

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Advanced GCE**

**BIOLOGY**

**2806/03/TEST**

Practical Examination (Part B): Practical Test

Thursday **23 JANUARY 2003** Morning 1 hour 30 minutes

Candidates answer on the question paper

Additional materials:

Electronic calculator

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

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 on the question paper.
- Read each question carefully before starting your answer.

**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.

<b>FOR EXAMINER'S USE</b>		
Qu.	Max.	Mark
<b>Planning</b>	<b>16</b>	
<b>1</b>	<b>17</b>	
<b>2</b>	<b>27</b>	
<b>TOTAL</b>	<b>60</b>	

**This question paper consists of 7 printed pages and a Report Form.**

Answer **all** the questions.

**Question 1** [35 minutes]

You are required to investigate the osmotic effects of two solutions, **A** and **B**, on guard cells.

Use a pair of fine forceps to remove a small piece of the **lower** epidermis of **K1**.

Place the piece of epidermis on a clean microscope slide. Add a drop of water and a cover slip.

Examine your preparation using a microscope.

- (a) Make a high power drawing to show **one** stoma, its guard cells and **two** epidermal cells in contact with the guard cells. **No labels are required.**

Remove the cover slip from your preparation. Blot off most of the water on the slide. Add one or two drops of **solution A** and a clean cover slip.

**Immediately** examine a stoma and its guard cells using the high power of your microscope.

- (b) (i) Describe briefly the effect of **solution A** on the stoma and guard cells.

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- (ii) Explain the effect you described in (b)(i).

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Remove the cover slip once more. Blot off **solution A**. Add one or two drops of **solution B** to the slide and then a clean cover slip. Leave the slide for **two** minutes.

**(c) (i)** Examine the slide under the microscope and describe briefly any changes that have occurred to the stomata and guard cells.

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**(ii)** Explain the changes that you described in **(c)(i)**.

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**(d)** Changes which you observed in **(b)** and **(c)** took place due to the additions of **solutions A and B**.

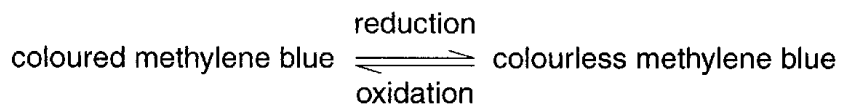
State the main environmental variable which brings about similar changes in most living leaves.

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[Total: 17]

**Question 2** [55 minutes]

Methylene blue can be used to investigate some reactions that occur in living cells. It can be reduced to a colourless form which can readily be oxidised back into the blue-coloured form.



You are required to investigate the effects of a suspension of living yeast cells on methylene blue solution.

*Proceed as follows:*

1. Set up a beaker of hot water and bring it to the boil.
2. Label three test-tubes **A**, **B** and **C** respectively.
3. Stir the yeast suspension thoroughly with a glass rod and place 10 cm<sup>3</sup> into each of the three tubes.
4. Place tube **C** in the boiling water and leave it for **five** minutes.

Meanwhile, prepare another beaker as a water bath in which you maintain the temperature between 38 °C and 42 °C during the experiment that follows.

5. After **five** minutes, remove tube **C** and cool it under a cold water tap.
  6. To each of tubes **A**, **B** and **C** add 1 cm<sup>3</sup> of methylene blue solution.
  7. Place a cork or rubber bung in each tube and gently shake the tubes to give a uniform colour.
  8. Remove the bungs and place the three tubes in the water bath at 38–40 °C for **ten** minutes.
  9. After **ten** minutes, place tube **B** in boiling water and leave it for **five** minutes. Remove tubes **A** and **C**, taking care **not** to shake them, and place them in a test-tube rack.
- (a) Observe tubes **A** and **C** carefully and record the appearance of the contents of each tube.

*Tube A*

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*Tube C*

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Remove tube **B** from the water bath. Allow it to cool.

Meanwhile, place a rubber bung firmly in the mouth of tube **A**.  
Shake tube **A** vigorously **ten** times.

**(b)** Record your observations on tube **A**.

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Now shake tube **B** as you did for tube **A**.

**(c) (i)** Record your observations on tube **B**.

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**(ii)** Is the reaction in tube **B** in **(c)(i)** enzyme-controlled? Explain your answer.

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**(d)** Explain your observations in **(a)** above.

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**(e)** Explain your observations in **(b)** above.

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- (f) State the **type** of chemical substances that occur in living cells that have the same role as that of methylene blue in the reactions you have followed above.

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- (g) State the process that occurs in living yeast cells in which the substances you mention in (f) are involved.

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In a class experiment, a student investigated the reaction that occurred in tube **A** by taking readings at intervals using a colorimeter. This instrument measures the amount of light that is absorbed by a coloured liquid. As a liquid becomes darker in colour, the amount of light absorbed (the percentage absorbance) increases.

Before taking readings, the student filtered the contents of tube **A**. Only the filtrate was used in the colorimeter.

The student's results are shown in the table below.

time / min	% absorbance
1	64
3	38
5	22
7	20
9	8
11	5
13	3
15	3

- (h) State why it was necessary to filter the mixture before taking readings in the colorimeter.

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- (i) State **two** advantages of using a colorimeter in following reactions like this.

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(j) Describe and explain the student's results.

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[Total: 27]

**REPORT FORM**

**The teacher responsible for this subject is asked to answer the following questions.**

- (a)** Was the candidate physically handicapped in drawing, dissecting or using a microscope or is the candidate colourblind? If so, give brief particulars.
- (b)** Was the candidate handicapped by deficient material or apparatus? If so, give brief particulars.
- (c)** Was it necessary to make any substitutions for the materials sent from OCR? If so, give details and reasons.
- (d)** Any comments.

Signed .....

N.B. Information which applies to all candidates need be given on the first candidate's answer book only.