Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

2221973770

BIOLOGY **5090/31**

Paper 3 Practical Test **May/June 2017**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As specified in the Confidential Instructions.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Write your answers in the spaces provided on the Question Paper.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
Total	

This document consists of **11** printed pages and **1** blank page.

CAMBRIDGE
International Examinations

[Turn over

In order to plan the best use of your time, read through all the questions on this paper carefully before starting work.

1 (a) You are going to carry out an experiment to investigate the effect of two different concentrations of sucrose solution on potato tissue.

You are provided with some potato tissue and two solutions of sucrose, labelled **S1** and **S2**.

- Label one Petri dish **S1** and the other Petri dish **S2**.
- Carefully cut two strips of potato tissue without skin, each measuring 80 mm × 4 mm × 4 mm.
- Place one strip into each Petri dish.
- Pour solution **S1** into the dish labelled **S1**. Pour solution **S2** into the dish labelled **S2**. Make sure that the strips are completely covered by the solutions.
- Leave the strips for 20 minutes. **Continue with question 1(b) while you are waiting.**
- After 20 minutes, remove the strip from solution **S1** and carefully blot it dry.
- Insert a pin near the end of the strip from solution **S1** and then attach it to the apparatus as shown in Fig. 1.1. Make sure that this end of the strip is level with the edge of the cork.

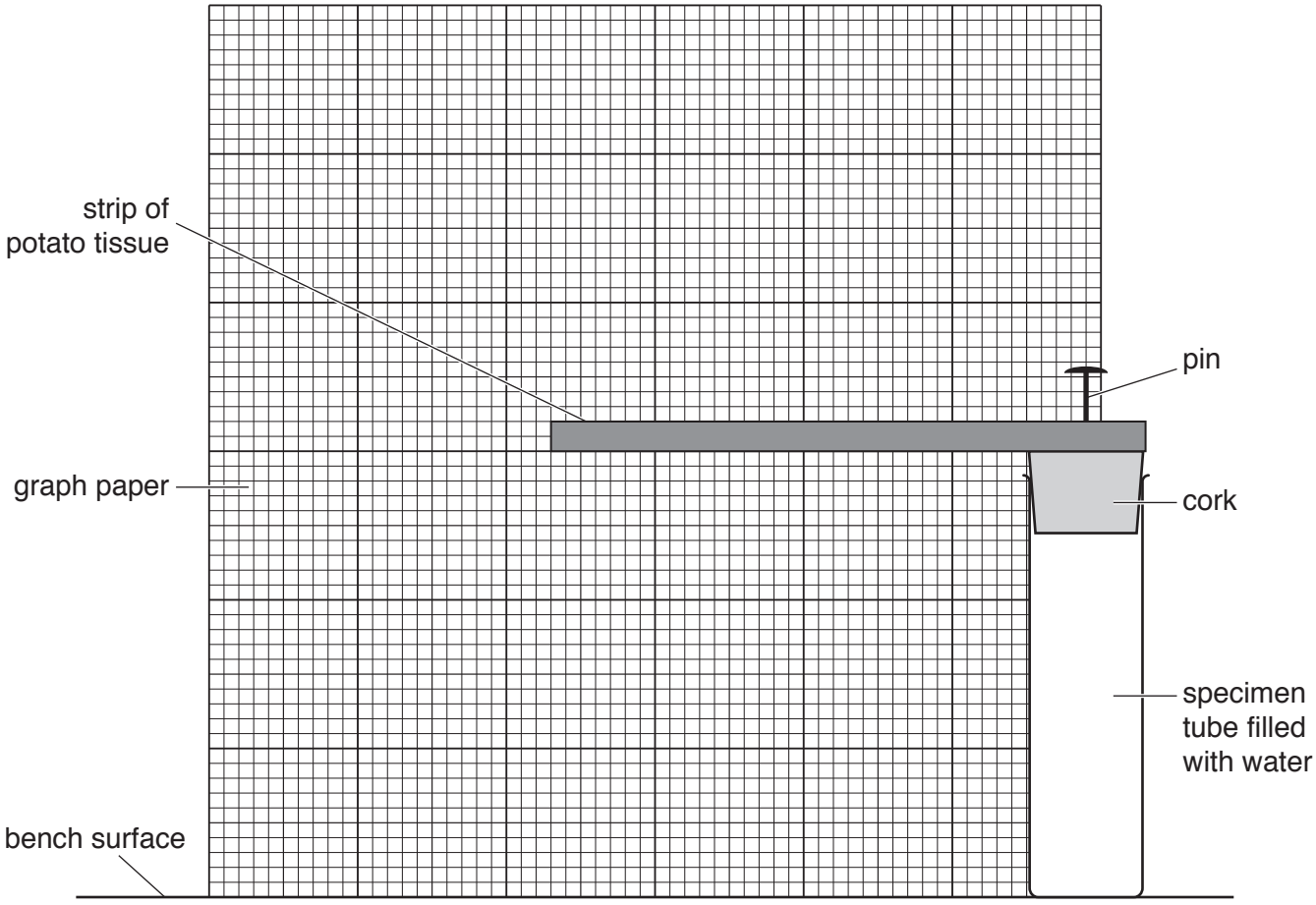


Fig. 1.1

- Record the position of the unpinned end of the strip on the graph paper, and label it **S1**.
- Repeat this procedure for the strip in solution **S2**.

(i) Carefully copy your results onto Fig. 1.2. Use a small **X** to show the position of the unpinned end for each strip. Label your results **S1** and **S2**.

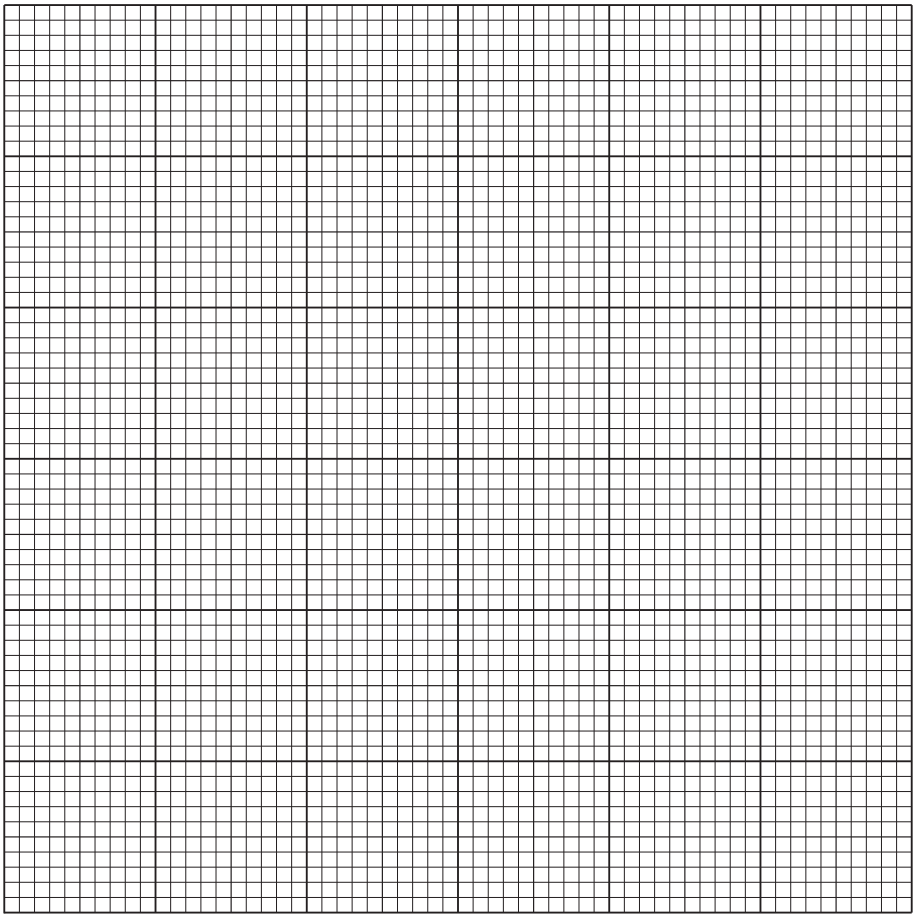


Fig. 1.2

[3]

(ii) Complete Table 1.1 by describing how flexible the strips are, that had been in solution **S1** and in solution **S2**.

Table 1.1

strip covered in solution	description of strip
S1	
S2	

[2]

(iii) State **two** variables which were controlled in this experiment to ensure that the results for **S1** and **S2** are comparable.

1 .....

2 .....

[2]

(iv) Suggest an explanation for your results.

.....

.....

.....

.....

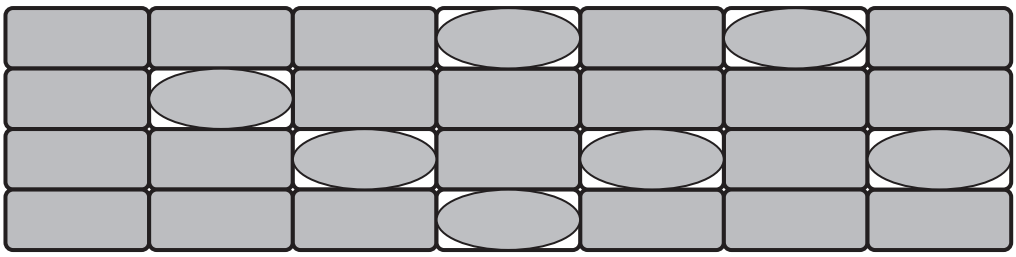
.....

.....

.....[4]

(b) When plant cells lose water, the cytoplasm may shrink and move away from the cell wall. When this happens, the cells are **plasmolysed**.

Fig. 1.3 represents a group of plant cells, some of which are plasmolysed.



key

plasmolysed cell

non-plasmolysed cell

Fig. 1.3

(i) Complete Table 1.2 by counting the number of plasmolysed cells and the number of non-plasmolysed cells.

Table 1.2

number of plasmolysed cells	number of non-plasmolysed cells

[1]

(ii) Calculate the number of plasmolysed cells as a percentage of the **total** number of cells.

Show your working.

.....%
[2]

(c) A student carried out an investigation into the relationship between the concentration of sucrose solution and the number of plant cells which were plasmolysed.

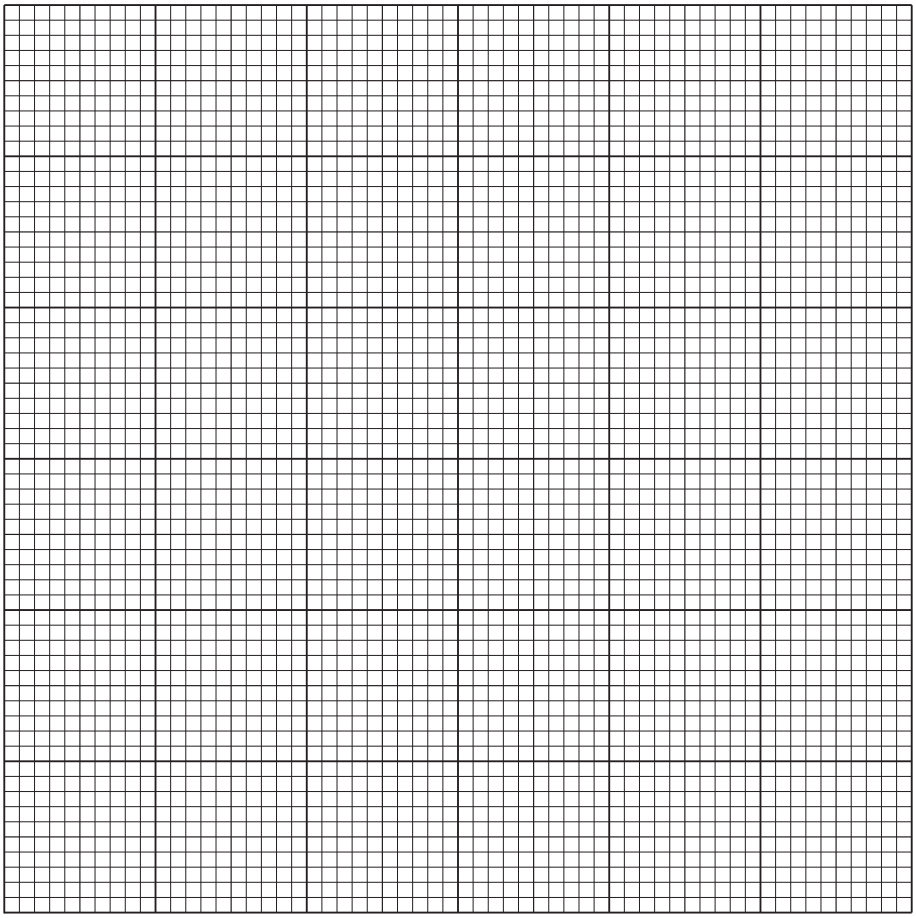
She placed small pieces of plant tissue in sucrose solutions and counted the number of cells that were plasmolysed. She then calculated the percentage of cells that were plasmolysed in each solution.

Her results are shown in Table 1.3.

Table 1.3

concentration of sucrose solution/mol per dm^3	percentage of cells that were plasmolysed
0.0	0
0.2	5
0.4	18
0.6	75
0.8	100

(i) Plot a line graph of the results in Table 1.3. Join the points on your graph with ruled, straight lines.



[4]

(ii) Use your graph to find the concentration of sucrose solution in which 50% of the cells would be plasmolysed. On your graph, show how you obtained this value.

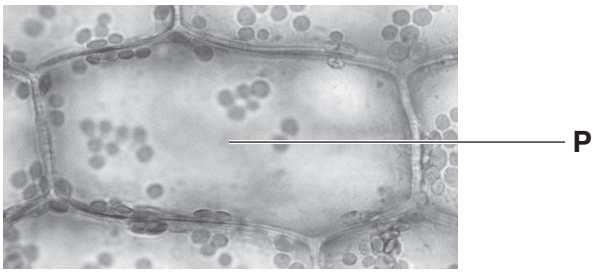
Concentration of sucrose solution in which 50% of the cells would be plasmolysed:

.....[2]

[Total: 20]

Question 2 begins on page 9

2 Fig. 2.1 shows cells as seen using a light microscope.



magnification ×200

Fig. 2.1

(a) In the space below, make a large drawing of the cell labelled **P**. You do not need to label your drawing.

[4]

(b) Measure and record the maximum length of cell **P** in Fig. 2.1.

Maximum length of cell **P** in Fig. 2.1 ..... mm

Use the magnification of Fig. 2.1 to calculate the **actual** length of cell **P**.

Show your working.

.....
[4]

(c) State **two** structures, visible in Fig. 2.1, that are found only in plant cells.

1 .....

2 .....
[2]

[Total: 10]

3 **(a)** Describe how you would test a food sample for the presence of each of the following, giving full experimental details.

(i) starch .....

.....

.....

.....[2]

(ii) reducing sugars .....

.....

.....

.....

.....

.....[3]

(b) Table 3.1 gives information about the composition of some foods.

Table 3.1

food	fat/g per 100 g	energy/kJ per 100 g	protein/g per 100 g
potato chips	11.0	1050	4.0
cooked chicken	5.0	630	25.0
boiled sweet potato	0.6	360	1.0
boiled peas	0.4	210	5.0

(i) Using the information in Table 3.1, state the relationship between the fat content and the energy content of these foods.

.....

.....

.....[1]

(ii) Calculate the protein content of 250 g of cooked chicken.

Show your working.

.....g
[2]

(iii) Calculate the mass of boiled peas that you would need to eat to obtain the same mass of protein as in 100 g of cooked chicken.

Show your working.

.....g
[2]

[Total: 10]

BLANK PAGE