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CAMBRIDGE INTERNATIONAL EXAMINATIONS

General Certificate of Education Advanced Level

BIOLOGY 9700/5

PAPER 5 Practical Test

OCTOBER/NOVEMBER SESSION 2002

1 hour 30 minutes

Candidates answer on the question paper.
Additional materials:
As listed in Instructions to Supervisors

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **both** questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.
You are advised to spend 40 minutes on Question 1 and 50 minutes on Question 2.

FOR EXAMINER'S USE	
1	
2	
TOTAL	

This question paper consists of 6 printed pages, 1 blank page and a Report Form.

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[Turn over

For Examiner's Use

Question 1 [40 minutes]

K1 is a stained, longitudinal section of a young root tip in which some cells are undergoing mitosis.

Examine **K1** carefully, in the region labelled **X** in Fig. 1.1, using low- and high-power objectives of your microscope.

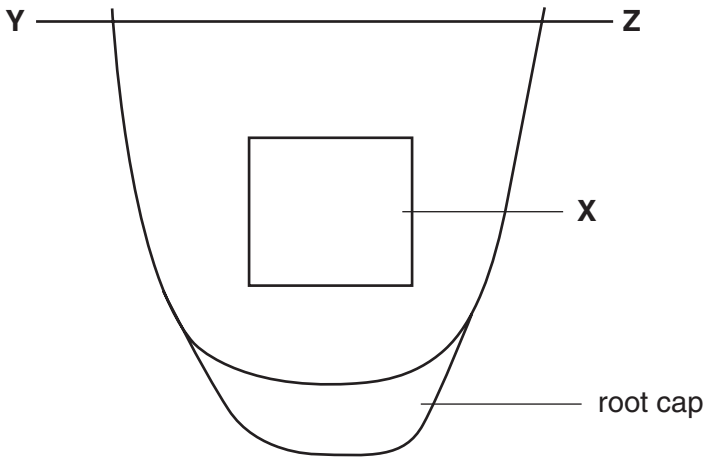


Fig. 1.1

(a) (i) Make a labelled, high-power drawing of a cell in interphase from region **X**.

[4]

(ii) Make a labelled, high-power drawing of **two** cells showing different stages of mitosis from region **X**.

[6]

(iii) Examine carefully the cells from the central region of the line labelled **Y-Z**.

Draw **one** cell from this region and annotate your drawing to indicate how it differs from the cells you drew in **(ii)**.

[4]

[Total : 14]

[Turn over

Question 2 [50 minutes]

You have been provided with three germinated pea seeds, labelled **S4**, and a solution of hydrogen peroxide, labelled **S5**.

Germinating peas produce the enzyme catalase. The enzyme catalyses the following reaction.

$$2H_2O_2 \longrightarrow 2H_2O + O_2$$

Carefully remove the whole length of the shoot from one of the pea seedlings and place it in a beaker. Cover the shoot with distilled water and gently boil the shoot for three minutes.
Remove the shoot and place it on a white tile. Add a spatula full of sand.
Use a glass rod and ensure the shoot is well macerated (crushed).
Place the macerated tissue in a test-tube and label it **S6**.

Wash and blot dry the glass rod and the tile.

Carefully remove the shoots from the second and third pea seedlings. Do **not** boil these shoots, but place them on the tile, add a spatula full of sand to each and carefully squash each shoot separately with the glass rod. Place each fresh, macerated shoot in separate test-tubes, labelled **S7** and **S9**.

Place a spatula full of sand in a test-tube and label it **S8**.

(a) Put 2 cm^3 of hydrogen peroxide in a measuring cylinder and pour it into test-tube **S6**.

Record your observations in Table 2.1.

Table 2.1

	observations
S6	
S7	
S8	

[1]

Repeat this procedure for **S7** and **S8**.

(b) Put 1 cm^3 of hydrogen peroxide and 1 cm^3 of distilled water in a measuring cylinder and add this to **S9**.

Record your observations in Table 2.2.

Table 2.2

	observations
S9	

[1]

(c) Compare your observations of **S6**, **S7**, **S8** and **S9** and explain them.

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.....[4]

(d) Explain three ways by which you could improve the experimental design.

1. .....

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2. .....

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3. .....

.....[3]

Question 2 continues on the next page.

An experiment was carried out to determine the uptake of oxygen, using germinating peas placed in a respirometer, as shown in Fig. 2.1.

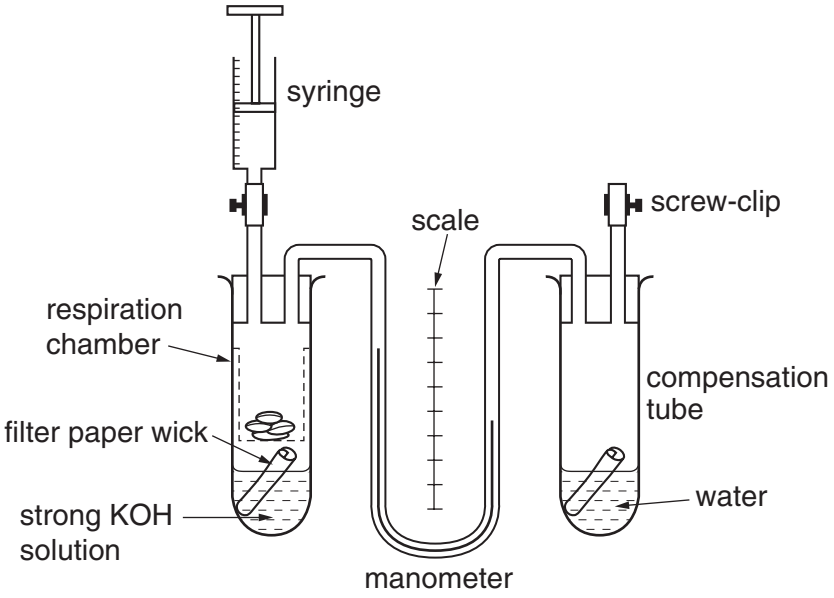


Fig. 2.1

(e) Describe the function of the compensation tube in the respirometer.

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.....[2]

(f) Explain the procedures that you would follow to determine the rate of oxygen uptake by the germinating peas in the respirometer.

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.....[3]

(g) Suggest and explain how the respirometer could be modified to determine the respiratory quotient (RQ) of the germinating peas.

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.....[2]

[Total : 16]

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REPORT FORM

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

(a) Was the candidate physically handicapped in drawing or in using a microscope or is the candidate colourblind? If so, give brief details.

(b) Was the candidate handicapped by deficient material or apparatus? If so, give brief details.

(c) Was it necessary to make any substitutions for the materials sent from Cambridge? If so, give brief details of the circumstances.

(d) Any comments.

Signed ……

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