Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

7447195688

BIOLOGY **5090/61**

Paper 6 Alternative to Practical **May/June 2015**

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 **11** printed pages and **1** blank page.

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CAMBRIDGE International Examinations

[Turn over

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

1 **(a)** Describe how you would safely test a sample of milk for the presence of each of the following substances:

(i) reducing sugars

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.....[4]

(ii) proteins.

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.....[2]

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Question 1 continues on page 4

(b) Fromase® is an enzyme that is used in the production of cheese. It causes the proteins in milk to coagulate (clot) to form a solid 'curd'.

A student investigated the time taken for milk to coagulate using Fromase® in the presence of calcium chloride solution. She used a range of concentrations of calcium chloride solution that were each added to 10 cm^3 of milk and 1 cm^3 of Fromase®.

For each concentration of calcium chloride solution, she recorded the time taken for the milk to coagulate.

Her record of results is shown below.

0.0 g per dm^3, 230 seconds; 0.2 g per dm^3, 200 seconds; 0.4 g per dm^3, 150 seconds; 0.6 g per dm^3, 50 seconds; 0.8 g per dm^3, 30 seconds

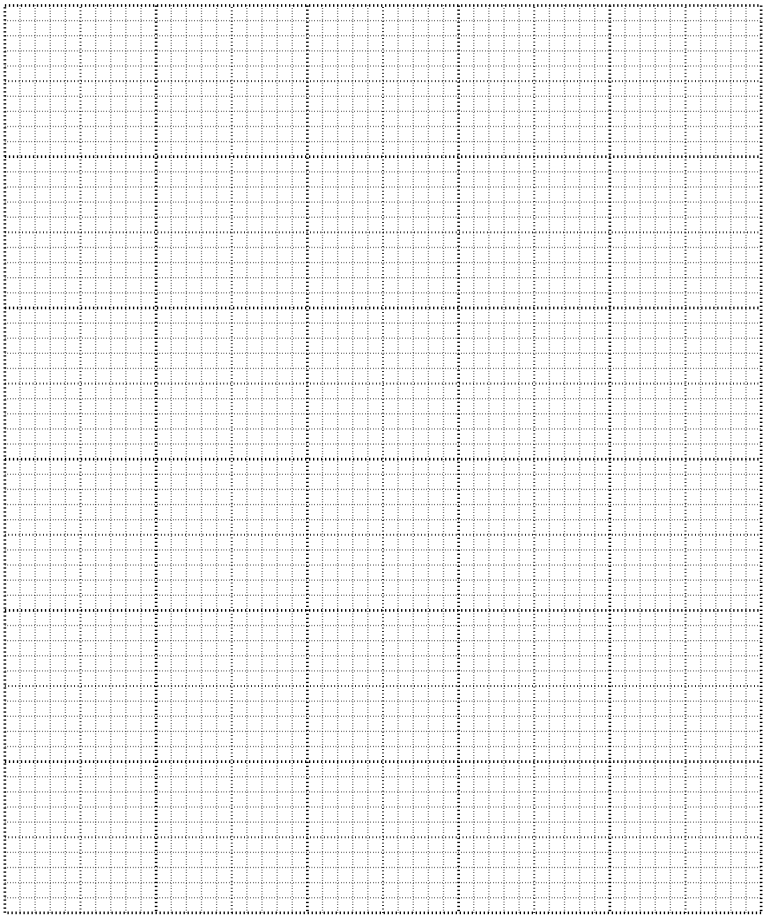
(i) Use these results to complete Table 1.1.

Table 1.1

concentration of calcium chloride solution / g per dm^3	time taken for milk to coagulate / seconds

[2]

(ii) On the grid below, construct a line graph of the data in Table 1.1.
Join your points with ruled, straight lines.



[4]

(iii) Use your graph to find the time it will take for milk to coagulate in calcium chloride solution of concentration 0.7 g per dm^3.

..... seconds [1]

(iv) Describe the relationship between the concentration of calcium chloride solution and the time taken for the milk to coagulate.

.....

.....[1]

(v) During this experiment, the student kept the test-tubes at a constant temperature of 40 °C.

Suggest how she kept the temperature constant.

.....

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.....

.....[2]

(c) Design an experiment you could carry out in the laboratory to investigate the effect of pH on the time taken for milk to coagulate using Fromase®.

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.....[4]

[Total: 20]

2 Fig. 2.1 shows part of the surface of a leaf, as seen using a microscope.

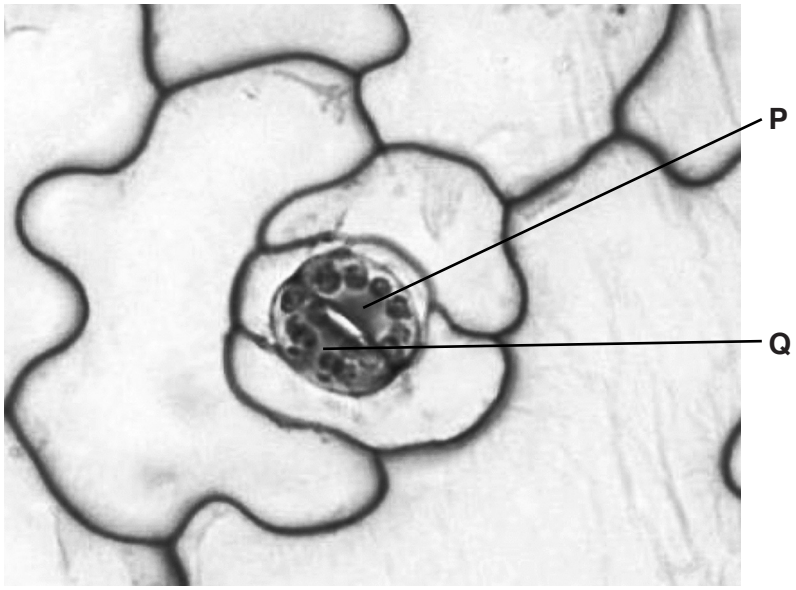


Fig. 2.1

(a) In the space below, make an accurate drawing of the cells labelled **P** and **Q**. Your drawing should be 3.0 × larger than the cells shown in Fig. 2.1.

You do not need to label your drawing.

[4]

(b) An experiment was carried out to measure the rate of transpiration in a sunflower plant. The rate of transpiration was recorded at 0800 hours and then every two hours until 1800 hours.

The rate of transpiration was measured as the mass of water lost in grams per hour.

The results are shown in Table 2.1.

Table 2.1

time of day (24 hour clock)	rate of transpiration/g per hour
0800	2
1000	15
1200	20
1400	25
1600	18
1800	15

(i) With reference to Table 2.1, describe how the rate of transpiration changed during this experiment.

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.....[3]

(ii) Using the information in Table 2.1, calculate the change in the rate of transpiration from 0800 until 1400.

.....[1]

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(c) Fig. 2.2 shows a leafy shoot. Some of the leaves were enclosed in a plastic bag. After 3 days, some liquid appeared in the bag.

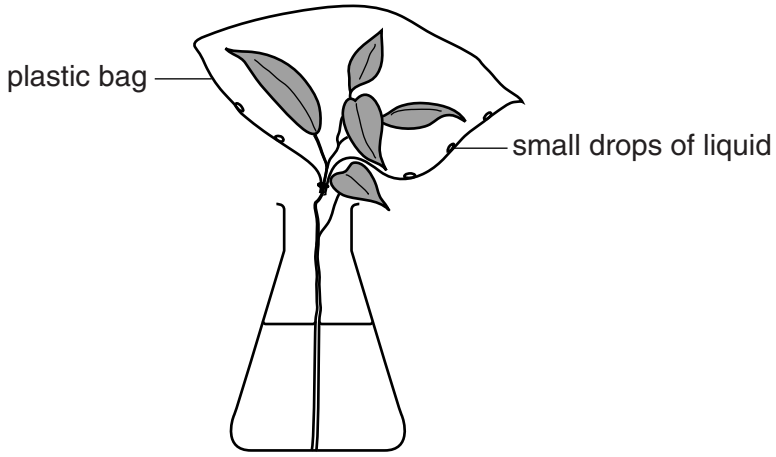


Fig. 2.2

Describe a test you could carry out on the liquid in the plastic bag to show that it is water.

.....

.....

.....

.....[2]

[Total: 10]

3 **(a)** Fig. 3.1 shows a photograph of a leaf.



magnification × 0.5

Fig. 3.1

(i) Measure and record the maximum width of the leaf shown in Fig. 3.1.

width = ...[2]

(ii) Calculate the maximum width of the actual leaf.

Show your working.

width = ...[2]

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(b) In an investigation, a student collected two samples of leaves of the same species as that shown in Fig. 3.1.

Ten leaves were obtained from plants that were growing in a sunny position and ten leaves were obtained from plants growing in a shady position.

The maximum width of each leaf was measured and recorded. From these measurements, the mean maximum width of each sample was calculated.

The results are shown in Table 3.1

Table 3.1

mean maximum width of leaves/mm	
in a sunny position	**in a shady position**
32.7	46.2

(i) Explain how the mean maximum widths were calculated.

.....

.....

.....

.....[2]

(ii) From these results, the student concluded that leaves growing in a shady position were wider than those growing in a sunny position.

Suggest **one** way in which this investigation could be improved to increase the validity of this conclusion.

.....

.....[1]

(iii) Suggest why it might be an advantage to the leaves growing in a shady position to be wider than those growing in a sunny position.

.....

.....

.....

.....

.....

.....[3]

[Total: 10]

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