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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

2165956600

BIOLOGY **9700/33**

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 **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 **9** printed pages and **3** blank pages.

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You are reminded that you have only one hour for each question in the practical examination. 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.

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You will gain marks for recording your results according to the instructions.

1 You are provided with five solutions **S1**, **S2**, **S3**, **S4** and **S5**.

These solutions contain starch or protein or reducing sugar in varying concentrations or any two of these or none of them.

Carry out tests, using only the reagents provided, to identify the contents of each of the solutions. Use your results to decide whether the concentration of each of the substances you identify is high or low.

You are required to identify two of the solutions, **S1** to **S5**, that could be mixed together to feed a young mammal.

The mixture needs to contain

- a high concentration of starch,
- a high concentration of protein and
- a low concentration of reducing sugar.

The mixture **must be made up from equal volumes of only two of the solutions, S1 to S5.**

You will need to consider carefully how you will carry out the tests so that you can determine the relative concentrations of the three substances.

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(a) (i) Complete the table below to show how you will carry out the tests on each solution.

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test for	method for test	expected results		
		negative	low concentration	high concentration
starch				
reducing sugar				
protein				

[4]

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(ii) Prepare the space below and record your observations of the tests on all the solutions.

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[6]

(iii) Use your observations to state the **two** solutions that should be mixed in equal volumes to provide the correct mixture to feed the young mammal.

.....[1]

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QUESTION 1 CONTINUES ON PAGE 6 OVERLEAF

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A student investigated the time taken for the complete digestion of starch by an enzyme found in the saliva of 25 individuals of a species of mammal.

A sample of saliva was collected from each individual and mixed with 5 cm^3 of 1% starch suspension. Samples of the mixture were tested for the presence of starch.

The student recorded the time taken for the complete digestion of starch.

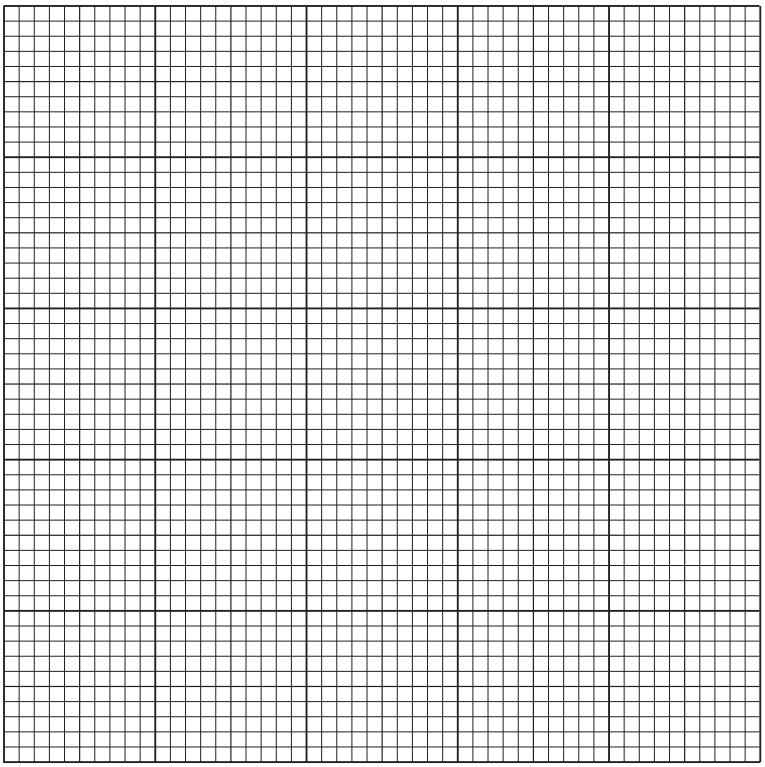
The investigation was repeated with the same individuals on the following day.

The results of the student's investigation are shown in Table 1.1.

Table 1.1

time taken for complete digestion of starch / min	number of individuals	
	day 1	day 2
35	2	8
40	6	10
45	9	4
50	5	2
55	3	1

(b) (i) Plot these data shown in Table 1.1.



[4]

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(ii) Describe the patterns in the results.

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.....[3]

(iii) Suggest a reason for the difference between the results for day 1 and day 2.

.....

.....[1]

(iv) Suggest how you might control the variables in this investigation to compare a different species of mammal with the mammal studied.

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.....[3]

[Total: 22]

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[Turn over

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2 **J1** is a slide of a stained transverse section of a leaf.

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You are not expected to have studied this leaf.

(a) **(i)** Draw a large low-power plan diagram of the midrib of the leaf as shown in the shaded area in Fig. 2.1.

Label the upper surface and one vascular bundle.

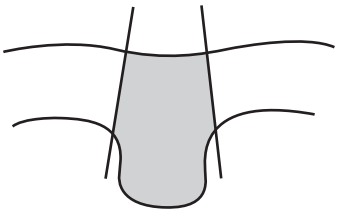


Fig. 2.1

[5]

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J1 is a leaf from a plant which grows in dry, sunny habitats.

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(ii) Describe **one** visible adaptation of this leaf and suggest a possible advantage to the plant.

.....

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.....

.....[2]

(iii) Using the eyepiece graticule and slide **J1**, find the ratio of the thickness of the midrib compared to the thickness of the lamina.
The position of the midrib and the lamina are shown in Fig. 2.2.

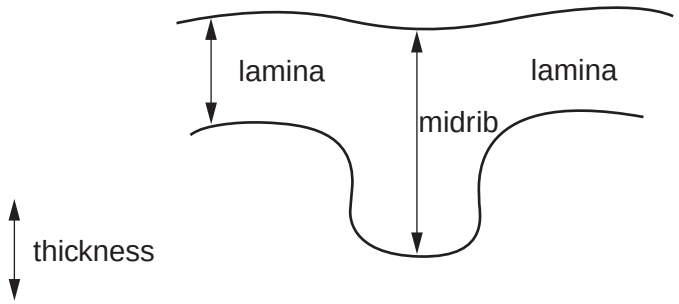


Fig. 2.2

You must show your measurements and all the steps in your calculation.

[3]

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(b) (i) Make a large, high-power drawing of a group of three cells from the upper epidermis and the cells touching them.

Label a cell wall.

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[4]

(ii) Prepare the space below so that it is suitable for you to record the observable differences between the upper and lower epidermis of the leaf.

Record your observations in the space you have prepared.

[4]

[Total: 18]

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