

Candidate Name	Centre Number	Candidate Number
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GCSE

239/02

**ADDITIONAL SCIENCE
HIGHER TIER
BIOLOGY 2**

P.M. WEDNESDAY, 21 May 2008

45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	8	
2.	7	
3.	3	
4.	7	
5.	9	
6.	6	
7.	5	
8.	5	
Total	50	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator.

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

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

You are reminded of the necessity for good English and orderly presentation in your answers.

1. In our mouth we produce an enzyme which digests starch. A scientist measured the amount of this enzyme in three groups of people who eat different foods. The results are shown in the table:

<i>Group</i>	<i>Food eaten</i>	<i>Amount of enzyme in mouth / units per cm³</i>
A	Mixed diet of meat, vegetables, fruit and starchy cereals	101
B	Mainly meat	22
C	Mainly starchy cereals	248

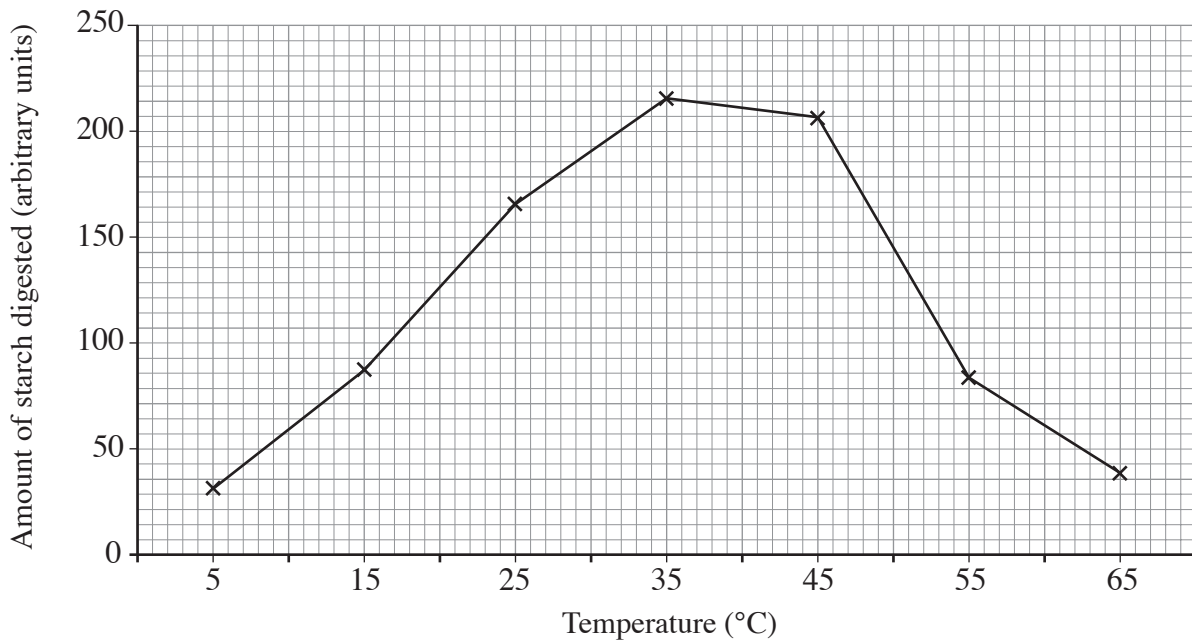
- (a) How does the type of food eaten affect the amount of enzyme produced?

[1]

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- (b) The graph shows the effect of temperature on the digestion of starch by this enzyme.



- (i) **Describe** the effect of temperature on the action of this enzyme. [2]

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- (ii) **Explain** the results obtained between 35 - 65°C. [2]

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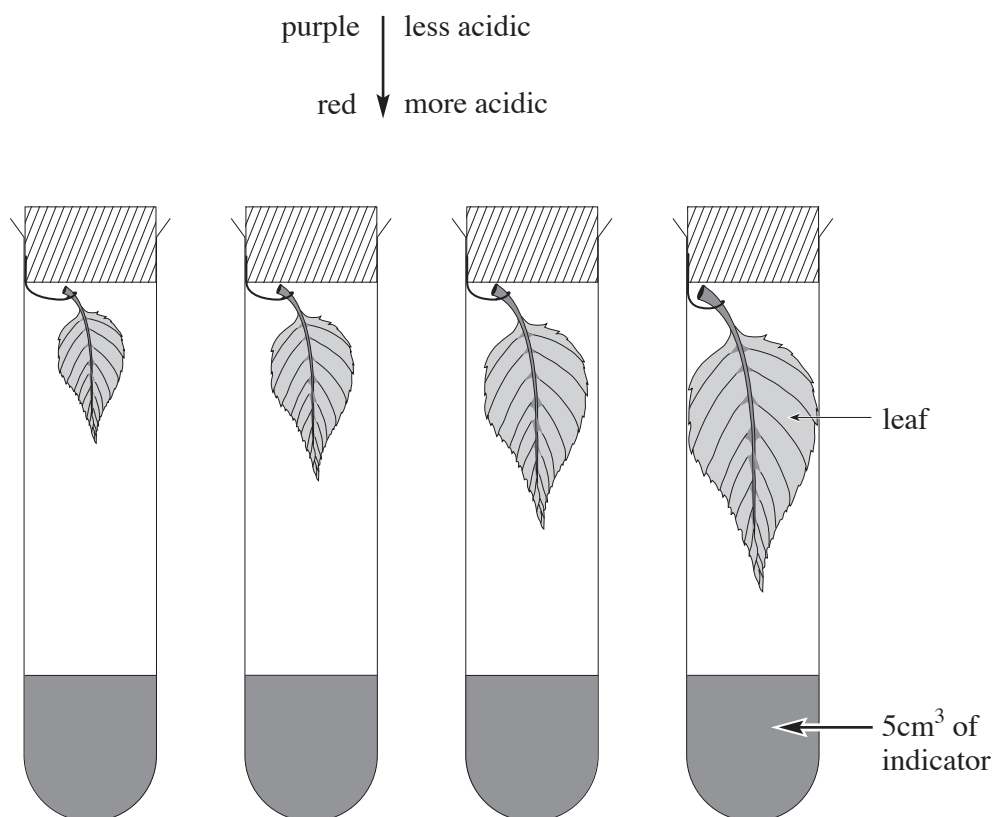
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- (c) Complete the table below to show the action of enzymes in different regions of the digestive system. [3]

<i>Region of digestive system</i>	<i>Enzyme</i>	<i>Action of enzyme</i>
Stomach	Protease
Small intestine	Digests starch to glucose
.....	Lipase	Digests fats to fatty acids and glycerol

2. Green leaves of four different sizes were placed in tubes, as shown in the diagram, and left in the light. Each tube contained an equal quantity of an indicator which changes from red to purple when it becomes less acidic. The presence of carbon dioxide increases acidity.



The time taken for the indicator to change from red to purple in each tube is recorded in the table below.

<i>Leaf size</i>	<i>Time taken for indicator to change from red to purple / minutes</i>
Small	63
Medium	47
Large	26
Very large	18

- (a) Explain how a biological process in the leaves caused the indicator to change from red to purple. [3]

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(b) Explain why the indicator in the tube with the largest leaf changed colour the quickest. [1]

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(c) After 60 minutes which tube would be expected to contain the most oxygen? [1]
Underline the correct answer.

The tube with the:

small leaf

medium leaf

large leaf

very large leaf

(d) If the apparatus was kept in the dark for several hours, which tube would contain the most oxygen at the end of the period? [1]
Underline the correct answer.

The tube with the:

small leaf

medium leaf

large leaf

very large leaf

(e) In order to make it a fair test state **one** factor that should be kept constant. [1]

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3. (a) Explain what is meant by a stem cell. [2]

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(b) Give **one** use of stem cells. [1]

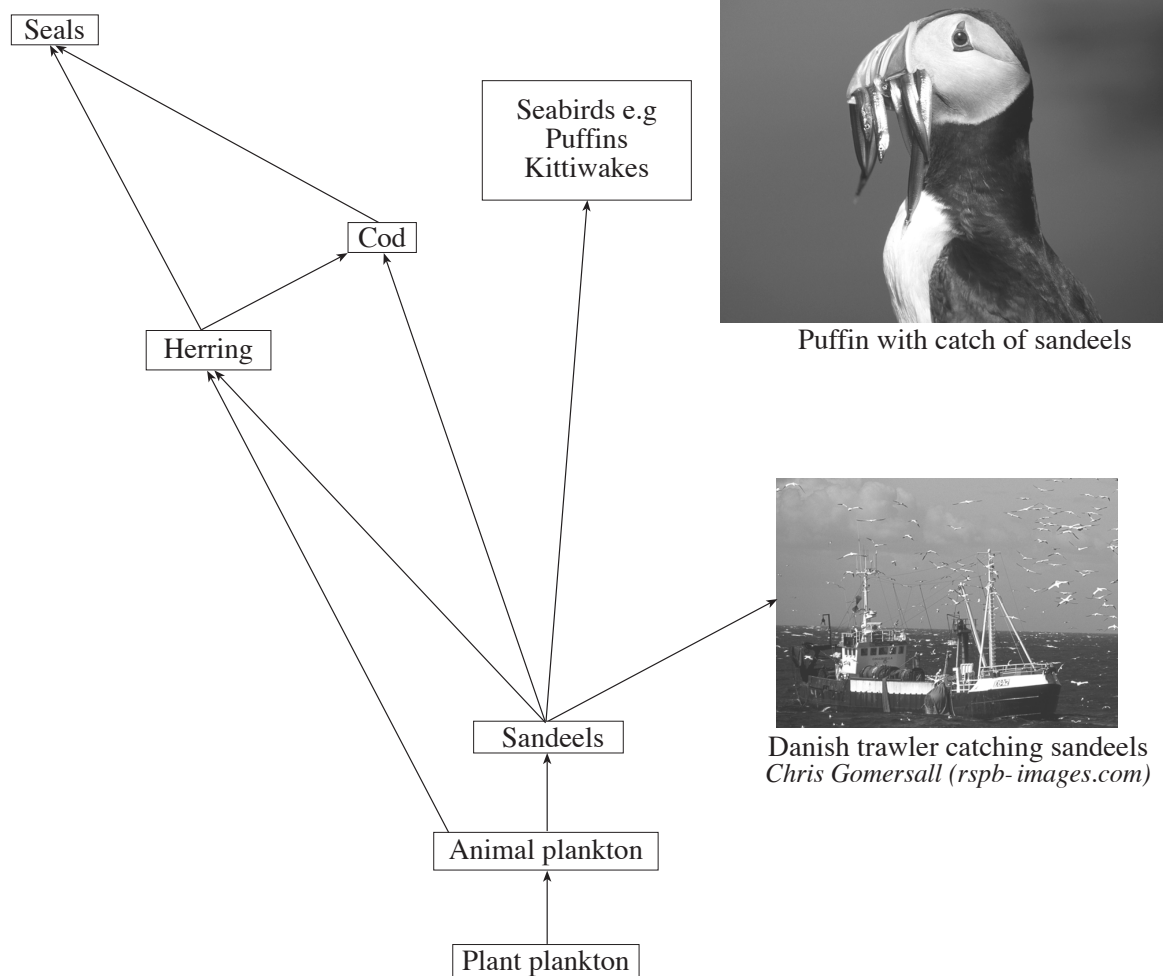
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4. Many of the UK's 4 million seabirds of the North Sea are at risk because there are not enough sandeels for them to feed on.

Here are some key facts about the North Sea:

- herring stocks are increasing after years of decline.
- many of the puffins and kittiwakes are feeding their young on thin, starving sandeels.
- in 2004, only 1 in 5 pairs of kittiwakes reared young successfully.
- there are many trawlers in the North Sea fishing for sandeels. Sandeels are turned into fishmeal which is used to feed livestock and farmed salmon.
- sea surface temperatures have risen by 2°C in the last 25 years. This is causing a decrease in the quantity of plant plankton available.

The diagram below shows a small part of the North Sea food web.



(a) Explain how the increase in the numbers of herring in the North Sea could affect the sandeel population. [3]

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(b) (i) Using the information in the food web and key facts explain why the North Sea puffin and kittiwake populations are falling dramatically. [3]

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(ii) The UK Government uses the kittiwake as an indicator of the state of the sea. Suggest **one** way the Government could reverse the decline in seabirds. [1]

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5. During the last 100 years, the percentage of land covered by forest has fallen by 17%.

(a) Suggest **one** reason for the decrease in the amount of forest. [1]

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(b) State **two** harmful environmental effects of destroying forests. [2]

(i)

(ii)

(c) Despite a great increase in demand for food, only 7% more land is now used for farming. One of the reasons for this is increased productivity, i.e. a higher yield per hectare, due to more intensive farming methods.

State one way in which each of the following helps to increase productivity:

(i) using fertilisers, [1]

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(ii) using pesticides. [1]

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(d) In the last 30 years, people have become more aware of the use of chemicals in farming. Some people are concerned about the effects of these on their health and choose to buy organically grown produce. The farmers who use organic methods to produce food, do not use chemicals on their crops.

(i) Suggest **one** way in which the use of chemicals in intensive farming may be a danger to humans. [1]

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(ii) Suggest a reason why organically grown food is usually more expensive. [1]

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(e) The use of pesticides may also cause damage in natural habitats. Explain **two** ways in which the use of pesticides could decrease bird populations. [2]

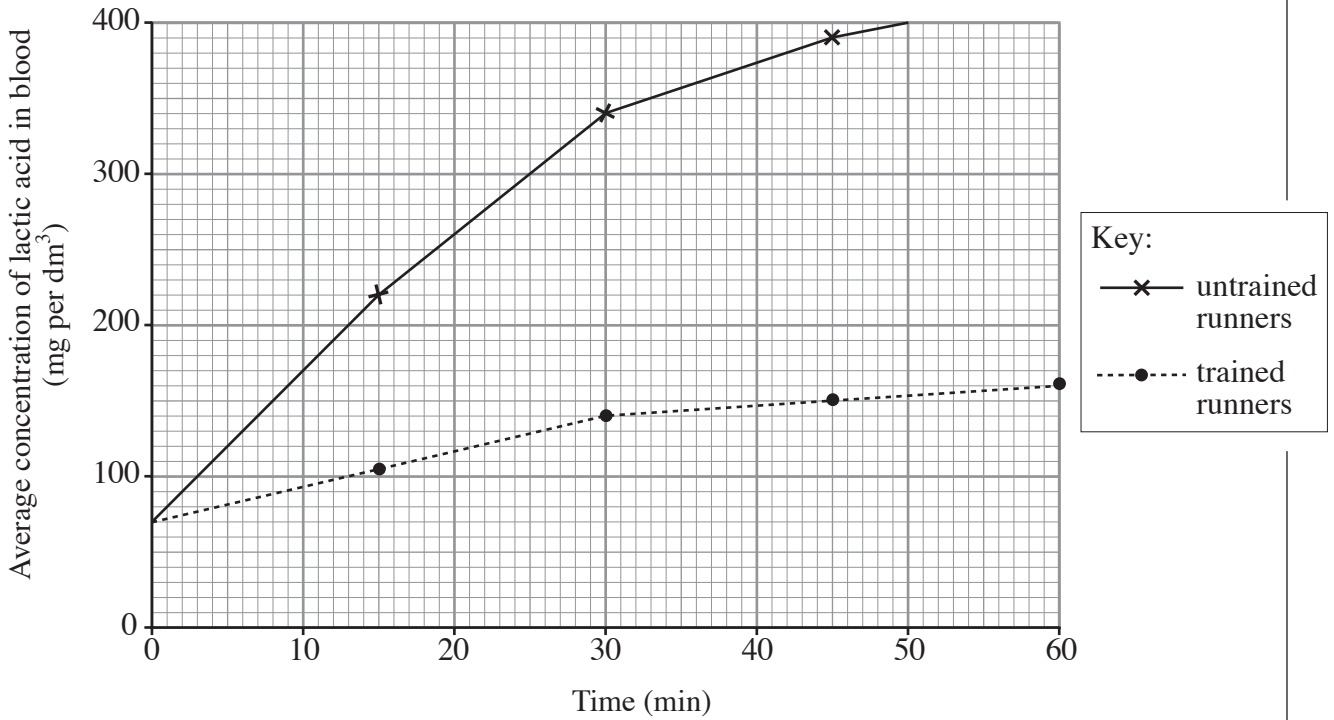
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6. (a) Why do runners in a long race often take drinks containing glucose? [1]

(b) A group of trained runners and a group of untrained runners ran for 60 minutes. The graph shows the average concentration of lactic acid in the blood of each group during this period.



(i) Describe the effect of running on the concentration of lactic acid in the blood of the untrained runners compared with the trained runners. [2]

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(ii) Use the graph to find the difference in the average lactic acid concentration after 30 minutes between the two groups. [1]

..... mg per dm³

(iii) Explain the difference in average lactic acid concentration. [1]

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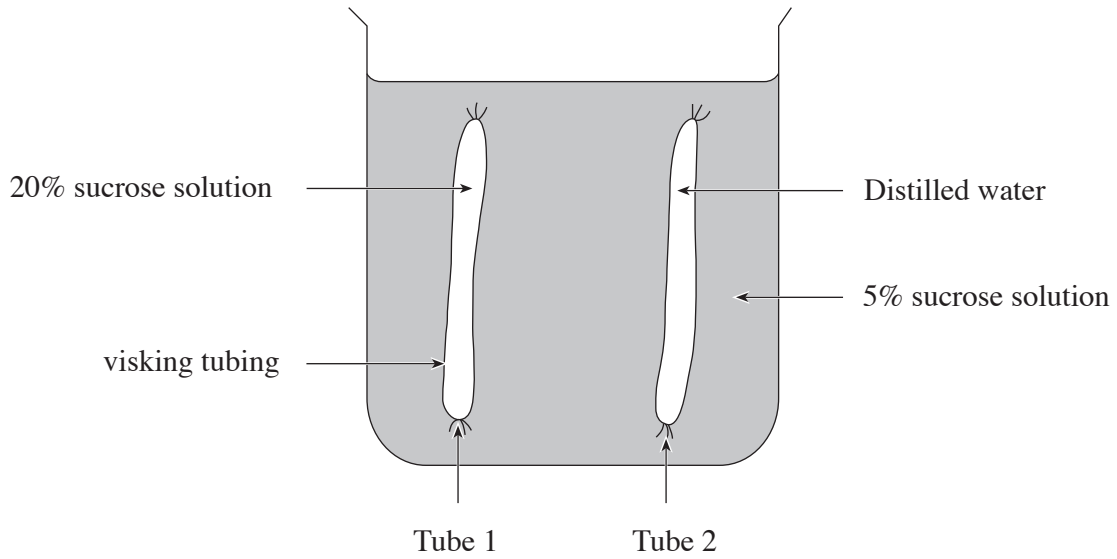
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(c) Explain why the lactic acid forms. [1]

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7. Some students set up the experiment shown in the diagram. They filled two pieces of visking tubing with different liquids and left them both in a beaker of 5% sucrose solution for one hour.



Describe and explain the expected results after one hour in [5]

Tube 1.
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Tube 2.
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8. Explain how nitrogen, in the protein of a dead animal, can become nitrogen in plant protein. [5]

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