Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

1466618286

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **May/June 2017**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

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.

This document consists of **8** printed pages.

DC (NH/CGW) 132482/6
© UCLES 2017

CAMBRIDGE International Examinations

Answer **all** the questions in the spaces provided.

1 **(a)** Some students investigated the effect of different concentrations of sucrose solution on potato tissue.

Four strips of potato **A**, **B**, **C** and **D**, were cut. Each strip measured 80 mm × 4 mm × 4 mm. The mass of each strip was measured and recorded in Table 1.1.

One strip of potato was placed in each of four sucrose solutions of different concentrations:

- 0.2 mol per dm^3
- 0.4 mol per dm^3
- 0.6 mol per dm^3
- 0.8 mol per dm^3

The same volume of sucrose solution was used for each strip.

The strips were left for 30 minutes. After 30 minutes, the strips were removed from the sucrose solutions and carefully blotted dry. The mass of each strip was then measured again and recorded in Table 1.1.

Table 1.1

potato strip	concentration of sucrose solution /mol per dm^3	mass of potato strip at start /g	mass of potato strip after 30 minutes/g	change in mass /g
A	0.2	4.0	4.3	
B	0.4	4.0	4.1	
C	0.6	4.0	3.8	
D	0.8	4.0	3.6	

(i) Complete Table 1.1 by calculating the change in mass for each potato strip. [3]

(ii) Suggest explanations for the results for strip **A** and strip **D**.

.....

.....

.....

.....

.....

.....[4]

(iii) Suggest why each strip was blotted dry after being removed from the sucrose solution.

.....

.....[1]

(iv) Explain why all the strips were cut to the same size (80 mm × 4 mm x 4 mm) at the start of this investigation.

.....

.....[2]

(v) You are given 50 cm^3 of a sucrose solution containing 0.8 mol per dm^3.
Describe how you would use this solution to prepare 100 cm^3 of 0.4 mol per dm^3 sucrose solution.

.....

.....

.....[1]

(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. 1.1 represents a group of plant cells, some of which are plasmolysed.

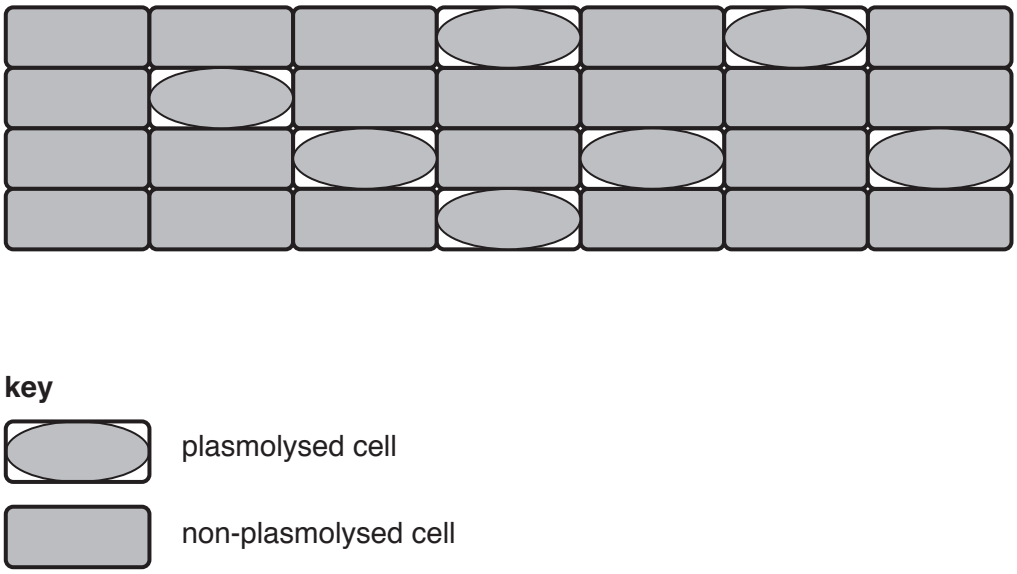


Fig. 1.1

(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.

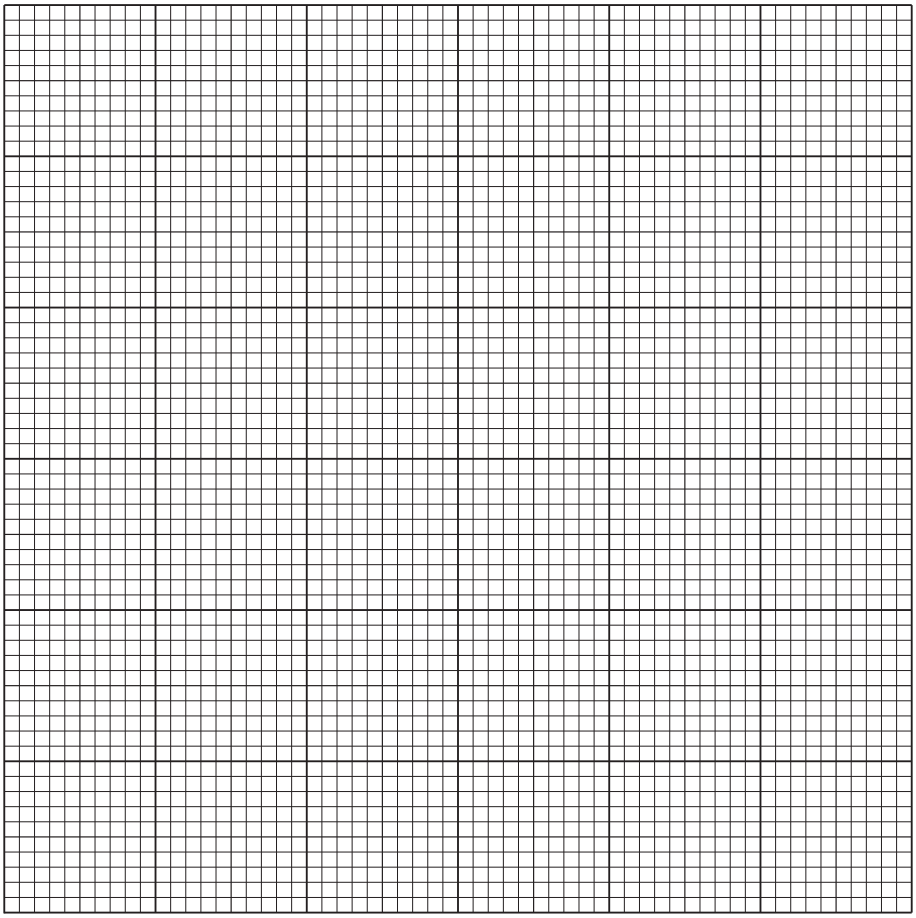
Her results are shown in Table 1.3.

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

© UCLES 2017

(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]

2 **(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 2.1 gives information about the composition of some foods.

Table 2.1

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 2.1, 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]

Question 3 starts on the next page.

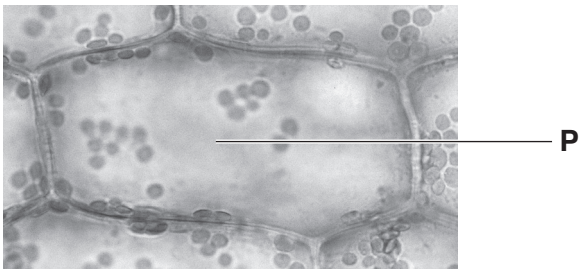
Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

© UCLES 2017

3 Fig. 3.1 shows cells as seen using a light microscope.



magnification ×200

Fig. 3.1

(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. 3.1.

Maximum length of cell **P** in Fig. 3.1 ..... mm

Use the magnification of Fig. 3.1 to calculate the **actual** length of cell **P**.

Show your working.

.....
[4]

(c) State **two** structures, visible in Fig. 3.1, that are found only in plant cells.

1 .....

2 .....
[2]

[Total: 10]

© UCLES 2017