Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0745640984

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **February/March 2016**

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.

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.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **10** printed pages and **2** blank pages.

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1 Some students investigated the effect of temperature on the activity of amylase.

Amylase is an enzyme that catalyses the break down of starch.

Starch changes the colour of iodine solution from orange-brown to blue-black.

Step 1 The students added 2 cm^3 of starch solution to a test-tube, labelled it **W**, and placed it into a beaker of warm water.

Step 2 They added 2 cm^3 of starch solution to a second test-tube, labelled it **C**, and placed it into a beaker of iced water.

Step 3 The students placed one dropping pipette into each of test-tubes **W** and **C**.

Step 4 They waited five minutes before continuing.

Step 5 The students added 10 drops of amylase solution to each of test-tubes **W** and **C** and shook both test-tubes gently.

Step 6 They started a timer.

Step 7 The students immediately tested the liquids in test-tubes **W** and **C** for starch using iodine solution.

Step 8 The students repeated step 7 after 2, 4, 6 and 8 minutes.

(a) Iodine solution can affect the activity of amylase.

The students tested the liquids in test-tubes **W** and **C** using iodine solution without affecting the activity of the amylase.

Describe how the students did this.

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.....[2]

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The students observed that the liquid from test-tube **W** turned the iodine solution blue-black after 0 minutes, dark brown after 2 minutes, and it remained orange-brown after 4, 6 and 8 minutes.

The liquid from test-tube **C** turned the iodine solution blue-black after 0, 2 and 4 minutes and dark brown after 6 and 8 minutes.

(b) Prepare a table to record these observations in the space below.

[4]

(c) Suggest reasons for:

(i) waiting for five minutes at step 4

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.....[1]

(ii) using separate dropping pipettes for test-tubes **W** and **C**.

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.....[1]

(d) Explain the observations for test-tube **W**.

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.....[3]

(e) The students concluded:

"The higher the temperature, the greater the activity of amylase."

Do you agree with this conclusion?

Give a reason for your answer.

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.....[1]

(f) There is a source of error in step 5 of the method.

(i) Identify this source of error.

.....

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.....[1]

(ii) Suggest apparatus that could be used to minimise this source of error.

.....[1]

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(g) State **one** other source of error in the method used in this investigation.

Suggest how to improve the method to minimise this source of error.

error .....

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improvement .....

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[2]

(h) Some students stated:

"The activity of amylase is greatest at 40°C."

Describe an investigation to test whether this statement is correct.

The investigation should be similar to that described in steps 1–8.

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.....[6]

(i) Amylase breaks starch down into reducing sugars.

Outline how the students could show that reducing sugars are present in a solution.

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.....[2]

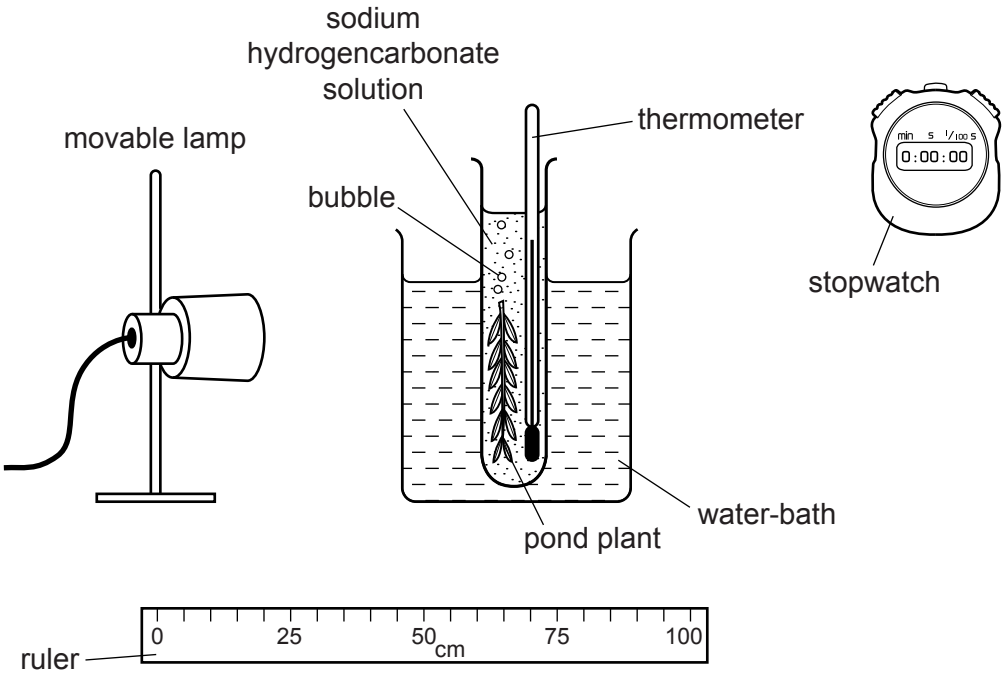
[Total: 24]

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2 Leaves exposed to light photosynthesise and produce oxygen gas.

A student measured the rate at which the leaves of a pond plant produced bubbles of oxygen gas when exposed to different intensities of light.

The apparatus used is shown in Fig. 2.1.



not drawn to scale

Fig. 2.1

The investigation was carried out in a dark laboratory. The only light source was the lamp, as shown in Fig. 2.1.

The student changed the light intensity by placing the lamp at different distances from the plant.

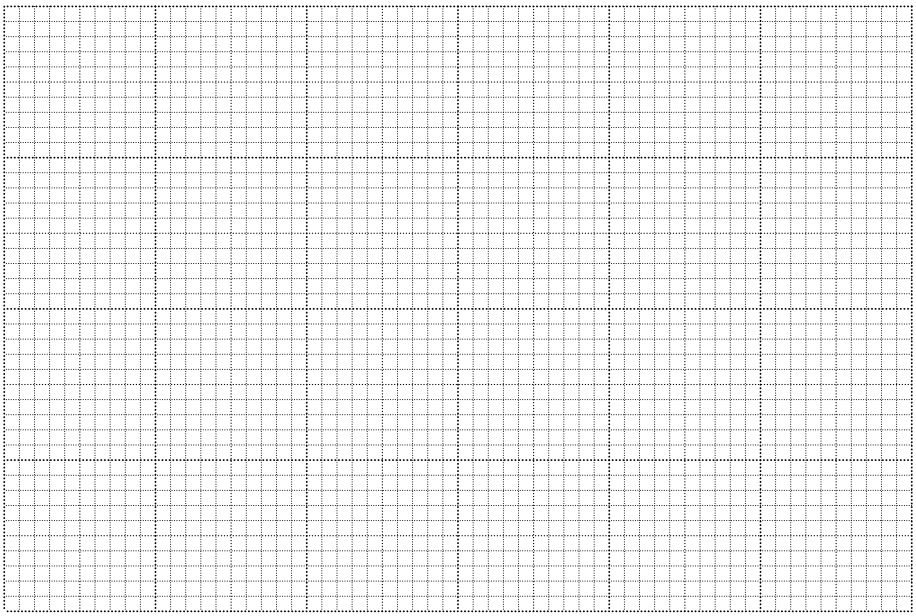
The results are shown in Table 2.1.

Table 2.1

distance of lamp from plant / cm	number of bubbles of oxygen produced per minute
20	29
40	16
60	8
80	3
100	1

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(a) (i) Plot a graph of the data in Table 2.1 and draw a line of best fit.



[5]

(ii) Use your graph to estimate the distance of the lamp from the plant when six bubbles of oxygen per minute would be produced.

Show **on the graph** how you obtained your answer.

.....

[2]

(iii) Describe the relationship between light intensity and the rate at which oxygen is produced by the plant.

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.....[2]

(iv) Suggest why the student used a water-bath in the investigation shown in Fig. 2.1.

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.....[1]

(b) Fig. 2.2 shows a photograph of a section through the pond plant as seen under a light microscope.

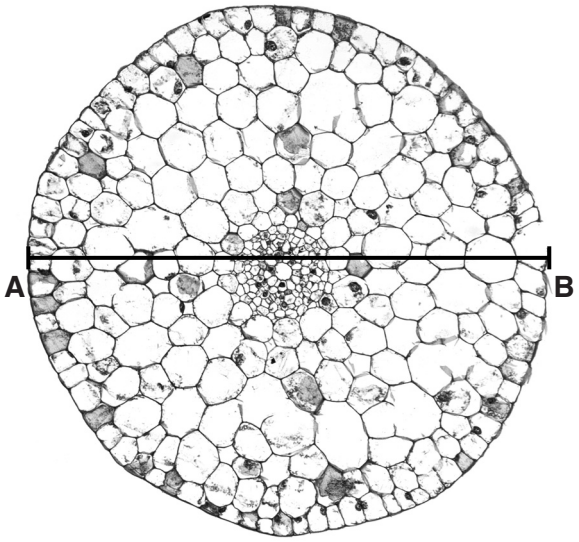


Fig. 2.2

(i) Make a large drawing of Fig. 2.2 to show the position of the outermost layer of cells and the central core.

Do **not** draw any of the individual cells or air spaces.

[3]

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(ii) The central core is called the stele. Label the stele on your diagram. [1]

(iii) The diameter of the section in the photograph in Fig. 2.2 is shown by the line **AB**.

Measure the length of **AB** on Fig. 2.2.

Length of **AB** on Fig. 2.2 ..... mm

The actual diameter of the section is 7.5 mm.

The magnification of Fig. 2.2 can be calculated using the following equation:

$$\text{magnification} = \frac{\text{length of } \mathbf{AB}}{\text{actual diameter of the section}}$$

Calculate the magnification of Fig. 2.2 using the information above and your answer for **AB**.

Show your working.

Give your answer to the nearest whole number.

magnification ..... [2]

[Total: 16]

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