

Candidate Name _____

| Centre Number | Candidate Number |
|---------------|------------------|
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CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level
BIOLOGY
PAPER 5 Practical Test

9700/5

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.

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.

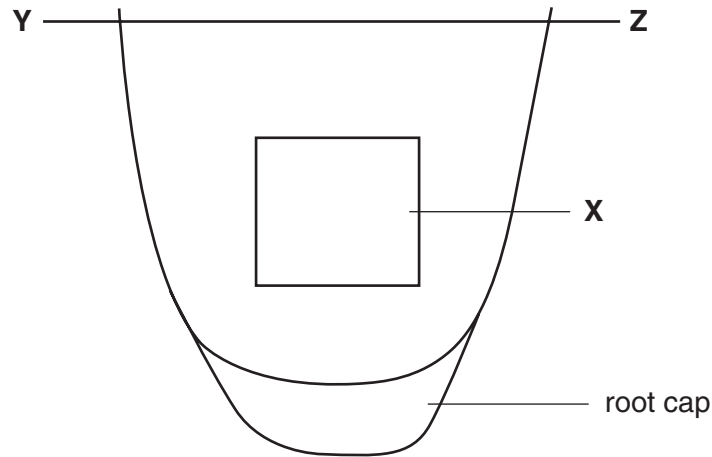


Fig. 1.1

- (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).

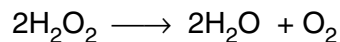
[4]

[Total : 14]

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.



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 cm³ 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 cm³ of hydrogen peroxide and 1 cm³ 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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.....
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.....
.....
.....[4]

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

1.
.....
2.
.....
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.

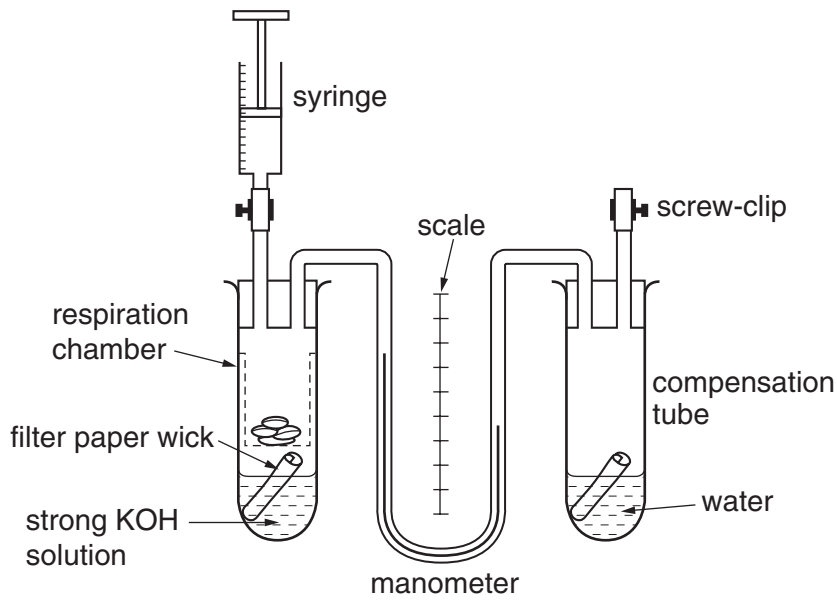


Fig. 2.1

(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]

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