

**ADVANCED GCE****BIOLOGY**

Practical Examination 2 (Part B – Practical Test)

2806/03/TEST

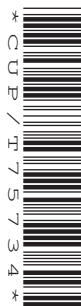
Candidates answer on the Answer Booklet

OCR Supplied Materials:

- Insert (inserted)

Other Materials Required:

- Slide **M**
- Candidate's Plan (Part A of the Practical Examination)
- Electronic calculator
- Ruler (cm/mm)

Thursday 22 January 2009**Afternoon****Duration:** 1 hour 30 minutes

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the spaces provided on the Answer Booklet.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read the instructions and each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- In this Practical Test, you will be assessed on the Experimental and Investigative Skills:
Skill I: Implementing
Skill A: Analysing evidence and drawing conclusions
Skill E: Evaluating.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **9** printed pages, **2** blank pages and a Report Form. Any blank pages are indicated.

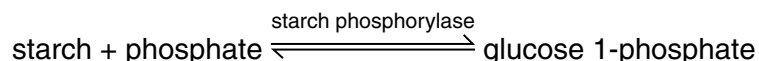
FOR EXAMINER'S USE		
Qu.	Max.	Mark
Planning	16	
1	29	
2	15	
TOTAL	60	

Answer **all** the questions.

Question 1 [60 minutes]

You are required to investigate the reaction catalysed by the enzyme starch phosphorylase extracted from potato storage tissue.

There are a number of enzymes in potatoes that break down starch. One of these enzymes is starch phosphorylase, which uses phosphate ions to break glycosidic bonds in starch molecules to directly form glucose 1-phosphate:



The reaction catalysed by starch phosphorylase is reversible.

The activity of starch phosphorylase can be investigated by testing for the presence or absence of starch using iodine solution.

You are provided with the following materials:

- extract containing starch phosphorylase made from potato storage tissue. The extract has been filtered to remove starch grains and kept in an ice-cold water-bath before the start of the investigation.
- a concentrated solution of potassium hydrogen phosphate (KH_2PO_4) to be used as a source of phosphate ions.
- glucose 1-phosphate solution.
- glucose solution.

Proceed as follows:

- 1 Add **two** drops of iodine solution to a clean well in a spotting tile.
- 2 Use a clean plastic dropping pipette to take a sample of the filtered potato extract and add **two** drops of extract to the well containing iodine solution in the spotting tile. Record your observation.

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- 3 Use the syringes provided to prepare test-tubes **A**, **B** and **C** as shown in Table 1.1.

Table 1.1

test-tube	water/cm ³	glucose 1-phosphate solution/cm ³	concentrated KH_2PO_4 solution/cm ³	glucose solution/cm ³
A	1	3		
B		3	1	
C	1			3

Read steps 4 to 8 and construct a table in the space below to record your observations.

- 4 Add **two** drops of iodine solution to each of three clean wells in a spotting tile.
- 5 Use a clean syringe to transfer 3 cm³ of the filtered potato extract into each of the test-tubes **A**, **B** and **C**.

After adding the extract, mix the contents of each test-tube by placing a bung into the test-tube and inverting three times.

- 6 Start a stopwatch, stop clock or bench timer.
- 7 Using the glass pipettes provided, **immediately** take a sample from test-tube **A** and add two drops into one of the wells in the spotting tile containing iodine solution.

Repeat this step for test-tubes **B** and **C**.

Record your observations in your table.

- 8 Repeat step 7 at three-minute intervals for twelve minutes. Remember that you will need to add two drops of iodine to each of three clean wells in a spotting tile each time before you repeat step 7.

- (a) State the reason for testing the filtered extract with iodine solution in step 2.

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- (b) Explain why the potato extract was kept in an ice-cold water-bath before the start of the investigation.

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- (c) Describe **and** explain the results you obtained in the following test-tubes:

Test-tube **A**

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Test-tube **B**

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Test-tube **C**

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(d) A student who was investigating the action of a similar potato extract extended the investigation to include a further test-tube, **D**, which contained the following:

- 3 cm³ starch solution
- 1 cm³ concentrated KH₂PO₄ solution
- 3 cm³ filtered potato extract.

After 35 minutes, the student tested a sample from test-tube **D** with iodine solution. The student observed a pale yellow colour.

Explain this result.

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The following two criticisms could be made of the procedure that you have followed:

- no quantitative results were obtained;
- a factor or factors **other than** enzyme action could have been responsible for the changes observed.

(e) Describe **and** explain ways in which you would modify the procedure to obtain **quantitative** results.

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(f) Describe **and** explain **two** ways in which you would modify the procedure to show that the changes are due to the action of an enzyme.

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(g) Make **two other** criticisms of the procedure you have followed.

Criticism 1

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Criticism 2

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[Total: 29]

Question 2 [30 minutes]

Slide **M** is a section through an anther taken from the flower of a lily, *Lilium*. You are not expected to be familiar with this specimen.

Examine slide **M** using your microscope.

Fig. 2.1 shows an outline drawing of an anther similar to that of slide **M**.

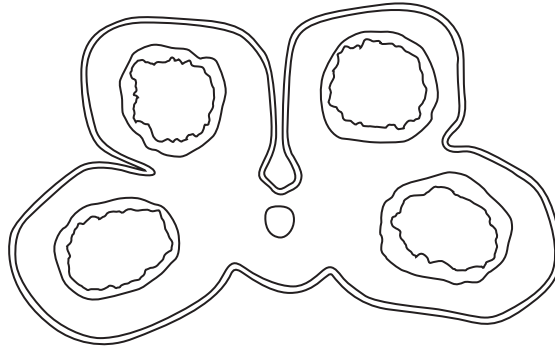


Fig. 2.1

- (a) (i) From your observations of slide **M**, indicate on Fig. 2.1, using a label line and the label **Y**, a position in which you saw cells undergoing cell or nuclear division.
- (ii) Using the high power of your microscope, locate one cell in **metaphase** of meiosis. Make a labelled drawing of this cell in the space below.

- (b) State **two** ways in which the products of meiosis will be different from other cells in the anther.

1

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2

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Fig. 2.2, **on the insert**, shows a photomicrograph of cells undergoing meiosis in an anther of *Lilium*.

- (c) (i) Identify the stage of meiosis shown in the cell labelled **A**.

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- (ii) From your observations of Fig. 2.2, give reasons for your identification in (c)(i).

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- (iii) Describe what happens to the chromosomes during the stage shown by the cell labelled **A**.

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[Total: 15]

END OF QUESTION PAPER

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(a) Any particular difficulties encountered in making preparations for the Practical Test.

(b) Whether it was necessary to make any substitutions for the materials listed in the Instructions. Submit a copy of the results obtained by a teacher or technician, using the substituted materials, on top of the candidates' scripts.

(c) Any difficulties experienced by the candidate due to deficient materials or faulty apparatus. If so, give brief details.

(d) Any assistance given to the candidate with respect to colour blindness or other physical disability. If so, give brief details, and attach a copy of the letter giving permission.

Other cases of hardship, for example illness, should be reported directly to OCR, by the Examinations Officer using the Special Consideration form.

Signed

Information that applies to **all** candidates should be given on the first candidate's script **only** or supplied on a separate sheet placed on top of the candidates' scripts.