



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE
NAME

CENTRE
NUMBER

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CANDIDATE
NUMBER

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BIOLOGY

5090/06

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



- 1 Fig.1.1 shows a simple apparatus to investigate the rate of photosynthesis by counting the bubbles that are given off by a piece of pond weed.

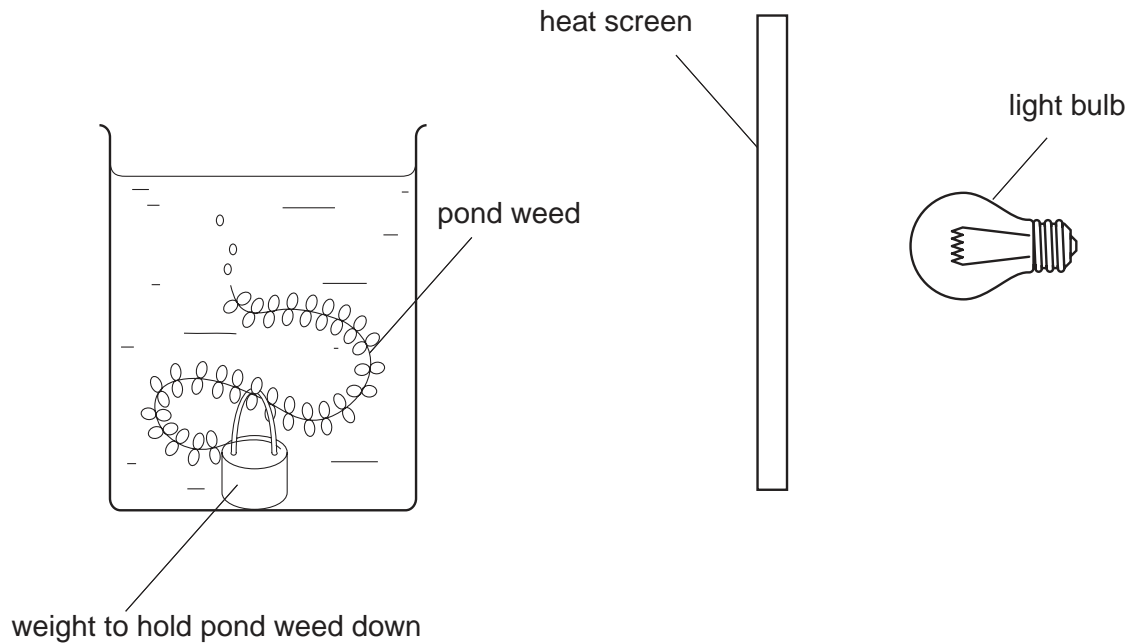


Fig. 1.1

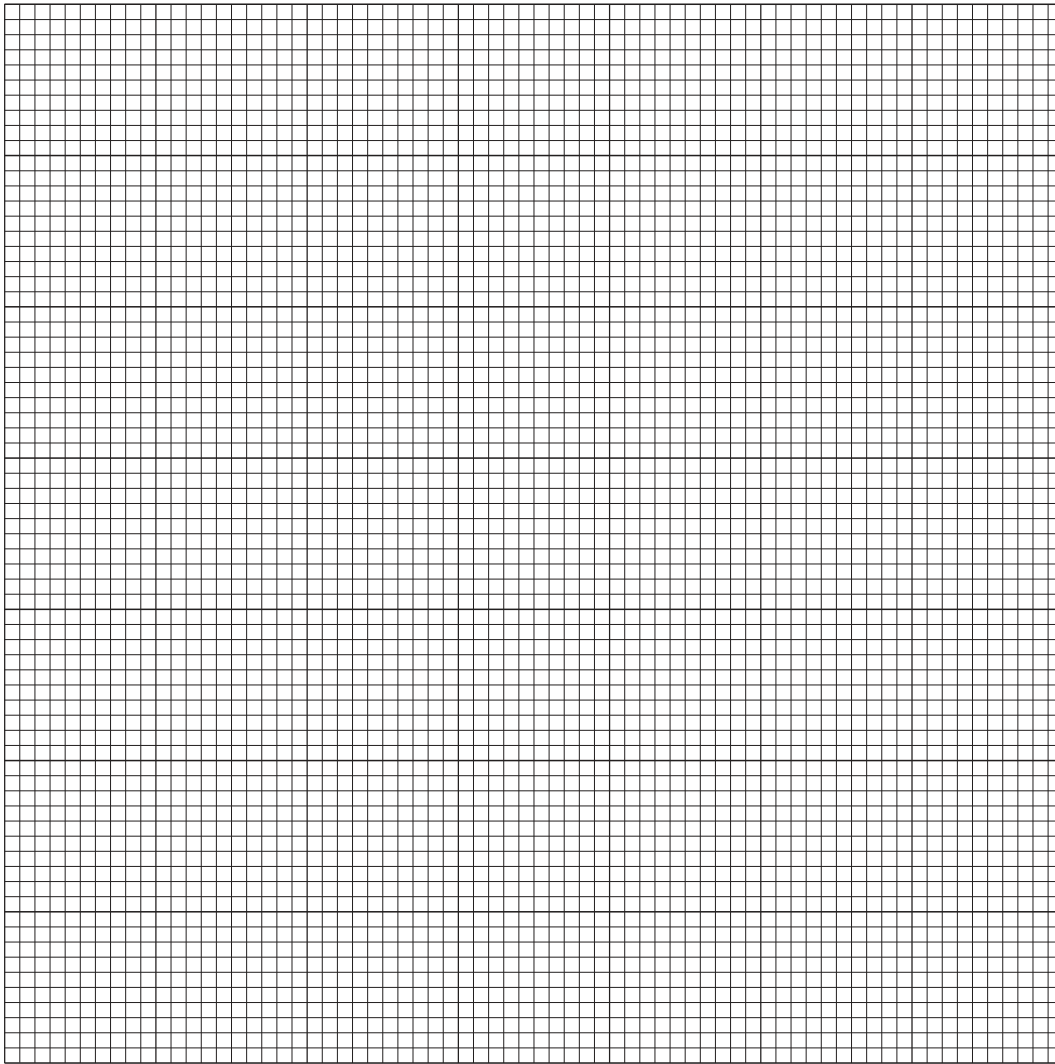
the bubbles given off in one minute were counted
 the light intensity was then changed
 after waiting 5 minutes the new rate was counted, and so on

The results of one experiment are given in Table 1.1

Table 1.1

light intensity / arbitrary units	rate of photosynthesis / bubbles per minute
2	4
3	7
4	10
5	12
7	13
9	14
10	14
13	14

(a) (i) On the grid below construct a graph from the information in Table 1.1.



[4]

(ii) Explain why the rate of photosynthesis did not increase as the light intensity increased from 9 to 13 arbitrary units.

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

(b) (i) Explain why it is necessary to have the heat screen in the apparatus.

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

(ii) State why there was a waiting time of 5 minutes before a new reading was taken.

.....
..... [1]

(iii) Suggest two ways by which the light intensity could be increased in the experiment.

- 1.
- 2. [2]

(iv) Suggest 4 ways in which the experiment could be made more accurate and reliable.

- 1.
- 2.
- 3.
- 4. [3]

[Total: 14]

- 2 Fig. 2.1 is a photomicrograph of part of the fungus *Penicillium* that is reproducing asexually.

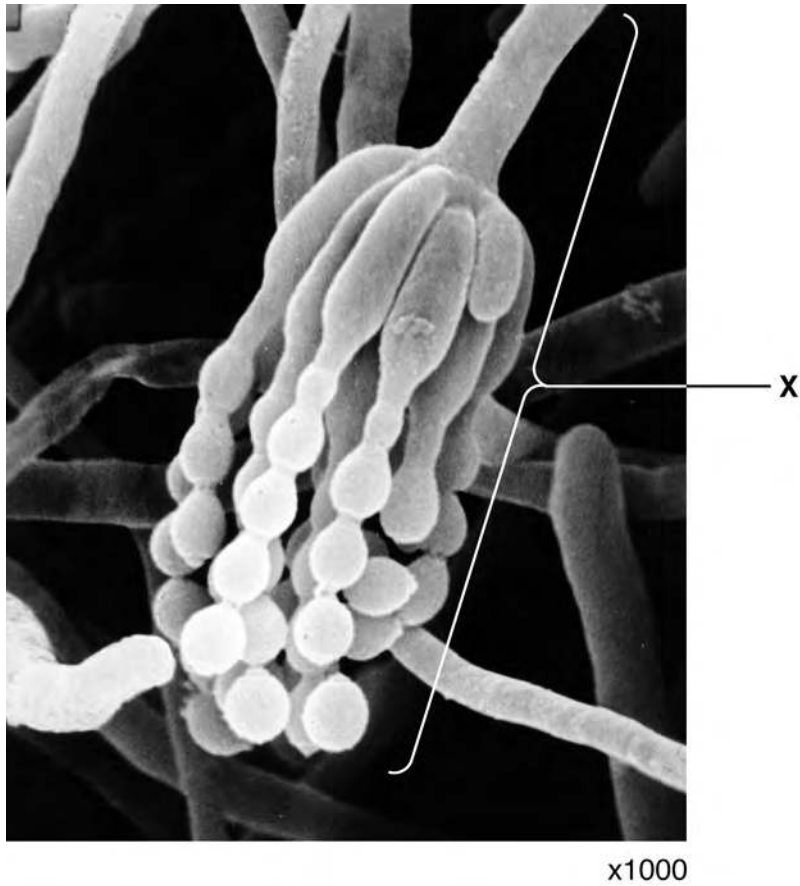


Fig. 2.1

- (a) (i) Make a large drawing of the structure labelled 'X'.
Labels are not required.

- 3 Fig. 3.1 shows a beaker of water in which is suspended an open-ended piece of Visking tubing, a partially permeable membrane.

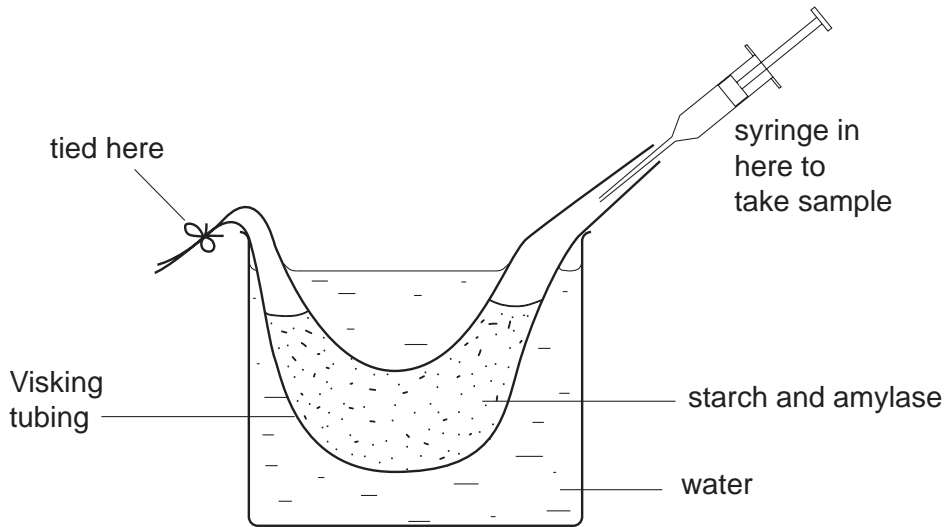


Fig. 3.1

the Visking tubing contains a mixture of 0.5% starch suspension and a 1% solution of amylase

the water in the beaker is at approximately 40 °C

when the experiment was set up it was confirmed that there was no reducing sugar in the water

a blunt-ended syringe could be inserted into the open end of the Visking tubing to obtain a sample of the contents

samples were taken and tested for starch and for reducing sugar

the liquid in the beaker was also tested in the same way

- (a) (i) Complete Table 3.1 to suggest the observed results (not the conclusions) of the tests indicated.

Table 3.1

time/min	solution in Visking tubing		liquid in beaker	
	starch test	reducing sugar test	starch test	reducing sugar test
0				
2				
4				
10				

[5]

- (ii) Suggest how you could be sure that the reaction between the amylase and the starch was complete.

..... [1]

- (iii) Explain how this apparatus can be taken to represent a model of some aspects of the digestive processes in the gut.

.....

.....

.....

..... [2]

- (b) In another experiment, Visking tubing was set up as shown in Fig. 3.2.

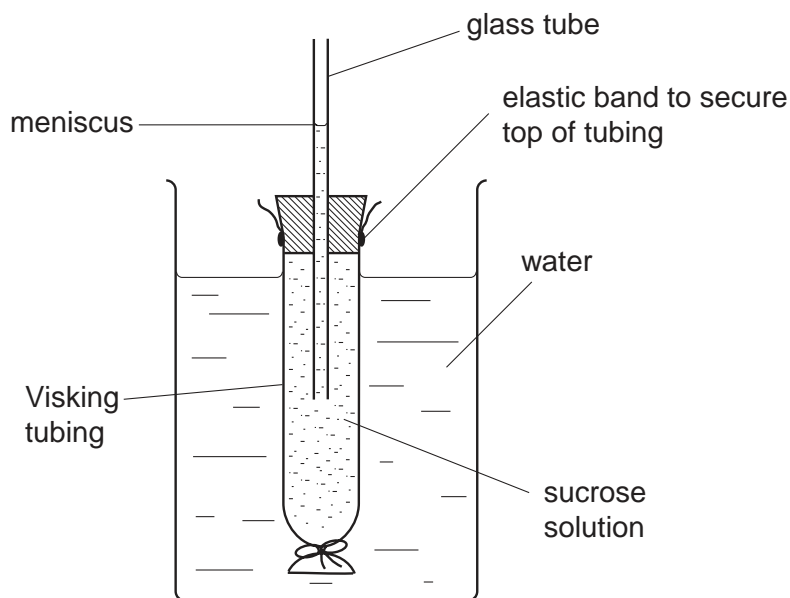


Fig. 3.2.

the bottom of the Visking tubing was securely tied to prevent leakage in or out
 the tubing was completely filled with a solution of sucrose
 the top of the tubing was securely tied to a bung through which passed a glass tube
 the apparatus was allowed to settle until the meniscus of the sucrose solution was visible above the bung.

(i) Suggest what might be observed after 20 – 30 minutes.

..... [1]

(ii) Explain how, and why, this occurred.

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

(c) With reference to the substances used and the results of both these experiments, explain why Visking tubing is described as partially permeable.

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

[Total: 15]

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Question 2 Fig. 2.1 © E. GUEHO / SCIENCE PHOTO LIBRARY.

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