Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

6356770420

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **February/March 2020**

1 hour

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Blank pages are indicated.

DC (JC/CT) 184715/4

[Turn over

1 **(a)** Beetroot is the large fleshy root of a beet plant. The cells of beetroot contain a coloured pigment. This pigment may leak from the cells if the cell membranes are damaged.

A student investigated the effect of temperature on the leakage of pigment from beetroot cells.

Step 1 Cylinders of varying length were cut from a beetroot. The student was provided with two of the beetroot cylinders. The student cut both cylinders to 3 cm in length.

Step 2 The student labelled one test-tube **C** and another test-tube **H**.

Step 3 The student put some cold water into test-tube **C** and some hot water into test-tube **H**.

Step 4 The student measured the temperature of the water in test-tube **C** and in test-tube **H**.

Sections of the thermometers are shown in Fig. 1.1.

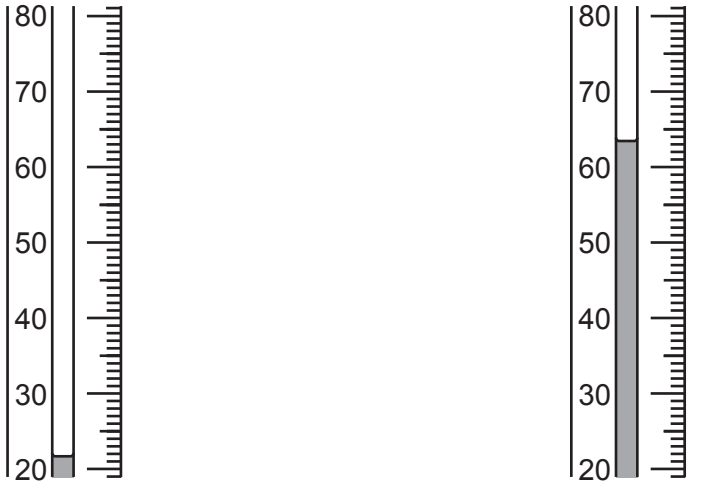

Fig. 1.1

Step 5 The student put one beetroot cylinder into test-tube **C** and one beetroot cylinder into test-tube **H**. A stopper was placed in each test-tube.

Step 6 The student waited for 10 minutes.

Step 7 After 10 minutes the student shook both test-tubes.

Step 8 The student observed the colour of the liquid in both test-tubes.

The student's observations are shown in Fig. 1.2.

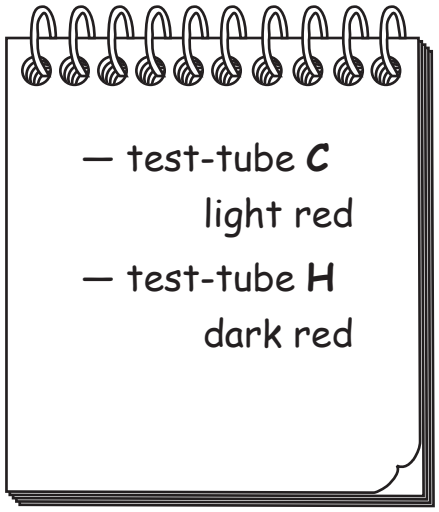

Fig. 1.2

(i) Prepare a table to record the results shown in Fig. 1.1 and Fig. 1.2.

[3]

(ii) State a conclusion for these results.

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..... [1]

(iii) In step 1 the two beetroot cylinders were cut to the same length.

Suggest why this was necessary.

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..... [1]

(iv) Identify **one** possible source of error in step 3.
Suggest a piece of apparatus that could be used to reduce this error.

error .....

.....

apparatus .....

.....
[2]

(v) In step 7 the student shook the test-tubes. It was important that the shaking of both test-tubes was the same.

Suggest **two** ways that this could be achieved.

1 .....

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2 .....

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[2]

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(b) A student repeated the investigation in **1(a)** at five different temperatures. They carried out three trials at each temperature.

The student measured the percentage of light that passed through the liquids in the test-tubes.

The coloured pigment reduces the percentage of light that can pass through the liquid. The higher the pigment concentration the less light passes through the liquid.

The student's results are shown in Table 1.1.

Table 1.1

temperature / °C	percentage of light that passes through the liquid			
	trial 1	trial 2	trial 3	average
10	100	99	98	99
20	94	48	96	95
40	80	77	77	78
60	26	30	31	29
90	1	2	0	1

(i) State the variable that was changed (independent variable) in the investigation described in **1(b)**.

..... [1]

(ii) Suggest **two** ways in which the method described in **1(b)** is an improvement to the method used in **1(a)**.

1 .....

.....

2 .....

.....

[2]

(iii) The student decided that the result for trial 2 at 20 °C was anomalous.

State what is meant by an anomalous result.

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..... [1]

(iv) State how the student dealt with the anomalous result when calculating the average value for 20 °C.

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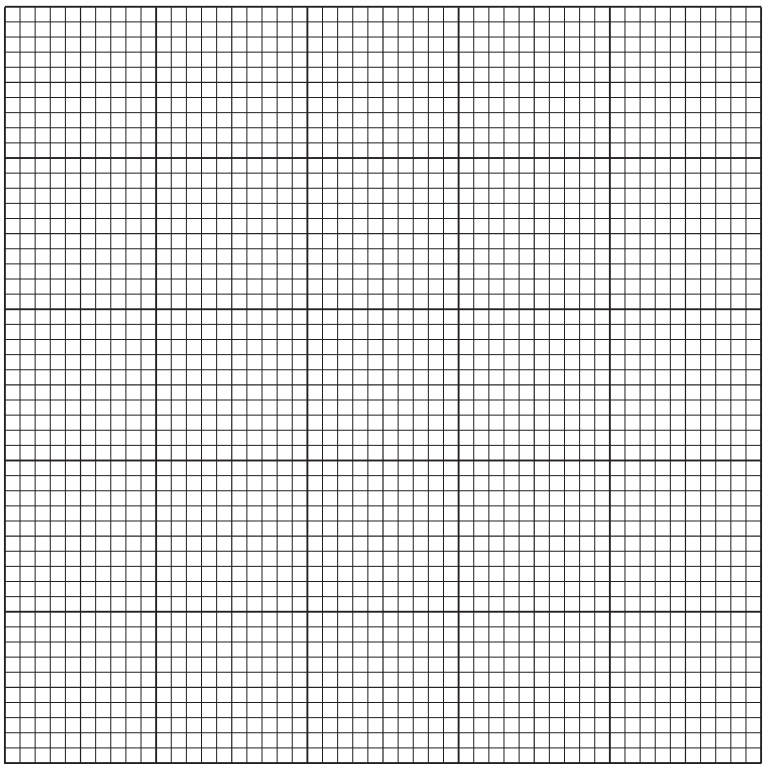
..... [1]

(v) Plot a line graph on the grid of the temperature against the average percentage of light that passes through the liquid using the data in Table 1.1.



[4]

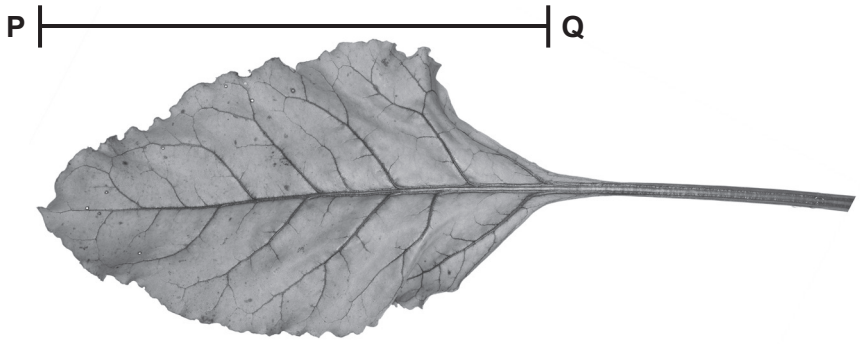
(vi) Estimate the percentage of light passing through the liquid at 50 °C.

Show on your graph how you obtained your estimate.

.....%
[2]

[Total: 20]

2 Fig. 2.1 is a photograph of a leaf from a beet plant.



magnification ×1.2

Fig. 2.1

(a) (i) Make a large drawing of the leaf shown in Fig. 2.1.

[4]

(ii) Measure the length of the line **PQ** on Fig. 2.1. Include the unit.

length of line **PQ** .....

Calculate the actual length of the leaf using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ}}{\text{actual length of the leaf}}$$

Give your answer to the nearest whole number and include the unit.

Space for working.

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[3]

(b) Some athletes drink beetroot juice because they think it improves their performance.

Scientists investigated the effect of drinking 100 cm^3 of beetroot juice on the length of time that athletes were able to run at their fastest pace before stopping due to exhaustion.

The results of the investigation are shown in Fig. 2.2.

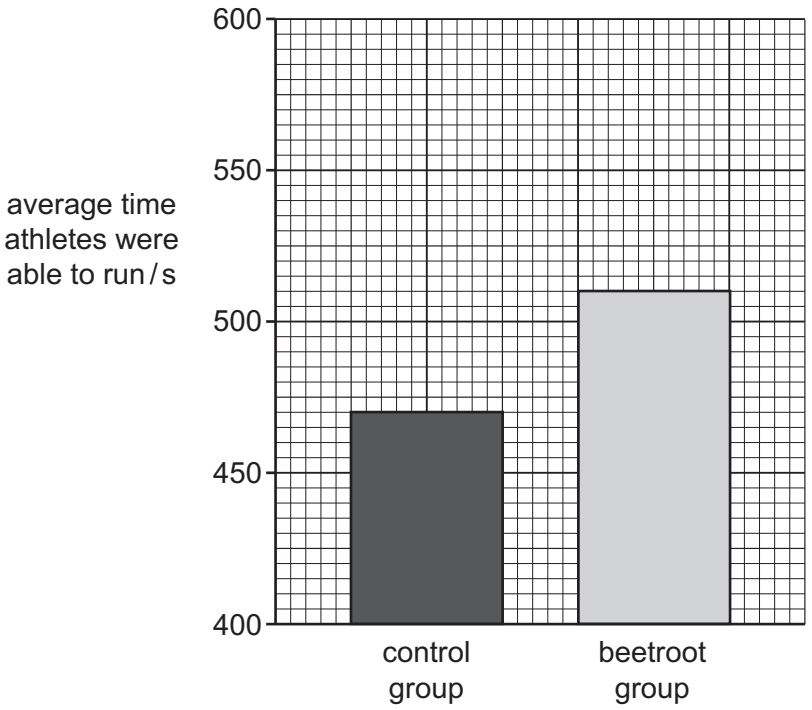

Fig. 2.2

(i) Explain why a control group was used in this investigation.

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(ii) Suggest a suitable control experiment for this investigation.

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..... [1]

(iii) Calculate the percentage increase in the average time athletes were able to run for the beetroot group compared to the control group.

Give your answer to one decimal place.

Space for working.

.....%
[2]

(c) An athlete suggested the hypothesis:

'Drinking a greater volume of beetroot juice would increase the length of time that athletes are able to run.'

Plan an investigation to test this hypothesis.

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(d) Athletes often consume energy drinks.

Describe how you could test a sample of an energy drink to determine if reducing sugars are present.

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..... [3]

[Total: 20]