mol dm^{-3}		
0.75 mol dm^{-3}		
1.0 mol dm^{-3}		

[3]

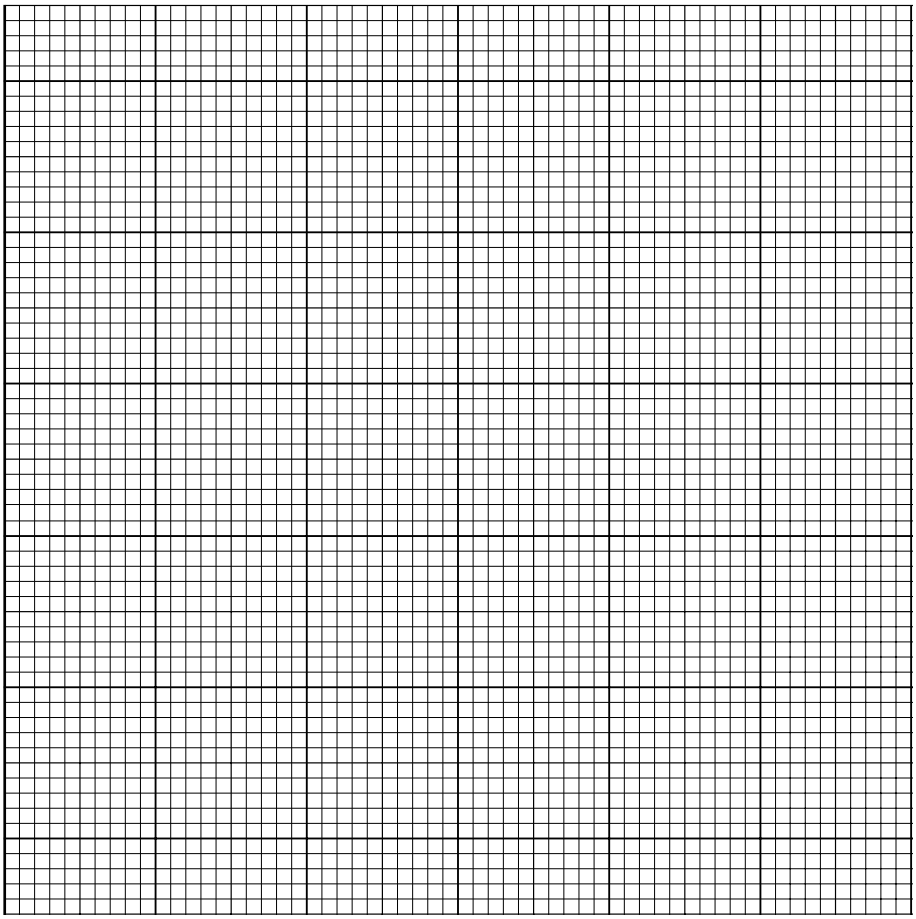
- Use your forceps to remove the two potato sticks from the boiling tube labelled 0.0 mol dm^{-3} and place them on the white tile. Gently blot them dry with paper towel.
- Measure the length of the sticks accurately, to the nearest mm.
- Record your results in Table 1.2 on page 3.
- Repeat this procedure with the remaining four boiling tubes.

Table 1.2

concentration of sucrose solution / mol dm^{-3}	initial length of potato stick / mm	final length of potato stick / mm		change in length of potato stick / mm		mean change in length / mm
		first stick	second stick	first stick	second stick	
0.0	50					
0.25	50					
0.5	50					
0.75	50					
1.0	50					

(b) (i) Calculate the change in length for each potato stick and then calculate the mean change in length for each pair of potato sticks.
Enter the results of your calculations in Table 1.2.
Use + and – to indicate whether the sticks increased in length or decreased in length. [5]

(ii) On the grid, plot a graph of the mean change in length against the molarity of the sucrose solution.



[3]

[Turn over

(iii) Explain, in terms of water potential, the mean changes in length of the potato sticks that occurred in

0.0 mol dm^{-3} (distilled water); .....

.....

.....

.....

1.0 mol dm^{-3} sucrose solution. .....

.....

.....

.....[5]

(iv) From your graph, determine the original molarity of the cell contents of the potato sticks. Give a reason for your answer.

.....

.....[2]

(c) Another way to perform this experiment is to measure the mass of each potato stick, rather than measure its length.

Suggest and explain an advantage of measuring mass rather than length.

.....

.....

.....

.....[2]

(d) Explain how you would carry out an experiment to investigate microscopically the effect on plant cells, such as epidermal cells, of immersion in the same range of sucrose solutions as you are using in **(a)**.
State any conclusions that you can draw from such an experiment.
Space has been provided for any diagrams that you might wish to draw, to aid your explanation.

.....

.....

.....

.....

.....

.....

[5]

[Total: 25]

BLANK PAGE

BLANK PAGE

REPORT FORM

The teacher responsible for this subject is asked to answer the following questions.

(a) Was the candidate physically handicapped in drawing or in using a microscope or is the candidate colourblind? If so, give brief details.

(b) Was the candidate handicapped by deficient material or apparatus? If so, give brief details.

(c) Was it necessary to make any substitutions for the materials sent from Cambridge? If so, give brief details of the circumstances.

(d) Any comments.

Signed ……

N.B. Information that applies to all candidates need only be given on the first candidate's answer book.