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

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

4140944425

BIOLOGY **9700/32**

Paper 3 Advanced Practical Skills **October/November 2009**

2 hours

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 **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 **10** printed pages and **2** blank pages.

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You are reminded that you have TWO hours to complete Questions 1, 2 and 3 in the practical examination.
Questions 1 and 3 use apparatus or a microscope. You should start with either Question 1 or 3. It is expected that Question 1 will take you approximately one hour. Question 3 should take you approximately 20 minutes.
Question 2 does not require apparatus or the use of a microscope, you should complete this question whenever you have spare time, most likely after you have completed Question 3.
You should read carefully through the whole of each question and then plan your use of the time to make sure that you finish all of the work that you would like to do.
You will gain marks for recording your results according to the instructions.

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1 You are required to identify four samples **S1**, **S2**, **S3** and **S4**.

One sample contains starch suspension which a person was about to eat.

One sample was taken from the mouth two minutes after being eaten.

One sample was taken from the stomach ten minutes after being eaten.

One sample was taken from the small intestine two hours after being eaten.

Starch is hydrolysed to glucose by enzymes in the mouth and small intestine. These enzymes are not active in the stomach. The starch suspension moves from the mouth to the stomach to the small intestine.

(a) (i) Suggest what happens to the concentrations of starch and glucose after the starch suspension has been eaten.

mouth .....

.....

stomach .....

.....

small intestine .....

..... [2]

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Using only the materials provided test the four samples **S1**, **S2**, **S3** and **S4**. You will need to consider carefully how you will carry out the tests so that you can determine the relative concentrations of starch and glucose.

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(ii) Prepare the space below and record:

- the tests you used
- the quantities of the samples and reagents
- and your results.

[7]

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(iii) Using the information provided and your results, complete Table 1.1 below to identify the samples.

Table 1.1

sample from	sample identified
starch about to be eaten	……
mouth	……
stomach	……
small intestine	……

[3]

(iv) Explain your answer to **(a)(iii)**.

.....

.....

.....

.....

.....

.....

..... [3]

(b) A student wanted to obtain a **quantitative** measurement of the glucose concentrations.

Suggest how the student could modify this investigation to obtain quantitative measurements of the glucose concentrations.

.....

.....

.....

.....

.....

.....

..... [3]

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A student investigated the effect of increasing the starch concentration on the time taken for 2 cm^3 of a 1% solution of amylase to hydrolyse the starch.

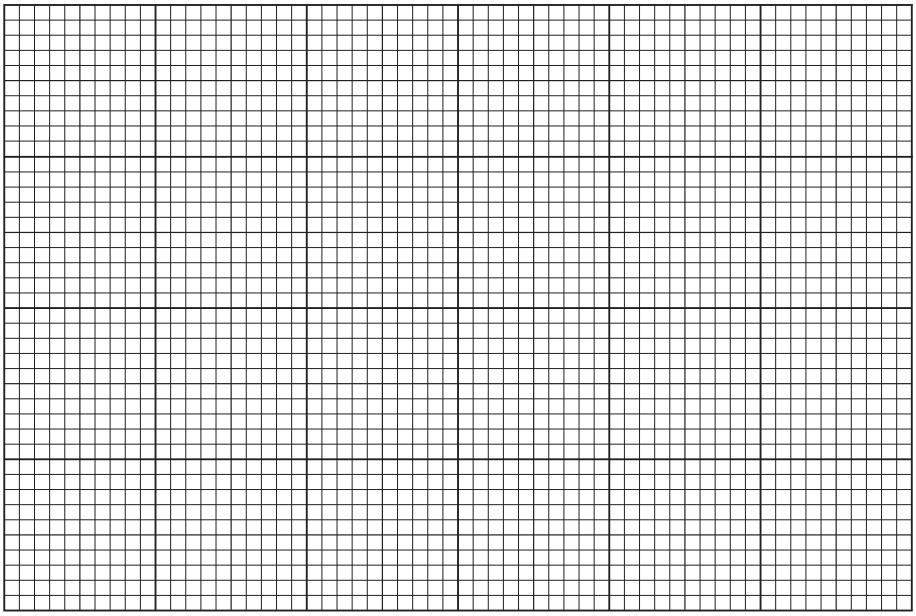
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The student's results are shown in Table 1.2.

Table 1.2

concentration of starch / g dm^{-3}	mean time taken for 1 cm^3 of starch to be hydrolysed / seconds
5	12
15	39
20	53
30	79

(c) (i) Plot a graph of these data shown in Table 1.2.



[4]

(ii) Use your graph to find the rate of hydrolysis by finding the gradient of the line.

Show on your graph where you took the readings to calculate the gradient. [1]

Show your working.

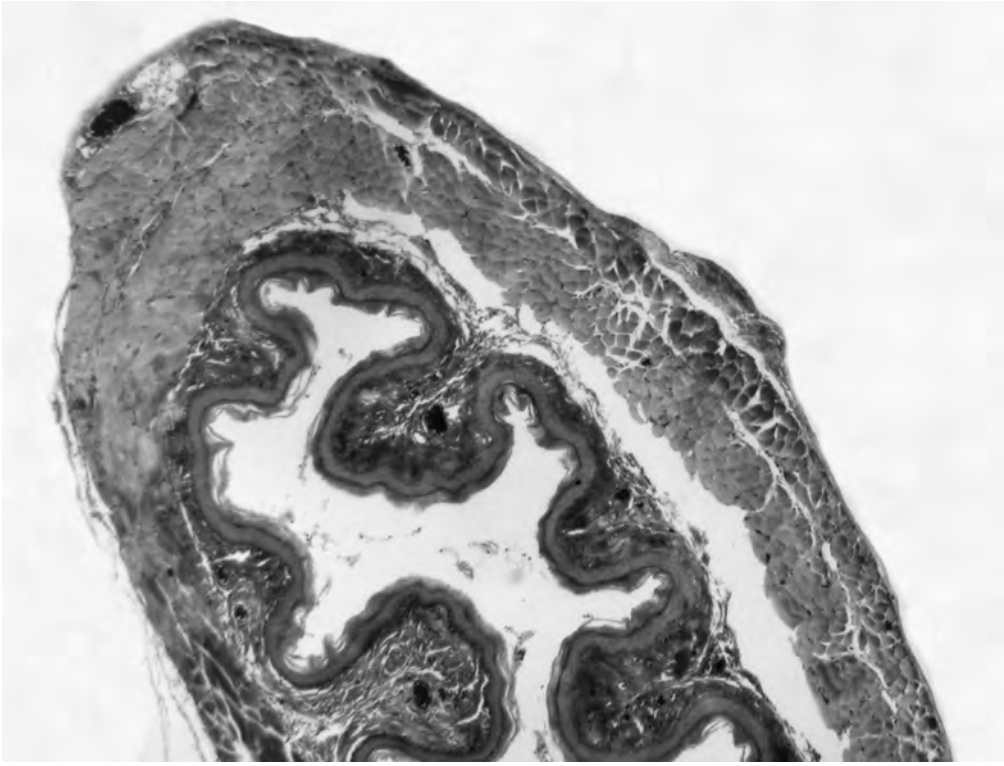
rate of hydrolysis ..... g dm^{-3} s^{-1} [1]

[Total: 24]

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2 **(a)** Fig. 2.1 is a photomicrograph of a transverse section through a tubular organ of a mammal.

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magnification × 100

Fig. 2.1

Draw a large plan diagram of the section shown in Fig 2.1.

No labels are required.

[4]

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(b) Fig. 2.2 is a photomicrograph showing a high-power view of the surface of a leaf.

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magnification ×400

Fig. 2.2

(i) Make a large, labelled drawing to show two guard cells and the complete cells that surround them. Do **not** draw more than six cells in total.

Show on Fig. 2.2 the cells that you have drawn.

[5]

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(ii) Calculate the actual length in micrometres (μm) of one of the guard cells.

Show all the steps in your calculation.

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..... μm [2]

[Total: 11]

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3 You are provided with two samples of plant material.

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A suspension of leaf cells in a dish, labelled **L**.

A piece of peeled potato tuber in a dish, labelled **P**.

1. Label four slides, two with **L** and two with **P**.

2. Using a pipette, place one drop of **L** on each of the two slides labelled **L**.

[H] 3. Add one drop of iodine solution to one of the slides labelled **L**.

4. Using a sharp blade or scalpel, cut the potato piece to show a fresh surface.

5. Carefully scrape off some potato cells from the fresh surface and smear them onto the middle of each of the two slides labelled **P**.

[H] 6. Add one drop of iodine solution to one of the slides labelled **P**.

7. Add a coverslip to each slide and use a paper towel to absorb the excess liquid.

8. Use your microscope to search each slide carefully and record the observations of the cells you can find.

(a) Prepare the space below and record all your observations.

[3]

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[Turn over

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(b) Explain your observations.

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.....

.....

.....

..... [2]

[Total: 5]

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