Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

4116008 52

BIOLOGY **5090/31**

Paper 3 Practical Test **October/November 2020**

1 hour 15 minutes

You must answer on the question paper.

You will need: The materials and apparatus listed in the confidential instructions

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 [ ].

For Examiner's Use	
1	
2	
3	
Total	

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

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

1 When tissue from some plants is cut, the cut surface turns brown. This is because enzymes are released which cause reactions between chemicals in the plant and oxygen to produce brown substances.

You are going to investigate the effect of different treatments on the rate at which bananas turn brown.

You are provided with half a banana which was cut several hours ago.

- Cut a slice 1 cm wide from the banana.

(a) (i) Complete the table to compare the colour of the newly cut surface of the banana with the surface cut several hours ago.

colour of surface	
new cut	**old cut**

[2]

- Label the white tile **A**, **B** and **C**. Cut three fresh slices of banana each approximately 1 cm wide and place one slice next to each letter.

- Place slice **A** in the beaker labelled dilute hydrochloric acid (HC*l*). Ensure that the slice is completely covered by the acid.

(ii) Record the time.

time ..... [1]

- Leave slice **C** untreated on the white tile.

- Cut slice **B** into small pieces and leave them on the white tile.

- After **two minutes** use forceps to carefully remove the slice from the hydrochloric acid and return it to the white tile.

(iii) Five minutes after the time you recorded, observe the three slices and record their colours in the table below.

time / minutes	colour		
	slice dipped in HC*l* (A)	**slice cut into small pieces (B)**	**untreated slice (C)**
5			
10			
20			

[4]

(iv) Measure the pH of the upper surfaces of the three slices using universal indicator paper.

Record your results in the table below.

pH		
slice dipped in HC*l* (A)	**slice cut into small pieces (B)**	**untreated slice (C)**

[2]

- 10 minutes after your recorded time, observe the three slices and record their colours in the table at the top of this page.
- 20 minutes after your recorded time, observe the three slices and record their colours in the table at the top of this page.

You should begin Question 2 or 3 while you wait.

After completing the table, continue with Question 1(b), (c) and (d).

(b) **(i)** Describe the effect of dilute hydrochloric acid by comparing the results for slices **A** and **C**.

.....

..... [1]

(ii) Suggest a reason for the result with dilute hydrochloric acid.

.....

..... [1]

(iii) State the effect of cutting up slice **B** into small pieces by comparing the results with **C**.

.....

..... [1]

(iv) Suggest a reason for this effect in slice **B**.

.....

..... [1]

(c) It can be difficult to describe your observations in this investigation. Suggest a reason why it can be difficult and an improvement to the method to overcome this.

reason .....

.....

improvement .....

.....
[2]

(d) Using a method similar to the one you carried out for this investigation design an experiment to determine the optimum (best) pH for a banana to turn brown.

.....

.....

.....

.....

.....

.....

.....

.....

.....

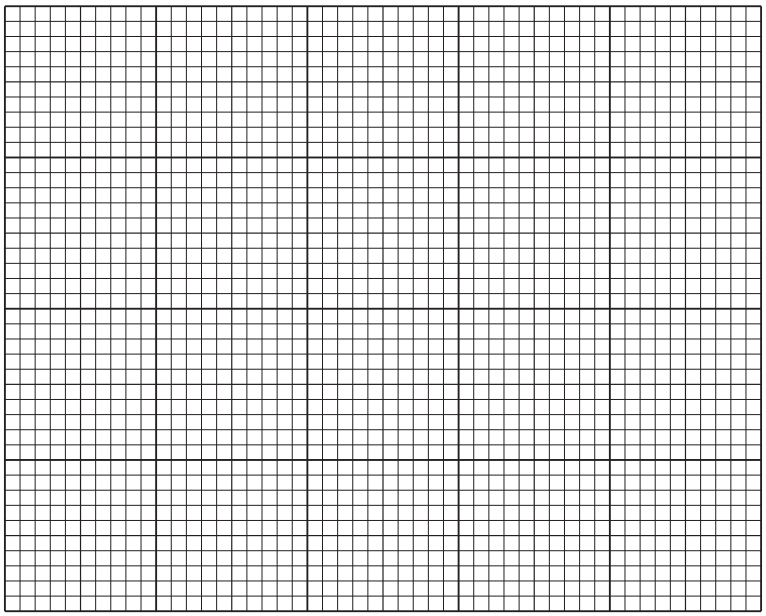
..... [5]

[Total: 20]

2 A student investigated the effect of exercise on her rate of breathing. She started exercising at two minutes and stopped exercising at eight minutes. The data collected is shown in the table.

time / minutes	rate of breathing / breaths per minute
0	14
2	14
4	24
6	35
8	35
10	19

(a) Construct a line graph of the data on the grid below. Join your points with ruled, straight lines.



[4]

(b) Use your graph to find the rate of breathing at five minutes. Show your working on the graph.

rate ..... [2]

(c) Describe how the student could have measured her rate of breathing.

.....

..... [1]

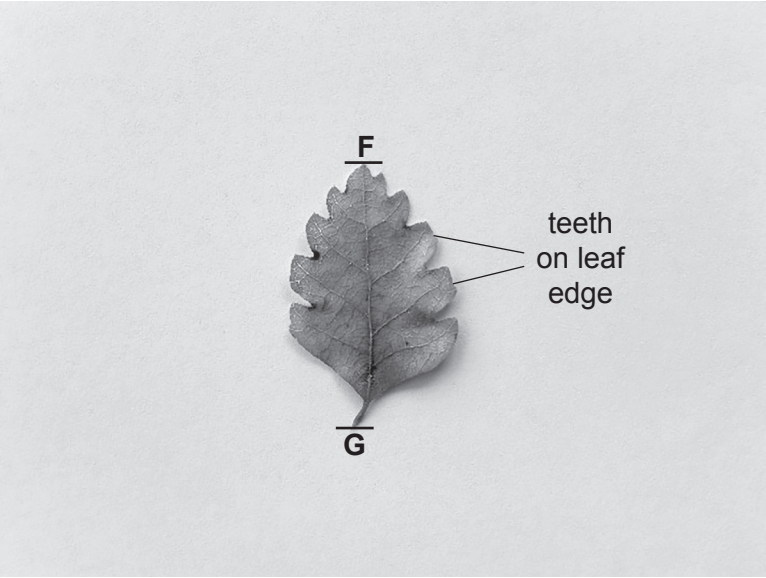
(d) Exercise increases the rate of breathing. State **one other** measurement that the student could have recorded to determine the full effect of exercise on breathing.

.....

..... [1]

[Total: 8]

3 The photograph shows a leaf of a southern beech tree.



magnification ×1

(a) **(i)** Make a large drawing of the leaf in the space below.

[5]

(ii) **On the photograph** draw a straight line to join **F** and **G**.

Measure and record the length of the line.

.....

On your drawing draw a straight line in the same position as on the photograph.

Measure and record the length of the line.

.....

[3]

(iii) Calculate the magnification of your drawing compared to the original size of the leaf. Space for working.

magnification × ..... [2]

(b) Biological keys can be used to identify species. A biological key for five different species of southern beech tree is shown below.

Use this key to identify the name of the tree whose leaf is shown in the photograph on page 8.

To use the key start at 1 and read the two alternatives, (a) and (b). Decide which one is correct and tick [✓] the box next to that option. If indicated, go to the next number. Continue with this procedure until you identify the tree leaf in the photograph.

1	**(a)**	Leaf with a smooth edge	☐	mountain beech
	(b)	Leaf with teeth on edge	☐	go to 2
2	**(a)**	Leaf 20–40 mm long	☐	go to 3
	(b)	Leaf 6–15 mm long	☐	silver beech
3	**(a)**	Leaf with 4–7 teeth on each side	☐	red beech
	(b)	Leaf with 8–12 teeth on each side	☐	hard beech

name of tree ..... [2]

[Total: 12]

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