Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

7547441955

BIOLOGY **5090/31**

Paper 3 Practical Test **May/June 2018**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As specified in the Confidential Instructions.

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.

For Examiner's Use	
1	
2	
Total	

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CAMBRIDGE International Examinations

You are advised to read through the questions on this paper carefully before starting work.

1 You are going to investigate heat loss from the outer surface of the bodies of two animals.

You are provided with a large test-tube and a small test-tube to represent the two animals.

The large test-tube has a lower surface area to volume ratio.

The small test-tube has a higher surface area to volume ratio.

When you are ready, place the two test-tubes in a rack or beaker and raise your hand. The Supervisor will pour hot water into the two test-tubes.

Caution: the test-tubes will be hot.

(a) (i) Immediately measure the temperature of the water in each test-tube and record your measurements in the table.

After 2 minutes, measure the temperature of the water in each test-tube again and record your measurements in the table.

Measure the temperature of the water in each test-tube every 2 minutes for 10 minutes and record your measurements in the table.

time/minutes	temperature/°C	
	large test-tube	small test-tube
0		
2		
4		
6		
8		
10		

[2]

(ii) Describe how your results could be made more reliable.

.....

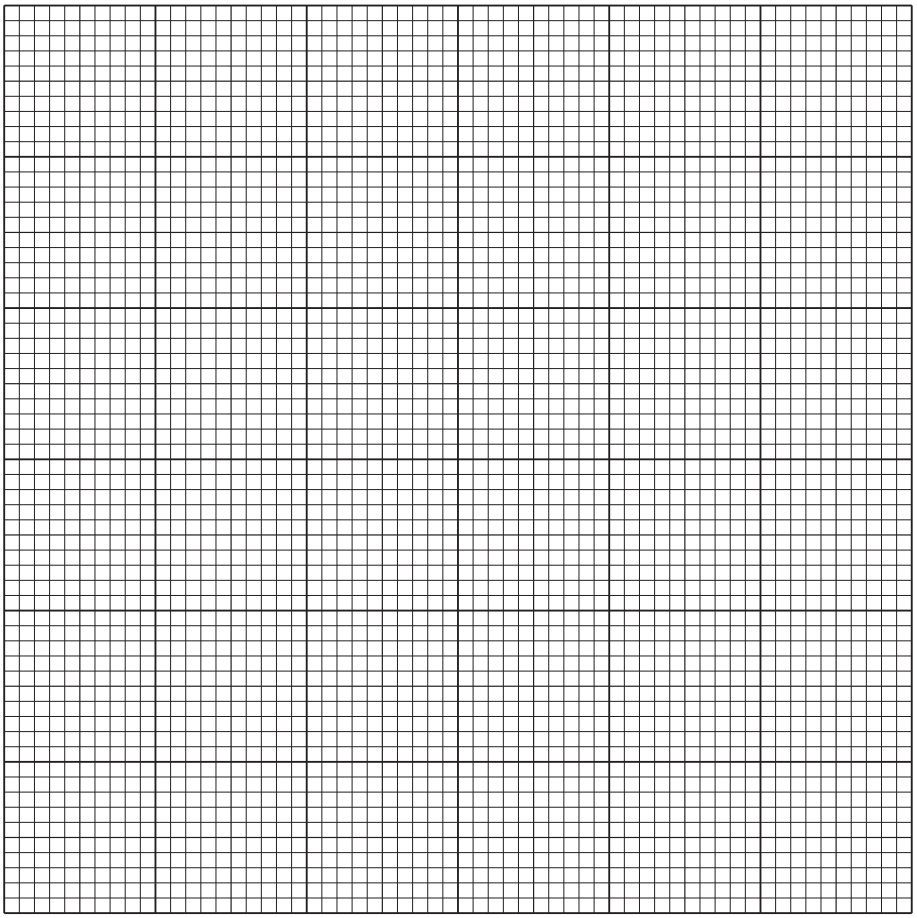
.....

.....[2]

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(b) (i) On the grid below and using **one** set of axes, construct a graph with **two** lines to show the relationship between time and temperature of the water in the two test-tubes.

Join your points with ruled, straight lines.



[5]

(ii) Use your graph to determine the temperature of the water in the **large** test-tube at 3 minutes.

Show your working on your graph.

.....[2]

(iii) Describe what you can conclude about heat loss in large and small animals from your results.

.....

.....[1]

(c) Penguins are animals that need to maintain a constant body temperature. They can be found living in cold climates near the South Pole as well as in the warmer climate of New Zealand.

Using the results of this investigation, suggest and explain:

(i) what difference there may be in the size of the penguins found in these two areas,

size .....

.....

explanation .....

.....

.....

[2]

(ii) why penguins stand very close together in groups when external temperatures are very low.

.....

.....

.....

.....[2]

[Total: 16]

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2 The photograph shows a human tooth.



(a) In the space below make a large drawing of this tooth.

[4]

(b) (i) Draw a line **on the photograph** to show the maximum length of the tooth.

Measure and record this length. .....

Draw a line **on your drawing** to show the maximum length of the tooth.

Measure and record this length. .....

[3]

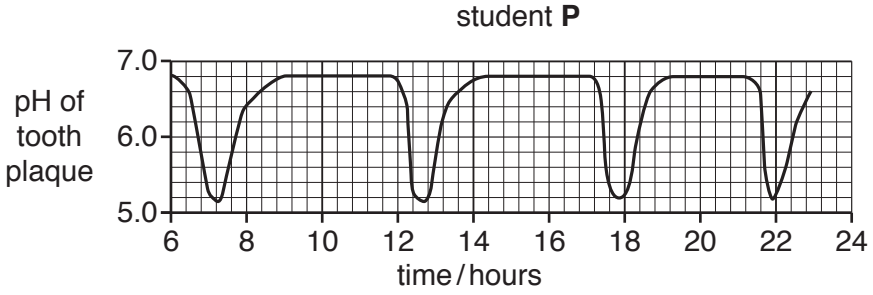
(ii) Use your measurements in **(b)(i)** to calculate the magnification of your drawing compared to the tooth in the photograph.

Show your working.

x ..... [2]

(c) Plaque is a layer of bacteria which forms on teeth and can cause dental decay.

The pH of the plaque from the teeth of student **P** was measured during a day. The results were plotted on a graph.



(i) Suggest how the pH of plaque could be measured safely.

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.....[3]

(ii) Suggest and explain why the pH of plaque in the graph is lower at certain times of the day.

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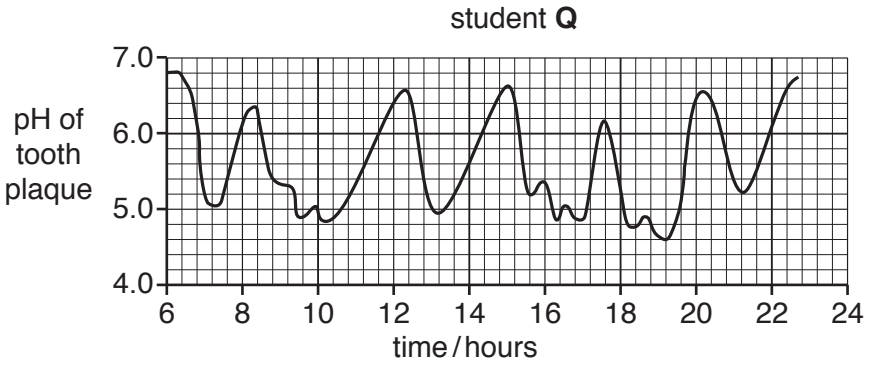
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.....[4]

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The pH of the plaque from the teeth of another student, **Q**, was also measured during a day. The results were plotted on a graph.



(iii) Dental decay starts to occur when the pH falls below 5.5. Suggest and explain why student **Q** is more likely to have dental decay than student **P**.

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.....[3]

(d) Some people rinse their mouths after eating with a liquid called mouthwash. Manufacturers of mouthwash claim that it helps to reduce dental decay.

Describe how you would investigate whether using mouthwash after eating affects the pH of plaque in a group of 10 students.

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.....[5]

[Total: 24]

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