



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education



CANDIDATE  
NAME

CENTRE  
NUMBER

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**BIOLOGY**

**0610/06**

Paper 6 Alternative to Practical

**October/November 2007**

**1 hour**

Candidates answer on the Question Paper

No Additional Materials are required.

**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 or graphs.

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.

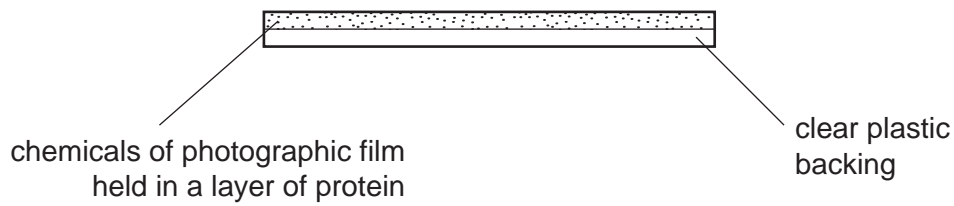
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
<b>1</b>	
<b>2</b>	
<b>3</b>	
<b>Total</b>	

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



- 1 A protein is used to hold other chemicals onto the clear plastic backing of photographic film, as shown in Fig. 1.1.



**Fig.1.1**

Trypsin is an enzyme which will digest the protein so that the coating on the photographic film is removed and the film becomes clear.

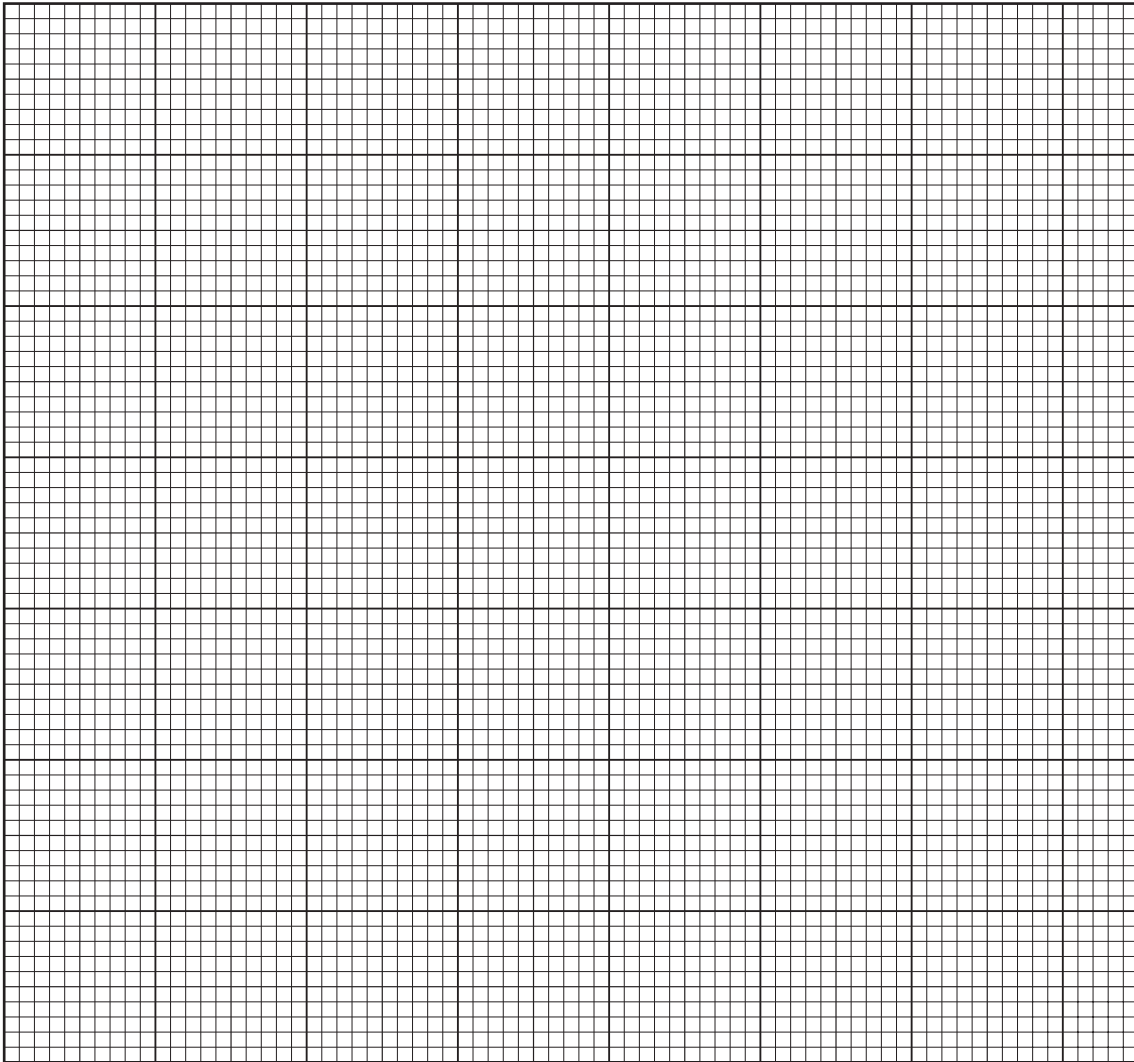
Table 1.1 shows the results obtained by two students who investigated the effect of pH on the activity of this enzyme. They made up the solutions, set up the experiment and timed how long the enzyme took to digest the protein and clear the film.

**Table 1.1**

pH	time for the protein to be digested / mins	
	student 1	student 2
2	12.0	14.0
4	8.0	9.0
6	2.0	3.0
8	0.5	1.0
10	8.0	9.0

(a) (i) Plot the results obtained by **student 2** in the form of a suitable graph.

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[5]

(ii) Describe and explain the effect of pH on the activity of the enzyme.

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[5]

**(b) (i)** Suggest reasons for the difference in the results for the two students.

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.....  
..... [3]

**(ii)** If you were to carry out this investigation, describe what steps you would take to ensure that your results were as reliable and valid as possible.

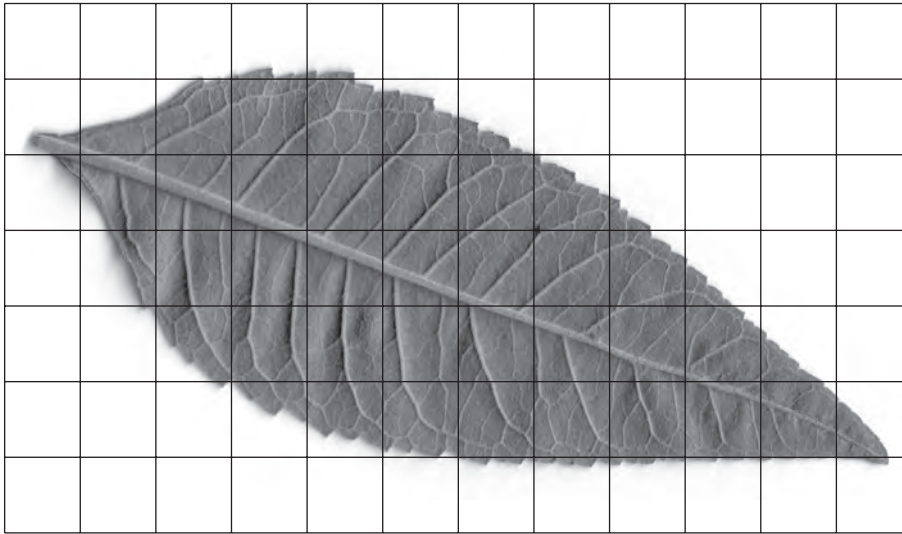
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..... [5]

[Total: 18]

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2 Fig.2.1 shows the lower surface of a dicotyledonous leaf.

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*Magnification  $\times 1$*

**Fig. 2.1**

- (a)** Make a labelled drawing of the leaf in Fig. 2.1. Your drawing should be the same size as that shown in Fig. 2.1.

[4]

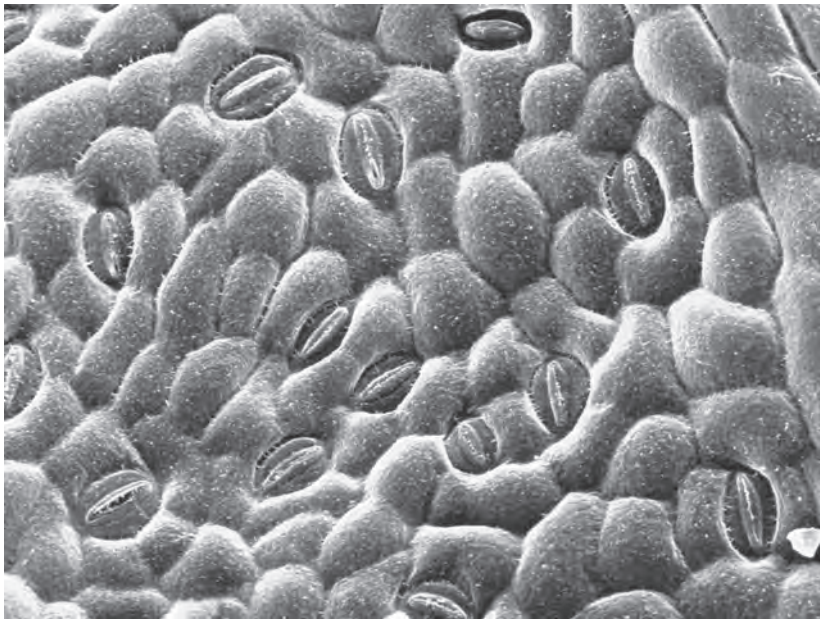
(b) (i) Calculate the surface area of this leaf in Fig.2.1 to the nearest  $\text{cm}^2$ .

.....  $\text{cm}^2$  [1]

(ii) Describe how you obtained an answer that was as accurate as possible.

.....  
.....  
..... [2]

(c) Fig. 2.2 shows the detail of part of the lower surface of a similar leaf.



Magnification  $\times 145$

Fig. 2.2

(i) On Fig. 2.2, label **two** different types of cell. Use ruled label lines. [2]

(ii) On Fig. 2.2, put a circle around **two** of the cells where chloroplasts are normally present. [1]

(d) Suggest how you could determine the number of stomata present on one surface of a whole leaf.

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..... [4]

[Total: 14]



- 3 Some seeds were obtained by breeding a pair of tobacco plants. Seeds from a single packet of these tobacco seeds were germinated in two dishes labelled **A** and **B**. Fig. 3.1 shows the germinating tobacco seeds.

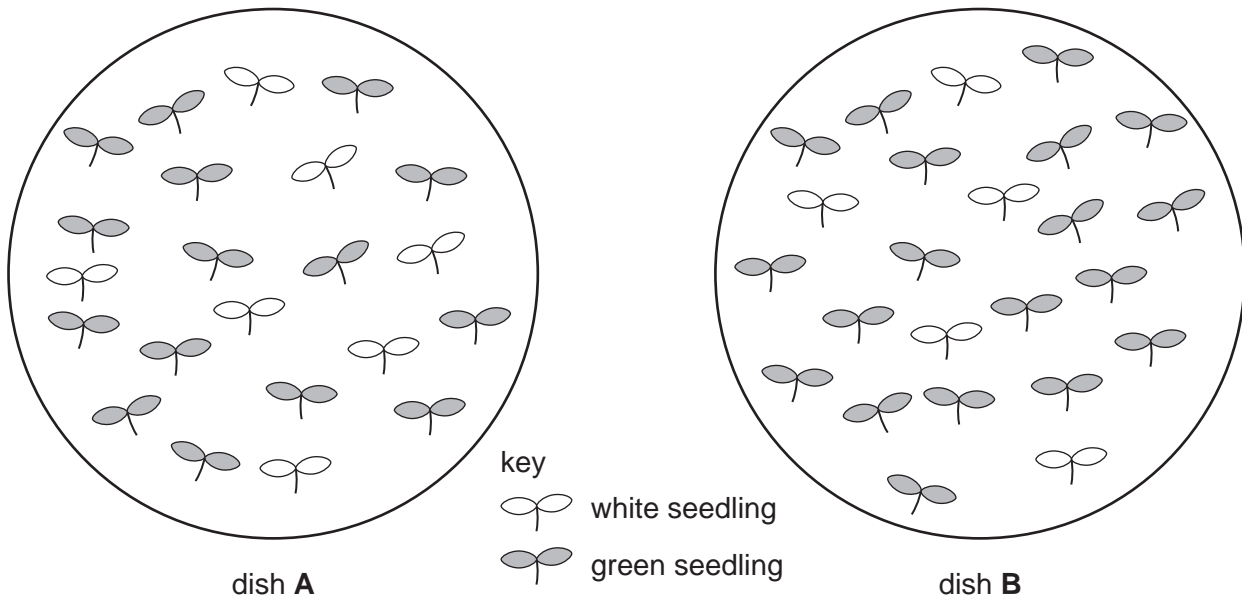


Fig. 3.1

- (a) Count the number of green seedlings and the number of white seedlings on the two dishes **A** and **B** and complete Table 3.1.

Table 3.1

dish	number of seedlings	
	green	white
A		
B		
total		

[3]

- (b) Using the total numbers in Table 3.1, suggest and explain what these results indicate about the inheritance of the green pigment.

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[2]

(c) Suggest and explain which of these seedlings would be able to grow and produce flowers.

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.....  
..... [3]

[Total: 8]

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*Copyright Acknowledgements:*

Question 2                      Fig. 2.2 © ANDREW SYRED / SCIENCE PHOTO LIBRARY.

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