

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**BIOLOGY**



Paper 6 Alternative to practical

**0610/06**

October/November 2005

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

**1 hour**

Candidate  
Name

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Centre  
Number

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Candidate  
Number

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**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 pencil for any diagrams, graphs or rough working.

DO **NOT** WRITE IN THE BARCODE.

DO **NOT** WRITE IN THE GREY AREAS BETWEEN THE PAGES.

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 questions.

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

This document consists of **8** printed pages and **4** blank pages.








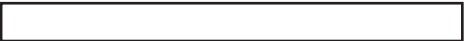

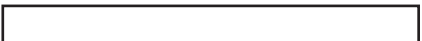
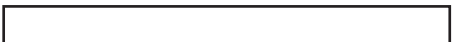

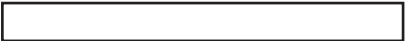


- 1 Fifteen pieces of raw Irish potato, *Solanum tuberosum*, were cut carefully to a length of 60mm.

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Three pieces were placed in each of five different concentrations of glucose solution and left for 2 hours. The pieces were removed and their lengths measured.

Table 1.1 shows the appearance of these pieces at the end of the two hours.

**Table 1.1**

concentration of glucose solution/ mol dm <sup>-3</sup>	potato pieces after being left in glucose solutions	length of potato/mm	change in length/mm
0.2		1 .....65.....	
		2 .....67.....	
		3 .....66.....	
	mean .....66.....	.....	
0.4		1 .....65.....	
		2 .....61.....	
		3 .....63.....	
	mean .....63.....	.....	
0.6		1 .....56.....	
		2 .....61.....	
		3 .....60.....	
	mean .....59.....	.....	
0.8		1 .....	
		2 .....	
		3 .....	
	mean .....	.....	
1.0		1 .....	
		2 .....	
		3 .....	
	mean .....	.....	

(a) (i) Measure the length of each piece carefully and record these measurements in Table 1.1. Write in the figures on the dotted lines. Nine measurements have been completed for you. [1]

(ii) Calculate the mean [average] length of the potato pieces. The first three rows have been completed for you. [1]

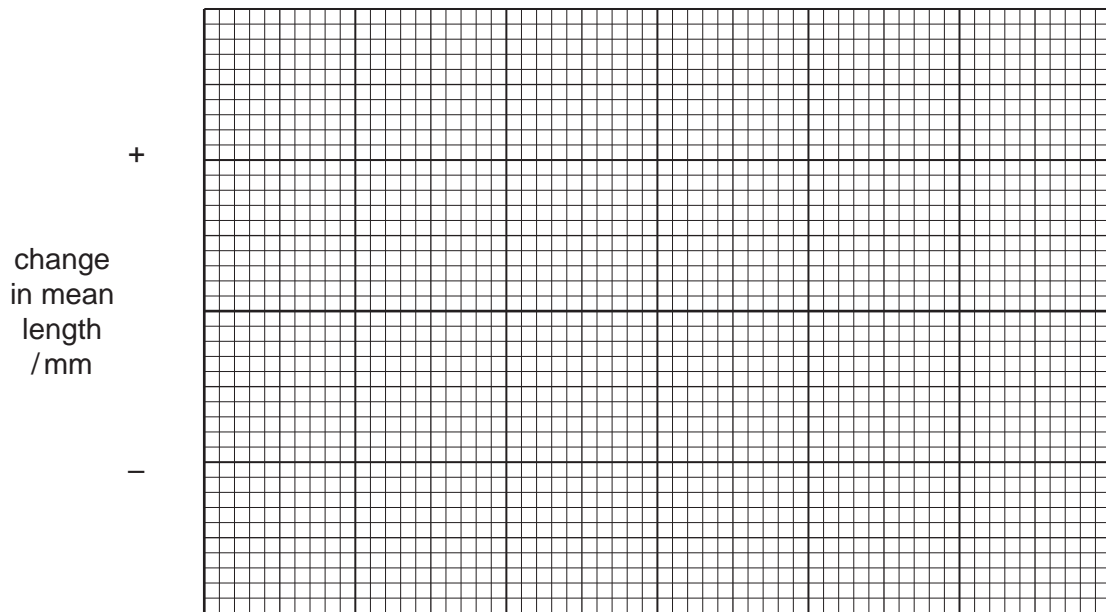
(iii) Calculate the change in mean length in **all** five concentrations of glucose solutions. [2]

(iv) Explain why three pieces of potato were used in each solution and not just one piece.

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

(b) (i) Plot the change in mean length of potato against concentration of glucose solution on the grid below.

Draw a line of best fit through the points.



concentration of glucose solution / mol dm<sup>-3</sup>

[4]

(ii) Describe and explain the changes in mean length of the potato pieces in the different glucose solutions.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

(c) (i) Using the information from the graph, estimate the glucose concentration which results in no change in mean length.

..... [1]

(ii) Suggest why, at this glucose concentration, there is no change in length.

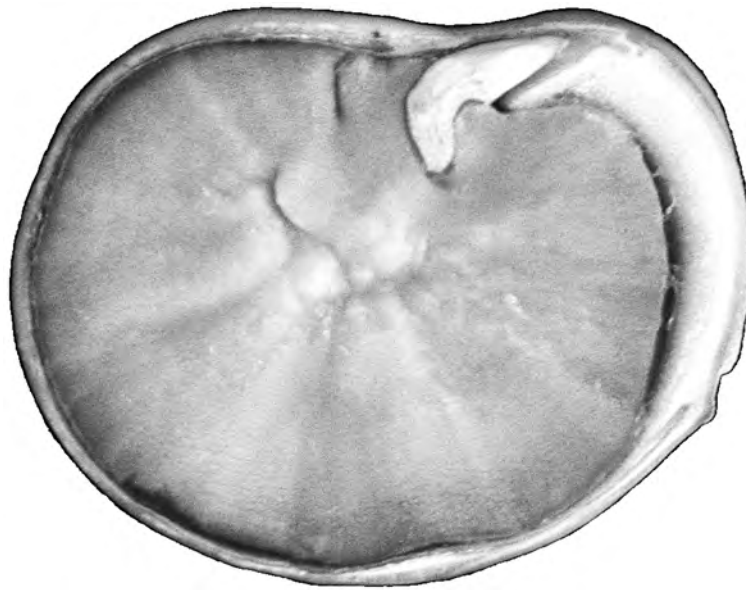
.....  
.....  
..... [2]

total [16]

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**QUESTION 2 IS ON PAGE 6**

- 2 Fig. 2.1 shows a fresh seed of broad bean, *Vicia faba*, which has been cut in half.



**Fig. 2.1**

- (a) (i)** Make a large, labelled drawing of the cut surface of the seed.

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[6]

(ii) Measure the length of the seed in Fig. 2.1 and in your drawing.

Indicate on Fig. 2.1 where the measurement was taken.

*length of seed in Fig. 2.1* .....

*length of seed in your drawing* .....

Calculate the magnification of your drawing.

Show your working.

*magnification* ..... [3]

(b) The broad bean is an example of a legume. Legumes are a good source of protein.

Describe how you would compare the protein content of two different beans.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

total [13]

- 3 If all conditions required for growth are present, some yeast cells in a flask can divide every hour.

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Fig. 3.1 shows the number of yeast cells in a flask measured over a period of 12 hours.

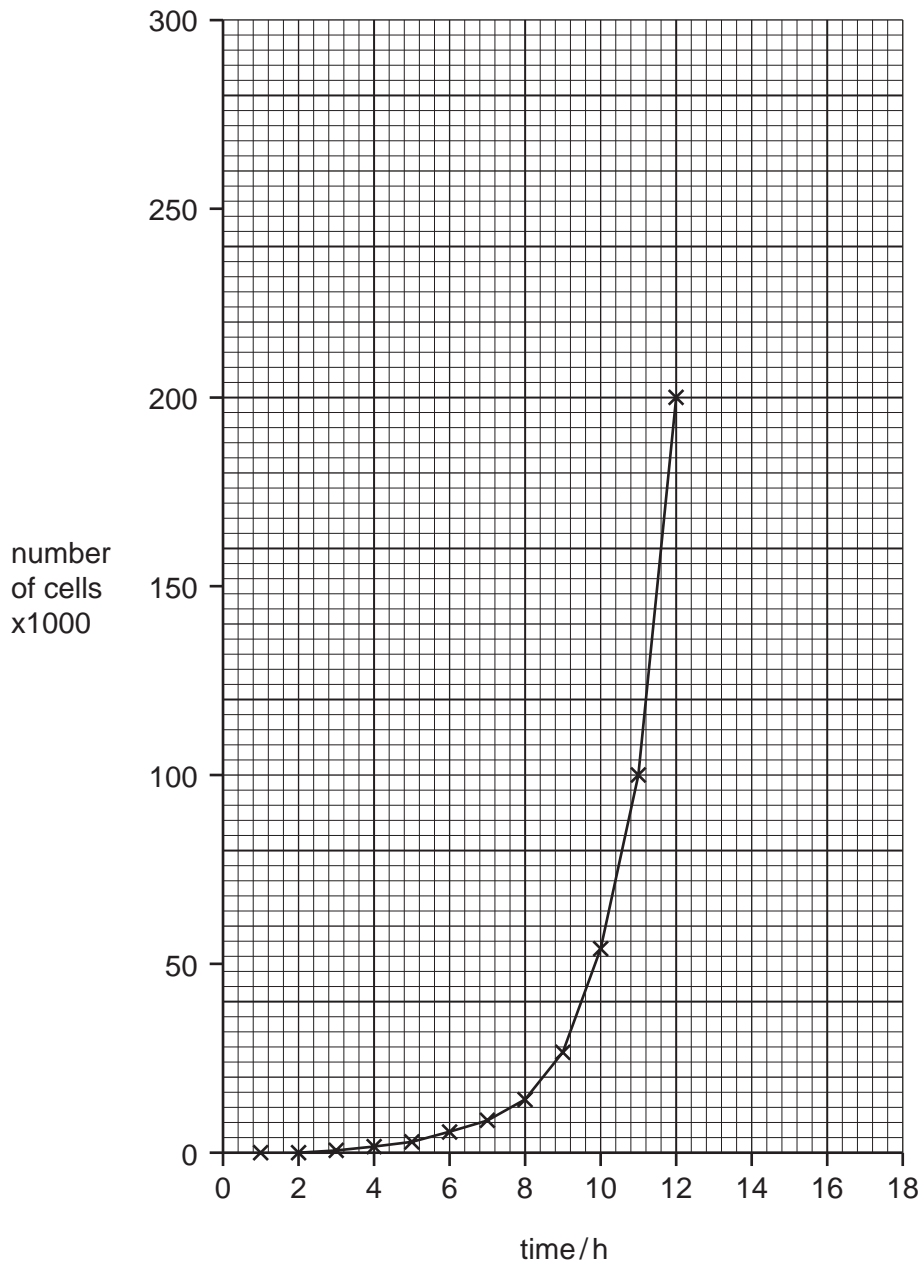


Fig. 3.1



(a) Suggest how you would observe the yeast cells and how you would estimate their total population in the flask.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

(b) On Fig. 3.1, indicate clearly and name, the **two** phases shown in this population curve. Mark when the change occurs between the two phases with a **Q**.

[3]

(c) (i) State two factors needed to maintain the maximum growth of the yeast population.

1. ....  
2. .... [2]

(ii) Suggest what would happen to the numbers of yeast in Fig. 3.1 if one of these conditions becomes limiting after 12 hours.

..... [1]

(iii) Draw a sketch to show the effect of your suggestion given in (c)(ii), by continuing the curve on **Fig. 3.1**.

[1]

total [11]





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