

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced Subsidiary GCE

BIOLOGY

2803/03/TEST

Practical Examination 1 (Part B – Practical Test)

Tuesday

17 MAY 2005

Morning

1 hour 30 minutes

Candidates answer on the question paper.

Additional materials:

Candidate's Plan (Part A of the Practical Examination)

Electronic calculator

Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number												
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TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers in the spaces provided on the question paper.
- Read the instructions and questions carefully before starting your answers.

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.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
Planning	16	
1	24	
2	20	
TOTAL	60	

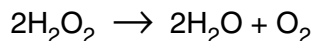
This question paper consists of 10 printed pages, 1 blank page, a Report Form and an Insert.

Answer **all** the questions.

Question 1 [50 minutes]

You are required to investigate the effect of pH on the activity of the enzyme catalase in potato tissue.

This enzyme catalyses the decomposition of hydrogen peroxide as follows:



You will cut thin discs from cylinders of potato tissue and place them into different buffer solutions. You will then put them into hydrogen peroxide diluted with the different buffer solutions.

Hydrogen peroxide is corrosive. If any should come into contact with your skin wash immediately under cold water. You should wear eye protection while using hydrogen peroxide.

Take care with the scalpel or single-edged razor blade.

Proceed as follows:

- 1 Place the graph paper on the tile and the potato cylinder on the graph paper. Use the scalpel or razor blade to cut discs of potato tissue that are all about 1.0 mm thick by cutting **across** the cylinder.

Reject any discs that are

- thicker than 1.0 mm
- not of the same, uniform thickness.

You will need 10 discs for the investigation.

- 2 Place **two** discs into each of the small beakers provided, which contain buffer solutions of the following pH:

4.0; 5.0; 6.0; 7.0; 8.0.

Before you continue, you should read carefully instructions 3 to 7 and draw up a table for your results and calculations in the space provided.

- 3 Use a 5 cm³ syringe to put 5 cm³ hydrogen peroxide solution into the flat-bottomed specimen tube.

- 4 Use a clean 5 cm³ syringe to put 5 cm³ of the buffer solution at pH 4.0 into the specimen tube. Use the glass rod to stir the contents of the tube.

Rinse out the syringes using distilled water (for use later at step 7).

- 5 Use the pair of forceps to place one of the discs from the beaker with the buffer solution at pH 4.0 into the specimen tube.

As soon as the disc reaches the bottom of the tube, start a stopwatch.

Watch carefully and stop timing as soon as any part of the disc starts to lift off the bottom of the tube. Record the time.

- 6 Remove the disc and place it in the waste beaker.
Repeat step 5 with the second disc from the beaker containing buffer solution at pH 4.0.
Record the time as before.

- 7 Repeat steps 3 to 6 with the remaining discs using the remaining buffer solutions and a clean flat-bottomed specimen tube for each pH.

(a) Record your results in a table below.

(b) Describe your results.

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(c) Explain what causes the discs of potato tissue to lift from the bottoms of the tubes.

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(d) Explain the results that you obtained for the different buffer solutions.

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(e) On the axes below, sketch the graph that you would obtain if you determined the **rate of reaction** from the results that you have obtained.



(f) Make **three** criticisms of the method that you have followed.

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[Total: 24]

Question 2 [40 minutes]

You are provided with a small piece of banana and some banana pulp.

The cells of the banana store starch in starch grains. The main form of starch in the grains is amylopectin.

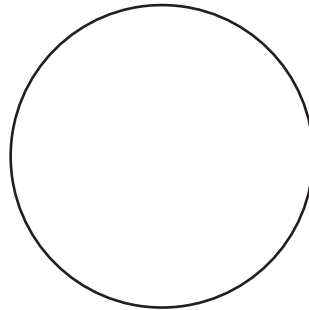
You will cut a transverse section of the banana and stain with iodine to find out how the starch grains are distributed within the banana. You will then use your microscope to look at some cells with starch grains. You will then test the banana pulp for other biochemical molecules.

Put the piece of banana on a tile.

Cut a section across the piece of banana about 5 mm thick.

Cover the surface of the section you have cut with iodine solution. Leave for about one minute.

- (a) Indicate on the outline below the distribution of starch in the section of banana.



Wipe a clean microscope slide across the surface of the remaining piece of banana.

Add iodine solution to the tissue smear that is on the microscope slide. Add a coverslip. Use filter paper to absorb any excess iodine solution from the slide.

Examine the banana tissue under the low power of your microscope. Look carefully for individual cells that contain stained starch grains. (Some cells will be broken open and there will be individual starch grains that are not inside cells.)

Examine the banana tissue with the **high power** of your microscope.

- (b) (i) Under **high power**, make a labelled drawing of **one** cell.
- (ii) Annotate your drawing by indicating the colours of the structures you have drawn.

(c) Fig. 2.1, which is provided on an insert, is a photograph of some cells from a potato tuber as seen in a scanning electron microscope.

(i) Calculate the magnification of Fig. 2.1. Show your working and express your answer to the nearest whole number.

Answer =

(ii) With reference to Fig. 2.1 and your drawing, suggest an advantage of studying cell structure with the scanning electron microscope.

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(d) Starch grains contain amylopectin.

(i) State the advantage to plants, like banana and potato, of storing starch.

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(ii) Explain the advantage of storing amylopectin rather than amylose.

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Question 2 continues on page 10

Using the reagents and equipment provided, test the **banana pulp** provided for the presence of reducing sugars.

(e) Describe the method you will follow to test for reducing sugars.

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(f) Record your results and conclusions.

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[Total: 20]

END OF QUESTION PAPER

