Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level

BIOLOGY **9700/05**

Paper 5 Practical Test A2

October/November 2005

1 hour 30 minutes

Candidates answer on the Question Paper.
Additional Materials: As listed in Instructions to Supervisors.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided at the top of this page.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

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

For Examiner's Use	
1	
2	
Total	

This document consists of **7** printed pages and **1** blank page.

1 You are required to investigate the effects of two different solutions, labelled **A** and **B**, on the epidermal cells of red onion.
You are provided with a Petri dish of **distilled water**, **solution A** and **solution B**.
You are also provided with part of an onion, labelled **C**.

Procedure to remove a piece of the inner epidermis of the onion scale.

- Make a small cut in the inner concave side of the onion scale.
- Using the forceps, peel off a thin sheet of pigmented epidermis.
- Place your thin sheet of epidermis into the Petri dish of distilled water, so that it is covered by the water.
- With a sharp blade, carefully cut three pieces from this epidermal tissue about 5 mm × 5 mm.
- Mount one of the squares on a microscope slide in **distilled water** and cover with a cover slip.
- Similarly mount the second square in **solution A** and the third square in **solution B**.
- Label your slides appropriately.

(a) (i) Examine the tissue mounted in the **distilled water**, using your microscope.
Make a large drawing to show **three** adjacent cells.
No labels are required.

[2]

(ii) Describe the appearance of the contents of the cells.

.....

.....

.....[2]

(b) Examine the tissue mounted in solution **A**, using the high power of your microscope.

(i) Make large drawings of **three** separate cells that show **different** arrangements of the coloured contents.
No labels are required.

[3]

(ii) Explain fully the reason for the appearance of the cells in your drawing.

.....

.....

.....

.....

.....[4]

(c) Examine the tissue mounted in solution **B**, using the high power of your microscope.
Describe the appearance of the contents of the cells.

.....

.....[1]

[Turn over

(d) Remove the cover slip from the slide with solution **A**.
Blot up as much of the solution as possible.
Add distilled water to the slide and replace the cover slip.

Immediately and for several minutes, observe the appearance of the cells.
Record your observations.

.....

.....

.....[2]

(e) Repeat the procedure for the cells mounted in solution **B**.
Record your observations.

.....

.....[1]

(f) Explain your observations in **(d)** and **(e)** as fully as possible.

.....

.....

.....

.....[2]

[Total: 17]

BLANK PAGE

Question 2 is on page 6.

2 The photomicrograph **P1** shows cells dividing by mitosis in a longitudinal section of a root tip.

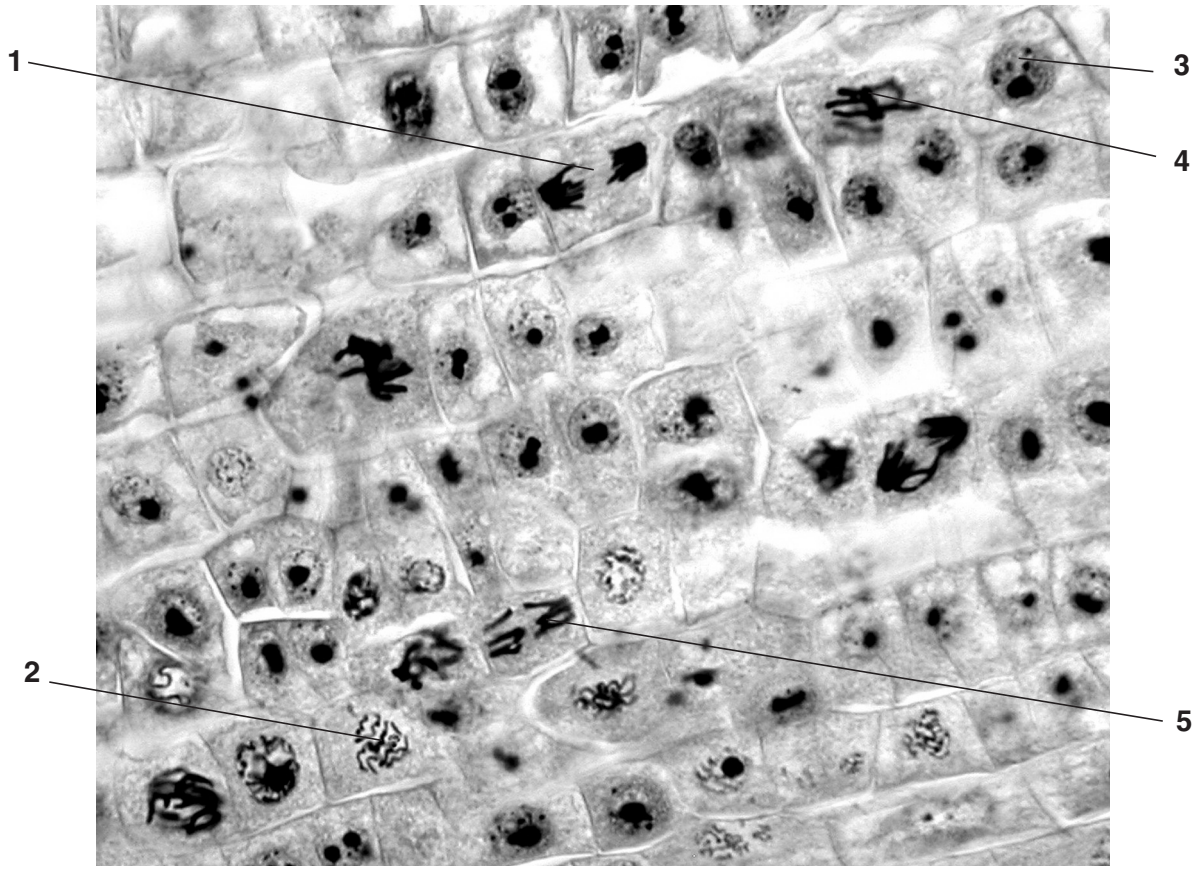

Fig. 2.1

Look at the cells labelled **1**, **2**, **3**, **4**, and **5**.

(a) (i) Name the stage of mitosis for each numbered cell.

1 .....

2 .....

3 .....

4 .....

5 ..... [2]

(ii) List the cell numbers in the correct sequence for the stages of mitosis.

.....

.....

.....

……

..... [2]

(iii) Choose a cell at metaphase. Do **not** choose cells 1, 2, 3, 4 or 5.
Make a large, labelled drawing of your chosen cell.
Draw, on Fig. 2.1, a ring round your chosen cell.

[4]

Question 2 continues on page 8.

[Turn over

(b) The photomicrograph **P2** shows cells dividing by meiosis.

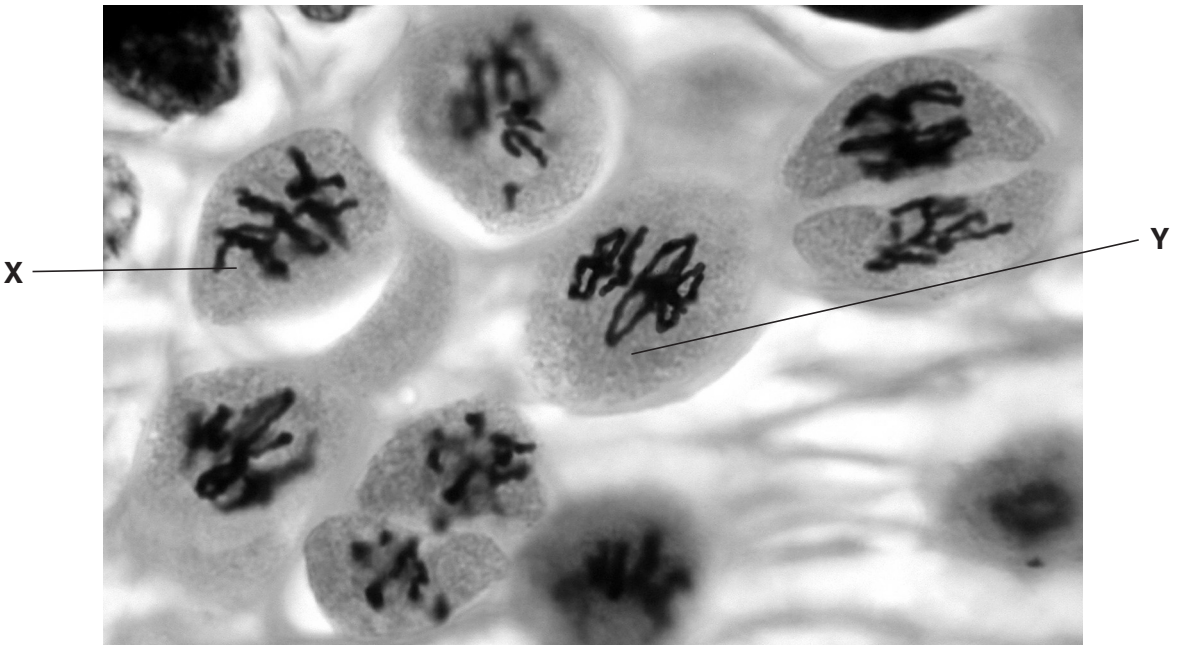

Fig. 2.2

Look at the cells labelled **X** and **Y**.

Describe the visible evidence that the cell labelled **X** is at metaphase 1 of meiosis.

.....

.....

.....

.....[3]

(c) Cell **Y** is at the same stage, metaphase 1, as cell **X**.
Explain why none of the cells in the L.S. of the root tip has the same appearance as cell **Y**.

.....

.....

.....[2]

[Total: 13]