Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

BIOLOGY **5090/31**

Paper 3 Practical Test **October/November 2017**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed 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	
3	
Total	

This document consists of **8** printed pages and **4** blank pages.

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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 Dried yeast may be activated by adding it to a solution containing sugar. When it is active, it produces bubbles which form froth on the surface of the mixture. The greater the activity of the yeast, the more froth is produced.

You are going to investigate the activity of yeast in solutions of different sugars. The activity will be assessed by measuring the height of froth produced by the yeast after 5 minutes and 10 minutes.

You are provided with 4 large test-tubes, solutions of three different sugars (5% glucose, 5% lactose and 5% sucrose) and distilled water.

- Label a large test-tube **W**. Use the measuring cylinder or syringe provided to pour 15 cm^3 of distilled water into test-tube **W**.
- Label a large test-tube **L**. Measure 15 cm^3 of 5% lactose solution and pour it into test-tube **L**.
- Rinse the measuring cylinder or syringe with water from the beaker labelled **water for rinsing** and pour the waste water into the beaker labelled **waste water**.
- Label a large test-tube **G.** Measure 15 cm^3 of 5% glucose solution and pour it into test-tube **G**.
- Rinse the measuring cylinder or syringe with water from the beaker labelled **water for rinsing** and pour the waste water into the beaker labelled **waste water**.
- Label a large test-tube **S**. Measure 15 cm^3 of 5% sucrose solution and pour it into test-tube **S**.

Put the 4 test-tubes into the beaker labelled **water bath**. When ready, raise your hand to request hot water which the Supervisor will pour into your water bath.

Check that the temperature of the water bath is between 40 °C and 45 °C. Adjust this if necessary by asking for more hot water or by using cold water.

- Leave your 4 test-tubes in the water bath for 5 minutes.

Then add dried yeast to each of the test-tubes as follows.

- Carefully pour all the contents of one small packet labelled **yeast** into test-tube **W**. Stir the mixture vigorously with a glass rod and return the test-tube to the water bath. Wipe the glass rod with a paper towel.

  Note the time (**W**) .....

- After 30 seconds add all the contents of another packet of yeast to test-tube **L**. Stir vigorously with a glass rod and return the test-tube to the water bath. Wipe the glass rod with a paper towel.

  Note the time (**L**) .....

- Repeat this process for test-tubes **G** and **S**.

  Note the times (**G**) ..... (**S**) .....

[Turn over

(a) **Five** minutes after adding yeast to test-tubes **W**, **L**, **G** and **S**, use a ruler to measure the height of any froth above the yeast mixture. Record your measurements in Table 1.1 and return the test-tubes to the water bath.

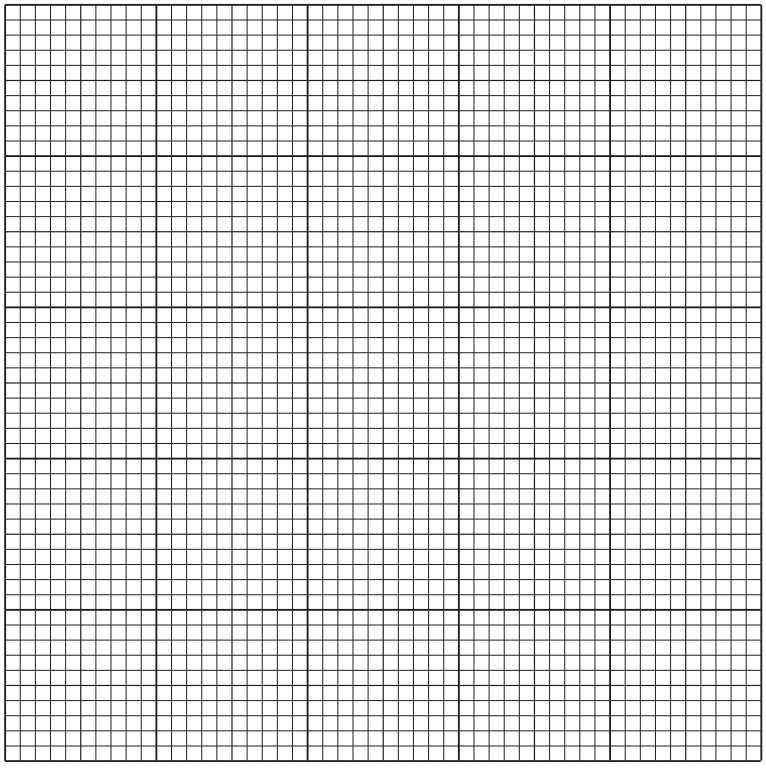
Follow the same procedure **10** minutes after adding yeast to test-tubes **W**, **L**, **G** and **S**, and record your measurements in Table 1.1.

Table 1.1

test-tube	height of froth/mm	
	after 5 minutes	after 10 minutes
distilled water (**W**)		
5% lactose (**L**)		
5% glucose (**G**)		
5% sucrose (**S**)		

[4]

(b) **(i)** Construct a bar chart to show the height of froth produced in each of the 4 test-tubes **after 10 minutes**.



[4]

(ii) Describe what you can conclude about the activity of yeast from your results.

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.....[3]

(c) (i) State the name of the process taking place when yeast produces bubbles which form froth.

.....[1]

(ii) State the name of the gas that was produced to make the froth above the yeast mixture.

.....[1]

(iii) Explain why the 4 test-tubes, **W**, **L**, **G** and **S**, were placed in the water bath for 5 minutes before the yeast was added.

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.....[1]

(iv) Explain why test-tube **W** containing yeast and distilled water was used in the investigation.

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.....[1]

(d) Suggest why yeast is less active with some sugars than with others.

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.....[1]

(e) The results of your investigation may not be reliable. Describe what you could do to make them more reliable and explain why the results would be more reliable.

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.....[2]

[Total: 18]

2 Fig. 2.1 shows flowers of the sweet pea plant.

magnification ×1

Fig. 2.1

(a) Using information from Fig. 2.1, suggest how sweet pea flowers might be pollinated. Give a reason for your answer.

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.....[1]

Fig. 2.2 shows a developing fruit and the remains of a flower.

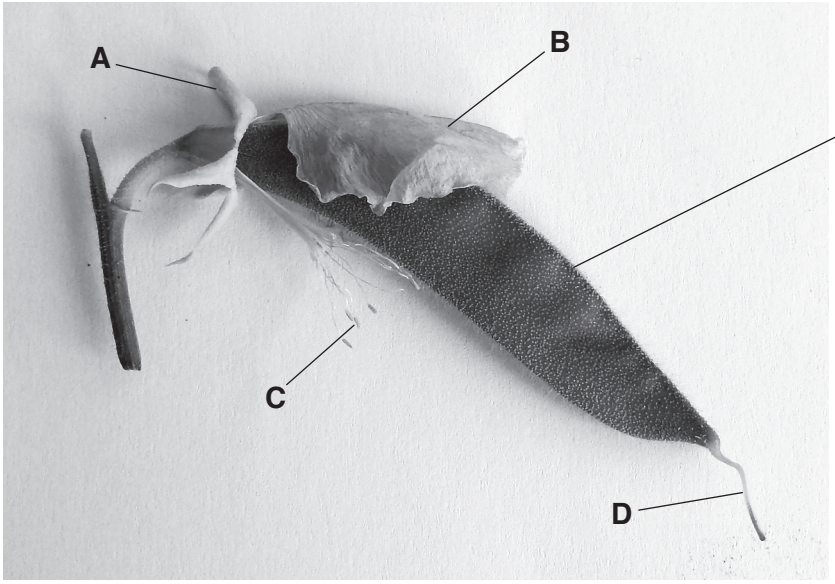

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Fig. 2.2

(b) Name the parts labelled in Fig. 2.2.

A .....

B .....

C .....

D .....

[4]

(c) Sweet pea seeds have a very hard testa (seed coat). Some growers say that the seeds germinate more successfully if a small part of the testa is cut out before planting.

(i) Suggest how cutting out a small part of the testa may help the seed to germinate.

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.....[1]

(ii) Design, giving details, an investigation to determine whether cutting out a small part of the testa improves the germination of sweet pea seeds.

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.....[4]

[Total: 10]

[Turn over

3 Fig. 3.1 shows some starch grains in a potato cell as seen under a microscope.

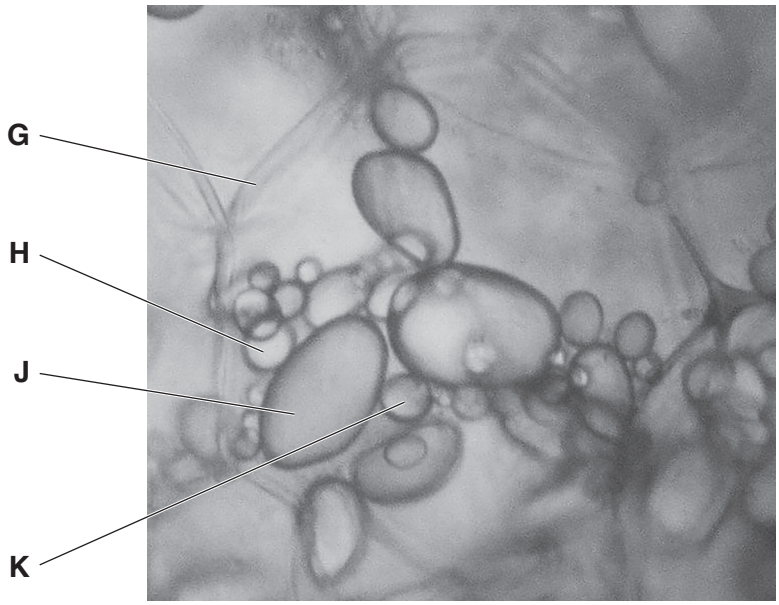

Fig. 3.1

(a) State the name of the structure labelled **G** in Fig. 3.1.

G ..... [1]

(b) In the space below make a large drawing of the starch grains labelled **H**, **J** and **K** as they appear in Fig. 3.1.

[3]

(c) **(i)** Draw a line on your drawing of grain **J** to indicate its maximum length.

Measure this length and record it.

..... mm [2]

(ii) The actual length of grain **J** is 0.03 mm. Calculate the magnification of your drawing and show your working.

magnification × ..... [2]

(d) Describe how you would prepare a slide of potato tissue to observe starch grains as clearly as possible under a microscope.

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.....[4]

[Total: 12]

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