Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

BIOLOGY **0610/06**

Paper 6 Alternative to Practical

May/June 2004

1 hour

Candidates answer on the Question Paper.
There are no Additional Materials.

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.

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	
3	
Total	

This document consists of **9** printed pages and **3** blank pages.

1 Fig. 1.1 shows the appearance of a cell from the epidermis of a leaf.

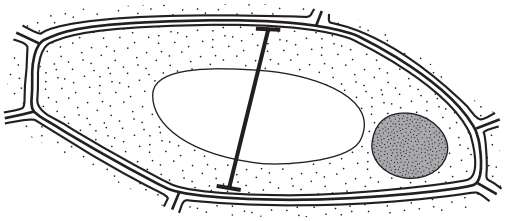

Fig. 1.1

Three similar pieces of epidermis have been placed in different solutions and left submerged for 30 minutes. One solution was pure water, another contained 1.5% sugar solution and the third 5% sugar solution.

Figs. 1.2, 1.3 and 1.4 show a cell from each of these three pieces of epidermis.

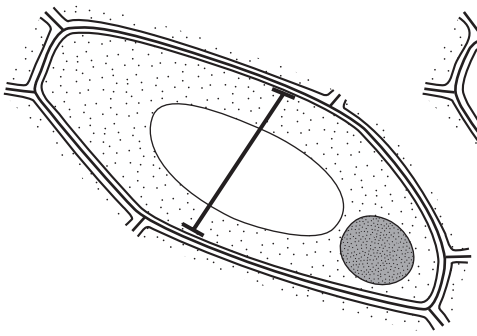

Fig. 1.2

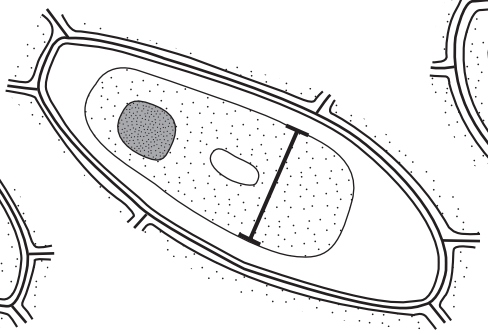

Fig. 1.3

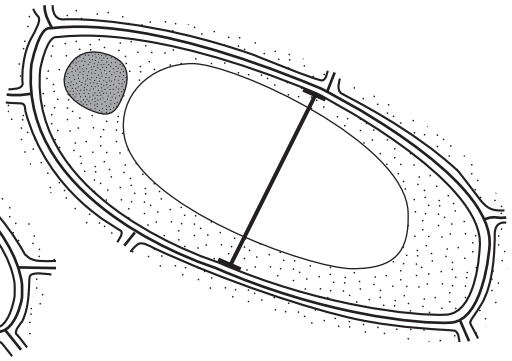

Fig. 1.4

(These cells are all drawn to the same magnification)

(a) Measure the width of the cell contents along the lines drawn across each cell.

Fig. 1.1 .....

Fig. 1.2 .....

Fig. 1.3 .....

Fig. 1.4 ..... [3]

(b) Suggest in which solution each of the cells, in Figs. 1.2, 1.3 and 1.4, was placed and explain your choice.

Fig. 1.2 .....

explanation .....

.....

Fig. 1.3 .....

explanation .....

.....

Fig. 1.4 .....

explanation .....

.....[8]

[Total : 11]

2 Starch is broken down during digestion by an enzyme, amylase.
The test for starch uses iodine solution.
When all the starch has been completely digested, the orange brown iodine solution does not change colour.

(a) Three test tubes **A**, **B** and **C** each contained 5 cm^3 of 1% starch solution.

To tube **A**, 1 cm^3 of water and 2 cm^3 of 1% amylase solution were added.
The stop clock was started immediately and the mixture was stirred.
Every minute a drop was removed from the mixture and added to iodine solution on a white tile.

To tube **B**, 1 cm^3 of water an 2 cm^3 of boiled and cooled 1% amylase solution were added.
The same method of testing was used.

To tube **C**, 1 cm^3 of 0.5% sodium chloride solution and 2 cm^3 of 1% amylase solution were added.
The same method of testing was used.

The colours observed are shown in Table 2.1.
These investigations were carried out at room temperature.

Table 2.1

time / mins	tube **A**	tube **B**	tube **C**
1	black	black	black
2	black	black	dark brown
3	black	black	dark brown
4	black	black	lighter brown
5	dark brown	black	lighter brown
6	dark brown	black	orange brown
7	dark brown	black	orange brown
8	dark brown	black	orange brown
9	lighter brown	black	orange brown
10	lighter brown	black	orange brown
11	lighter brown	black	orange brown
12	lighter brown	black	orange brown
13	orange brown	black	orange brown
14	orange brown	black	orange brown
15	orange brown	black	orange brown

(i) State how long it took for the starch to be completely broken down in tubes **A** and **C**.

tube **A** ..... *tube* **C** .....[2]

(ii) Describe the effect on the reaction of using sodium chloride solution.

.....

.....

.....[2]

(iii) State the purpose of tube **B** in this investigation.

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.....[1]

(b) In the human alimentary canal, starch is broken down by amylase. The pH of the alimentary canal varies between pH 2 and pH 8.5.

Suggest how you could investigate the effect of pH on the activity of amylase.

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.....[5]

[Total : 10]

3 Fig. 3.1 shows two joined mature *Acer* fruits.

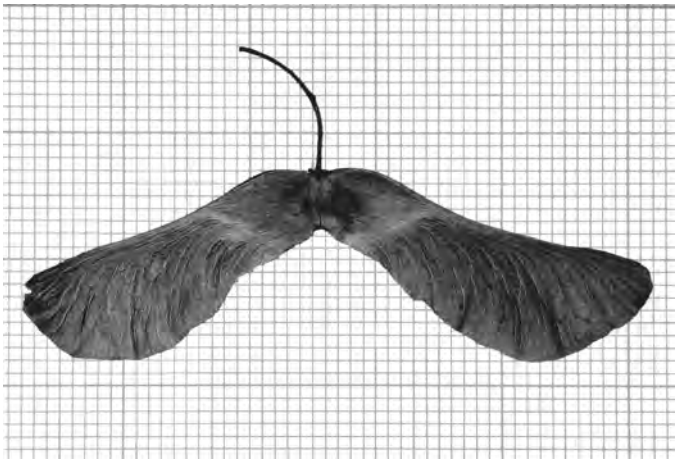

Fig. 3.1

(a) (i) Make a large drawing of **one** of these fruits in the space below.

Label the position of the seed.

[4]

(ii) Calculate the magnification of your drawing using the maximum length of the fruit in Fig. 3.1 that you have drawn.

maximum length of your drawing of one fruit ..... cm

maximum length of the same fruit in Fig. 3.1 ..... cm

working:

magnification .....[2]

The background in Fig. 3.1 is a grid, with squares of 1 mm x 1 mm.

(iii) Determine the surface area of one of the fruits including the wing-like extension. Explain how you worked out your answer.

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.....[3]

(b) Using paper and plasticine to represent a wind dispersed fruit, such as *Acer*, it is possible to adjust the size of the wing. The effect of different wing size was investigated by dropping a model fruit with different surface areas, from the same height in the same wind conditions. The horizontal distance travelled by the model was measured. Each model fruit was dropped five times.

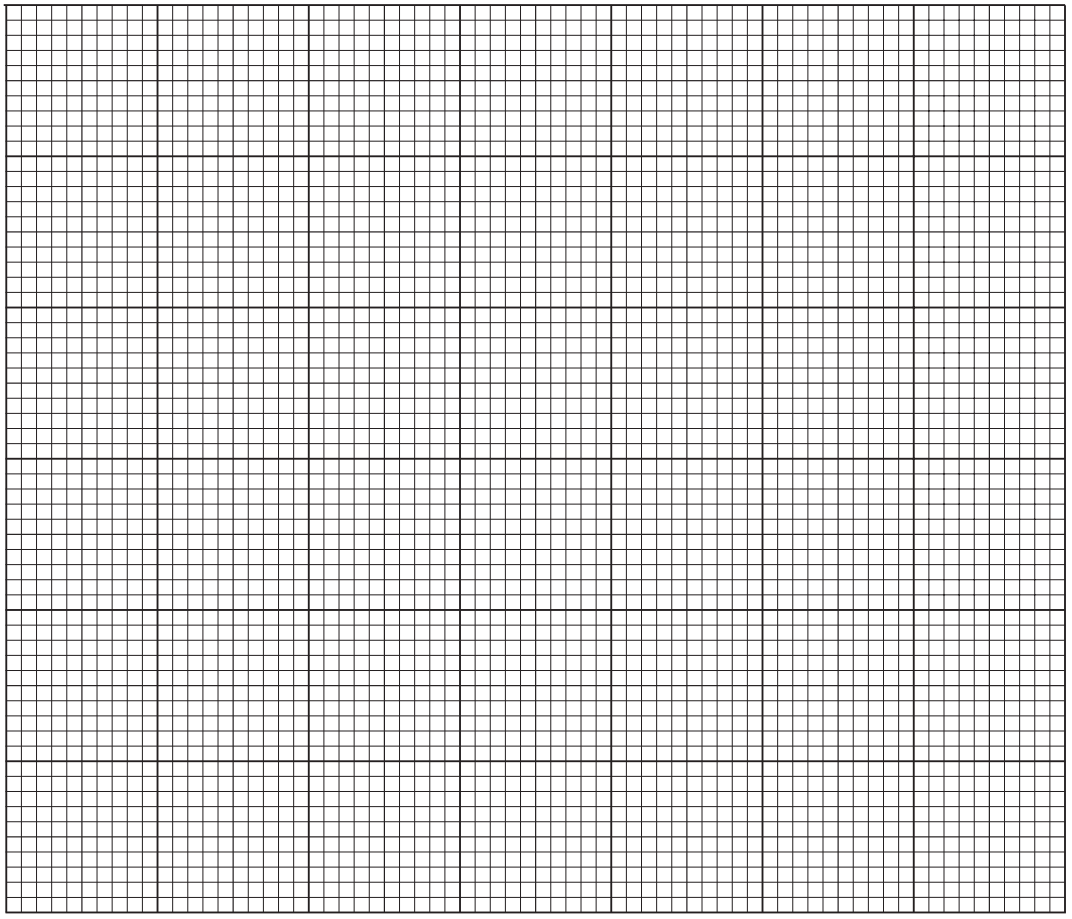
The results are shown below.

Table 3.1

surface area of wing-like extension / cm^2	distance travelled / cm					mean distance travelled / cm
	drop 1	drop 2	drop 3	drop 4	drop 5	
32	30	40	20	15	20	
64	20	30	30	25	40	
96	30	40	26	50	35	
128	45	20	40	45	65	
160	72	40	54	50	34	

(i) Complete Table 3.1 by calculating the mean (average) distance travelled by the model fruits. [2]

(ii) Plot the mean distance the model fruit travelled horizontally against the surface area of the model as a line graph. [4]



(iii) Describe the relationship between the surface area and the mean distance travelled.

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.....[2]

(iv) Outline the importance of seed dispersal away from the parent plant.

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.....[2]

[Total : 19]

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