Cambridge
O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2945717171

BIOLOGY **5090/61**

Paper 6 Alternative to Practical **May/June 2019**

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

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Cambridge Assessment International Education

[Turn over

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

1 A student wanted to investigate the digestion of fat in the human alimentary canal.

He used some white milk as the source of fat, an enzyme solution, an indicator solution, some bile salt solution and water.

The indicator he used is pink in alkaline conditions and colourless in acidic conditions.

The enzyme digests the fat in the milk to give fatty acids and glycerol.

(a) Suggest which enzyme he used in this investigation.

..... [1]

He set up 3 test-tubes, **A**, **B**, and **C**.

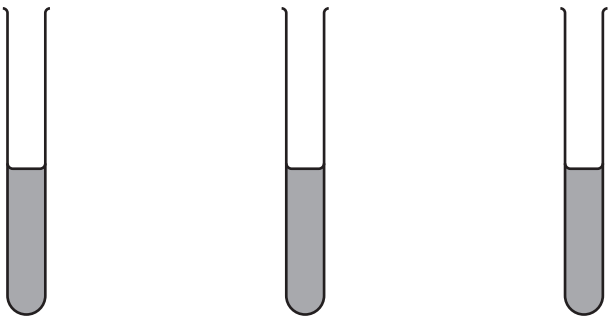
He added 10 cm^3 of milk and 5 drops of indicator solution to each test-tube.

He placed the 3 test-tubes in a water bath for 5 minutes.

After 5 minutes, 1 cm^3 of enzyme solution was added to each of test-tubes **A** and **B**. 1 cm^3 of water was added to test-tube **C**.

1 cm^3 bile salt solution was added to test-tube **B** and 1 cm^3 water to each of test-tubes **A** and **C**.

The diagram shows the contents of each test-tube.



A	**B**	**C**
milk	milk	milk
indicator	indicator	indicator
enzyme	enzyme	water
water	bile salts	water

He then placed the 3 test-tubes in the same water bath again and observed them every minute for 5 minutes.

(b) (i) Name a suitable piece of apparatus for the student to use to measure the milk.

..... [1]

(ii) Name a suitable piece of apparatus for the student to use to add the indicator solution.

..... [1]

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(iii) Suggest a suitable temperature for the water bath ..... [1]

(iv) Suggest why the test-tubes containing milk and indicator solution were placed in a water bath for 5 minutes before any other contents were added.

.....

..... [1]

(v) Explain why water was added to test-tubes **A** and **C**.

.....

..... [1]

When the indicator solution was first added, the contents of all three test-tubes turned pink.

At 3 minutes, the contents of test-tube **B** had turned white.

At 5 minutes, the contents of test-tube **A** had turned white.

At 5 minutes, the contents of test-tube **C** were still pink.

(c) (i) Complete the table below, including the column heading, to show these results.

.....	**colour observed**		
	test-tube A	**test-tube B**	**test-tube C**
0			pink
1			pink
2			pink
3			pink
4			pink
5			pink

[4]

(ii) Suggest what caused the indicator solution to change colour in test-tubes **A** and **B**.

.....

.....

..... [2]

(d) Describe and explain what the student could conclude about the digestion of fat in each test-tube.

A .....

.....

B .....

.....

C .....

.....

[3]

(e) **(i)** Design an investigation based on the contents of test-tube **A** to find the effect of pH on the action of this enzyme.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

(ii) State and explain **one** safety precaution that should be taken when carrying out this investigation.

safety precaution .....

.....

explanation .....

.....

[2]

[Total: 23]

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2 The photograph shows a germinating bean seed.



(a) (i) In the space below make a large drawing of the germinating bean seed as it appears in the photograph.

[4]

(ii) On your drawing use label lines to label the **plumule** and the **cotyledon**. [2]

A student investigated the effect of temperature on the germination of some seeds. She followed these instructions:

- put damp filter paper into 5 Petri dishes
- place 10 seeds on the paper in each dish
- place one dish in each of the following temperatures and leave for 3 days: 10 °C, 15 °C, 20 °C, 25 °C and 30 °C.

She called this trial 1. She set up three more trials identical to trial 1, which she called trial 2, trial 3 and trial 4.

After 3 days, she counted how many seeds in each dish had germinated. Her results are shown in the table below.

temperature /°C	number of seeds that germinated				
	trial 1	trial 2	trial 3	trial 4	mean
10	2	3	1	2	2.0
15	3	5	2	4	3.5
20	5	8	6	4	
25	6	8	7	5	
30	8	9	8	7	

(b) Complete the table by calculating the mean number of seeds that germinated at 20 °C, 25 °C and 30 °C. [2]

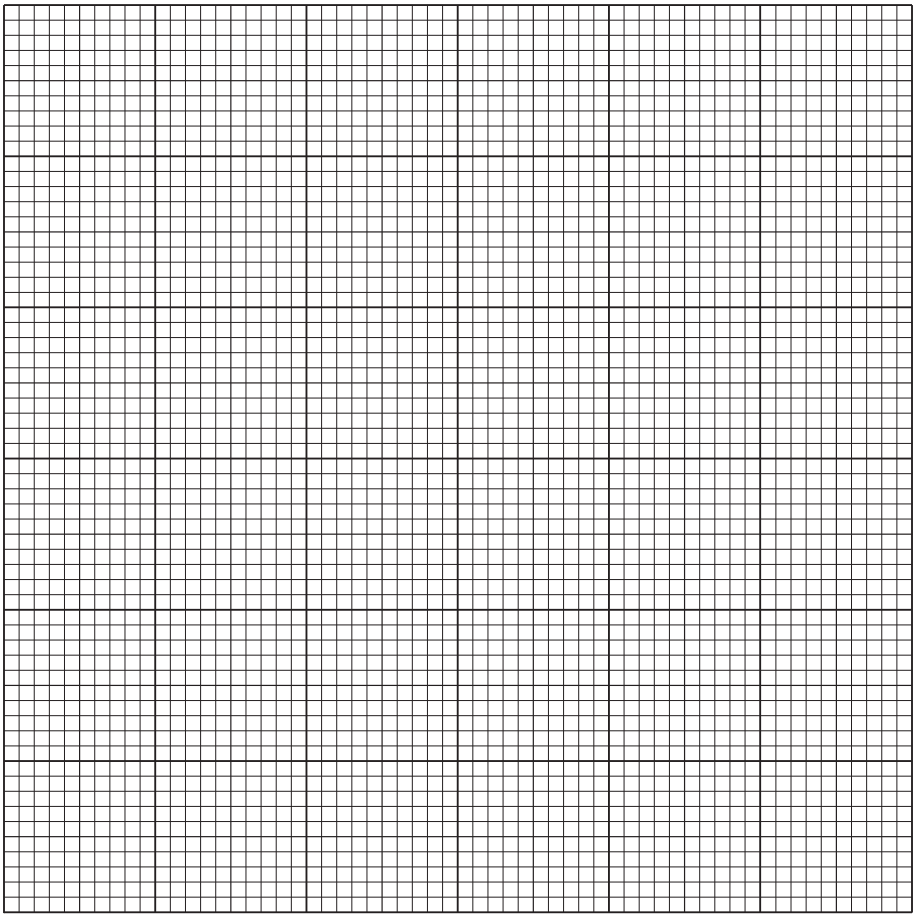
(c) Suggest **two** factors, other than the number of seeds, that should have been kept constant during this investigation.

1. .....

2. .....

[2]

(d) On the grid below, construct a bar chart to show the mean number of seeds that germinated at each temperature.



[4]

(e) Use the results in the table to suggest what the student could conclude about the effect of temperature on the germination of these seeds.

.....

..... [1]

(f) Suggest **two** reasons why some seeds did not germinate at 30 °C.

1. .....

.....

2. .....

.....

[2]

[Total: 17]

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