



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

**May/June 2009**

**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	
<b>Total</b>	

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



1 Saliva may contain an enzyme, amylase, that acts on the substrate, starch.

(a) Describe how you would carry out a test to show the presence of

(i) the substrate,

.....

.....

.....

(ii) the product of the action of amylase on starch.

.....

.....

.....[4]

A student carried out an investigation to find the effect of pH on the activity of amylase on the breakdown of starch.

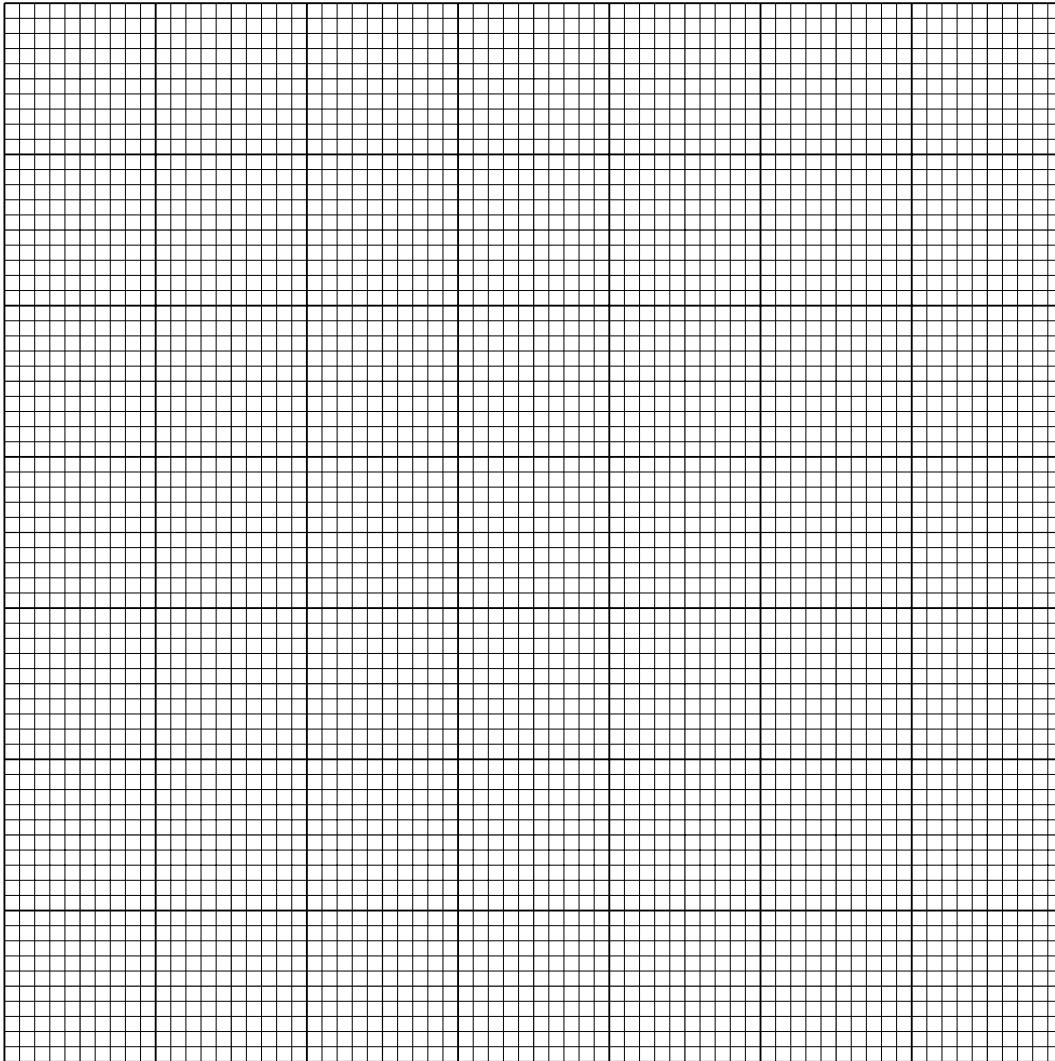
The student carried out a second experiment but added 1 cm<sup>3</sup> of dilute sodium chloride (salt) solution to the amylase and starch.

The results are shown in Table 1.1.

**Table 1.1**

pH	time taken for breakdown of starch / seconds	
	first experiment – no salt added	second experiment – salt added
3.5	600	450
4.0	65	50
4.5	90	60
5.0	150	100
6.0	300	200

(b) (i) Using the information in Table 1.1, construct a graph of the results using one set of axes.



[5]

(ii) Describe the effects of pH and of adding salt on the activity of amylase on the breakdown of starch.

*effect of pH*

.....  
.....

*effect of adding salt*

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

(c) Describe how you would ensure that your results were as reliable and valid as possible if you were to carry out the above investigation.

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[5]

[Total: 18]

2 Yoghurt is prepared by the bacterial fermentation of milk.

Fig. 2.1 shows two types of bacteria that can be found in yoghurt.

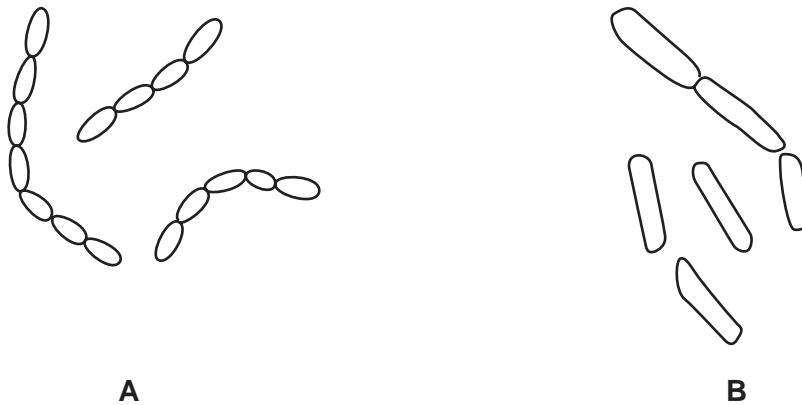


Fig. 2.1

(a) From the shape of the cells in Fig. 2.1, identify each of the two types of bacterial cell shown.

A ..... B ..... [2]

(b) Bacteria like that in Fig. 2.1 B are called *Lactobacillus bulgaricus*.

(i) In the formation of yoghurt, suggest what this bacterium might use as a source of energy in the milk.

.....[1]

(ii) Give a simple word equation to show the metabolic reaction that may occur.

.....[1]

(c) Starting with one litre of milk and a small sample of 'live' yoghurt, suggest how you might prepare a larger quantity of yoghurt.

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

[Total: 6]

- 3 Three specimens of the same dicotyledonous seed were soaked in water and then left under different conditions.

Specimen **A** – at 20°C in the dark.

Specimen **B** – at 20°C in the light.

Specimen **C** – at 4°C in the light.

Fig. 3.1 shows what had happened after they had been left in those conditions for 4 days.

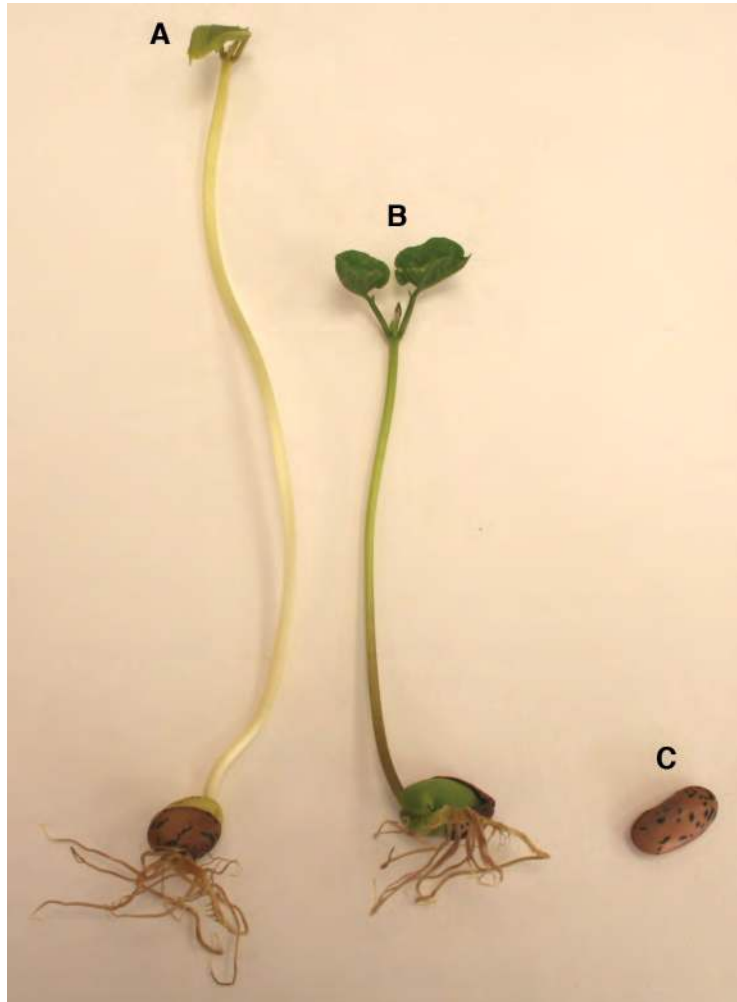


Fig. 3.1

- (a) In table 3.1, make labelled drawings of **A**, **B** and **C**. Include measurements to indicate maximum length and a brief description of each in words.

**Table 3.1**

specimen	drawing	maximum length	description
<b>A</b>			
<b>B</b>			
<b>C</b>			

[8]

(b) Use the information you have been given and your observations of the specimens to suggest explanations for

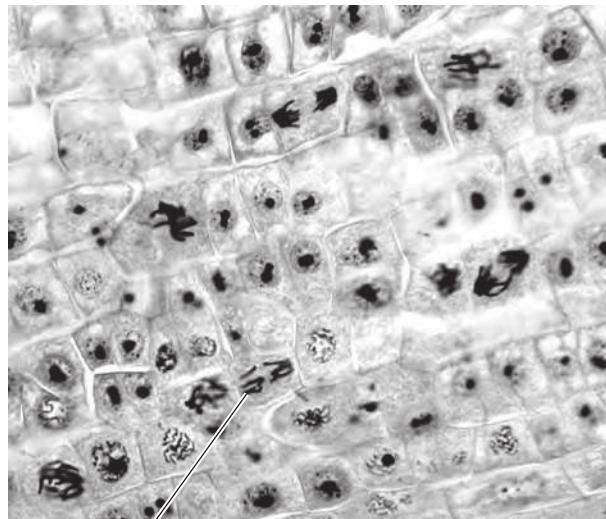
(i) the differences between **A** and **B**,

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

(ii) the differences between **B** and **C**.

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

(c) Fig. 3.2 shows the cells in a section through a root tip. The section has been treated with a stain for deoxyribonucleic acid, DNA.



X

**Fig. 3.2**

(i) State the type of cell division shown in these cells.

..... [1]



(ii) Name the structure labelled **X** in Fig. 3.2.

.....[1]

(iii) Describe how the cells shown in Fig. 3.2 differ from cells found in other parts of the root.

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

[Total: 16]





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