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Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

BIOLOGY **9700/03**

Paper 3 Practical Test AS

October/November 2004

1 hour 15 minutes

Candidates answer on the Question Paper.
Additional Materials: As listed in Instructions to Supervisors.

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 in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

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.
You are advised to spend 45 minutes on Question 1 and 30 minutes on Question 2.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

For Examiner's Use	
1	
2	
Total	

This document consists of **7** printed pages and a Report Form.

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1 You are provided with a Petri dish, labelled **S**, and another Petri dish containing some carbohydrate, **C**.

The relative molecular weight of the carbohydrate, **C**, is 340 (to two significant figures).

(a) Using the balance, distilled water, **C** and measuring cylinder, make up 20 cm^3 of a 1 mol dm^{-3} solution of **C**.

(i) State the mass of carbohydrate, **C**, that you used.

mass …… [1]

(ii) Describe the steps that you used to make up the solution of **C**.

.....

.....

.....

..... [2]

Place the solution of **C** in the Petri dish labelled **S**.

You are also provided with three strips of potato in a Petri dish labelled **P**.

Using a scalpel or a sharp knife, carefully trim each potato strip to a length of 50 mm.
It is most important that you perform this task as accurately as possible.

Place the three potato strips into the Petri dish labelled **S**.

Leave for at least 30 minutes.
While you are waiting, you should start Question 2.

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After 30 minutes, remove the strips from the Petri dish, blot them carefully with a paper towel and accurately re-measure their lengths.

(b) (i) Record the lengths of the strips in **Table 1.1**. Calculate the mean strip length and the percentage change in mean strip length.

Table 1.1

initial length of strips /mm	length of strip 1 /mm	length of strip 2 /mm	length of strip 3 /mm	mean length of strips /mm	percentage change in length of strips
50					

[2]

(ii) Suggest **two** ways to improve the procedure that you followed to make your results more reliable.

1. .....

.....

2. .....

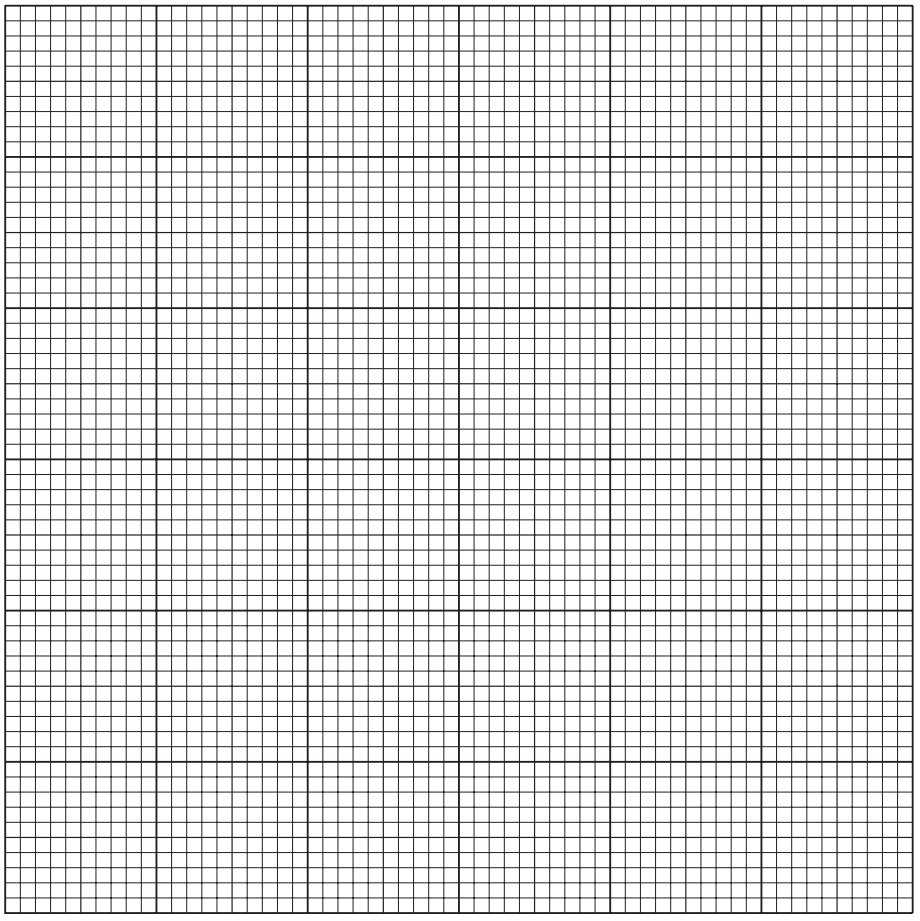
..... [2]

(c) In a similar investigation, involving a range of sucrose concentrations, the results shown in **Table 1.2** were obtained.

Table 1.2

sucrose solution concentration /mol dm^{-3}	mean length of strips /mm	percentage change in length of strips
0.00 (water)	52.0	+4
0.25	49.0	–2
0.50	47.0	–6
0.75	43.5	–13
1.00	41.5	–17

(i) On the grid provided, plot a graph of the percentage change in length of the strips, against the molar concentration of the sucrose solutions.



[3]

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(ii) Use the graph to determine the concentration of the solution that is equal to the water potential of the potato tissue.

..... [1]

(iii) Explain in terms of water potential, the percentage change in length of the potato chips that occurred in water.

.....

.....

..... [2]

[Total: 13]

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2 **K1** is a slide of frog blood. Like human blood it contains many red blood cells. These are different from human red blood cells.

(a) Make a large, labelled, high power drawing of a red blood cell from slide **K1**.

[3]

(b) **K2** is a slide of human blood.

(i) Make a large, labelled, high power drawing of a white blood cell from slide **K2**. Identify the type of white blood cell that you have drawn.

Type of white blood cell ..... [3]

(ii) Assuming that a human red blood cell has a diameter of 8 µm, estimate the diameter of a human white blood cell.
Show your calculations.

..... [2]

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(iii) Use the eye-piece graticule provided to make an estimate of the ratio of the size of frog red blood cells to human white blood cells.
You should measure the longest axis of each cell type.

Space for measurements	*Space for working*

Ratio ..... [2]

(iv) State **two** visible structural differences between frog and human red blood cells.

.....

.....

.....

..... [2]

[Total: 12]

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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, or recommended in the confidential instructions? If so, give brief details of the circumstances.

(d) Any comments.

Signed ……

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

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