Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

8239747036

BIOLOGY **5090/61**

Paper 6 Alternative to Practical **October/November 2017**

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 **10** printed pages and **2** blank pages.

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

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

Some students investigated whether yeast is active in solutions of different sugars.

Four test-tubes were set up as shown in Fig. 1.1.

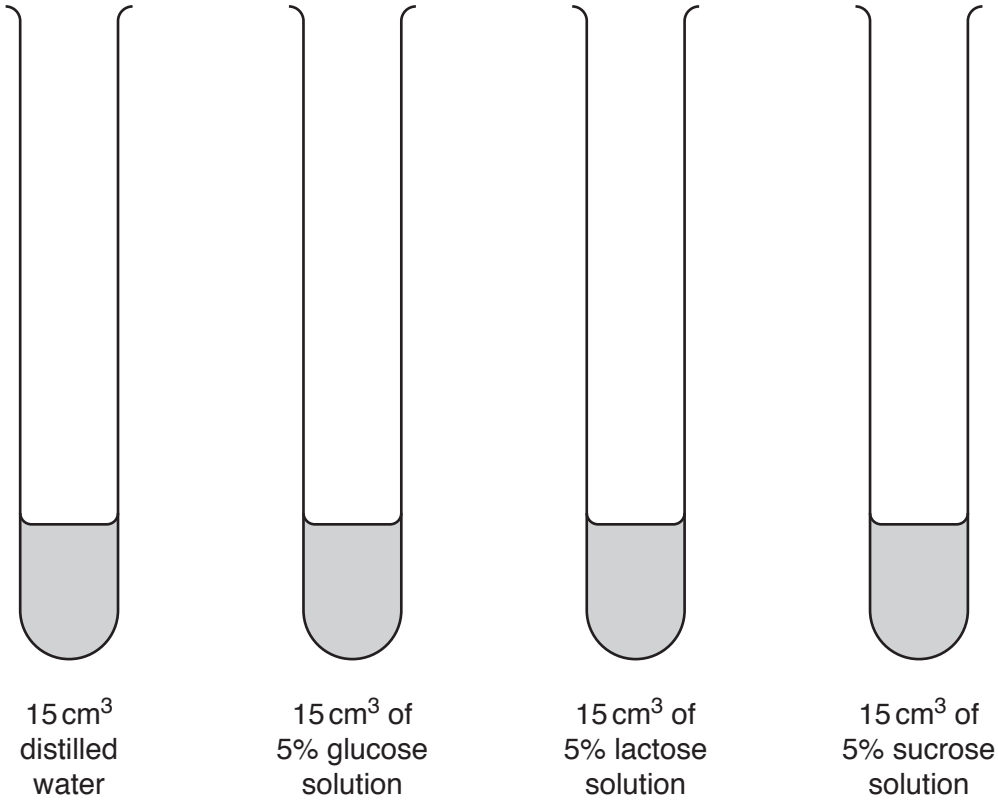


Fig. 1.1

- A large beaker was set up as a water bath with the water at 40 °C. This temperature was maintained throughout the investigation.
- The four labelled test-tubes as in Fig. 1.1 were placed in the water bath and left for 5 minutes.
- 1 g of dried yeast was then added to each test-tube and the mixtures were stirred vigorously. The test-tubes were left in the water bath.
- Five minutes after adding the yeast, the height of the froth produced above the yeast mixture in each test-tube was measured and recorded in Table 1.1.
- The test-tubes were left in the water bath for another 5 minutes. Fig. 1.2 shows their appearance 10 minutes after adding the yeast.

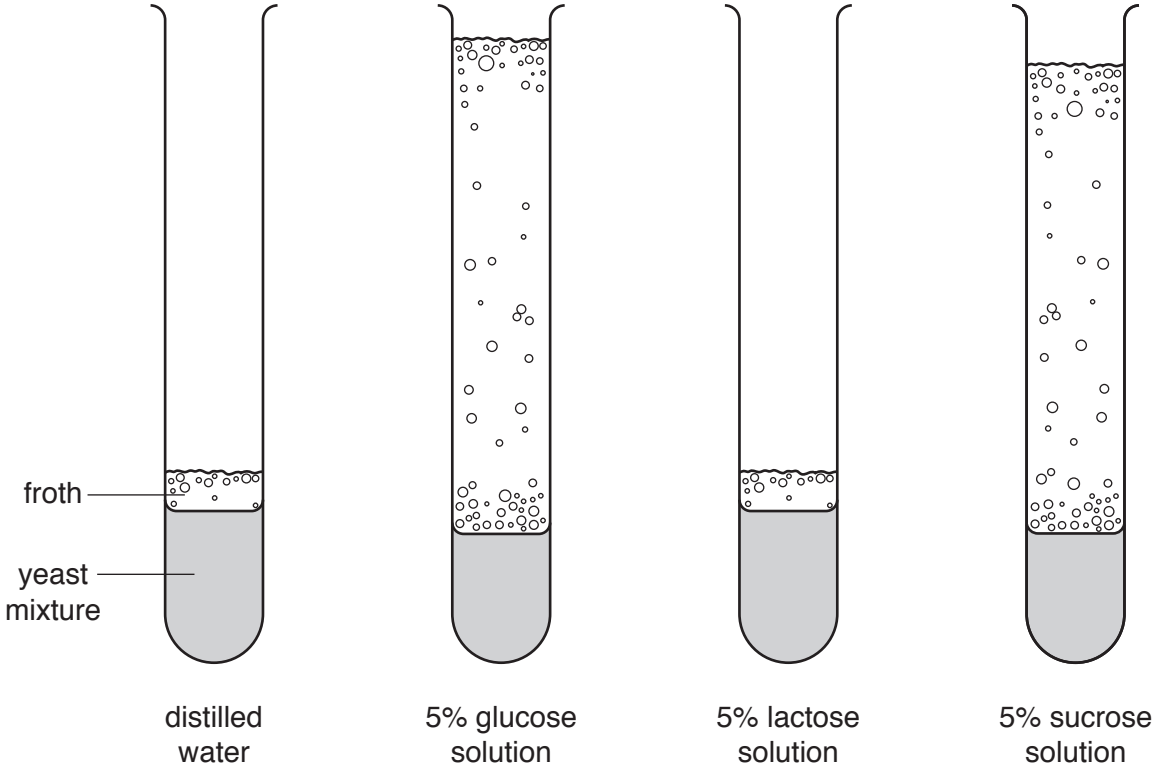


Fig. 1.2

(a) **(i)** On Fig. 1.2 measure the height of the froth in each test-tube and record your results in Table 1.1. The value for glucose has already been entered.

Table 1.1

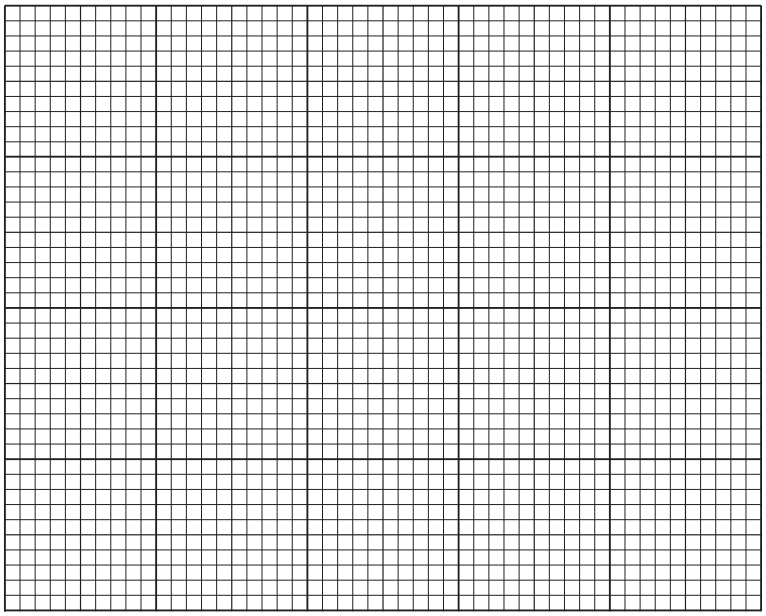
solution	**height of froth/mm**	
	after 5 minutes	**after 10 minutes**
distilled water	5	.....
5% glucose solution	25	65
5% lactose solution	5	.....
5% sucrose solution	22	.....

[2]

(ii) Calculate the increase in the height of froth produced using glucose solution between 5 and 10 minutes.

.....[1]

(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.

.....

.....

.....

.....

.....

.....[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 test-tubes in Fig. 1.1 were placed in the water bath for 5 minutes before the yeast was added.

.....

.....[1]

(iv) Explain how the students could have ensured that the temperature of the water bath remained at 40 °C during the investigation.

.....

.....[1]

(v) Explain why the test-tube with yeast and distilled water was used in the investigation.

.....

.....[1]

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

.....

.....

.....[1]

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

.....

.....

.....

.....[2]

[Total: 18]

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Question 2 begins on page 8.

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

magnification ×1

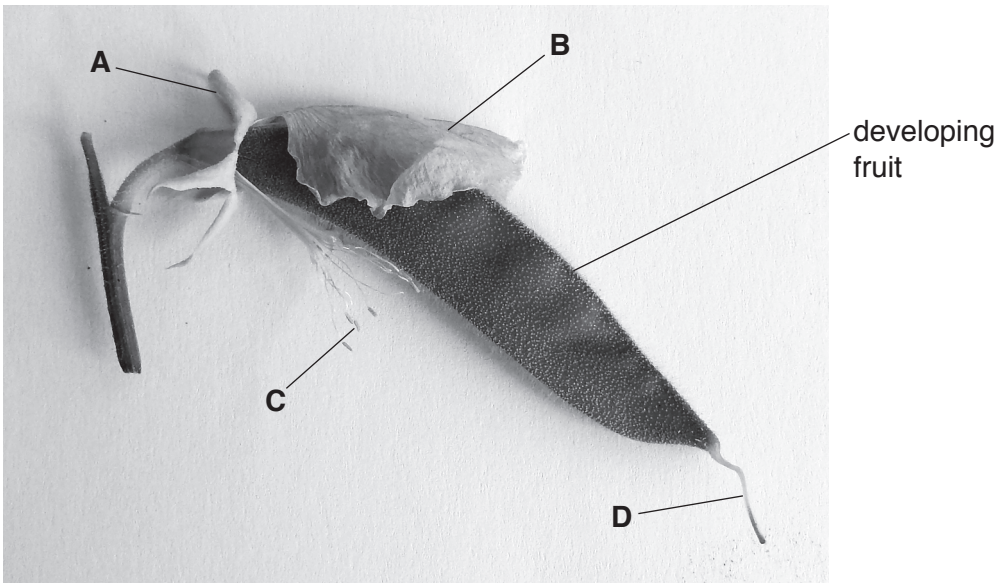
Fig. 2.1

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

.....

.....[1]

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



magnification ×2

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.

.....

.....[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]

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

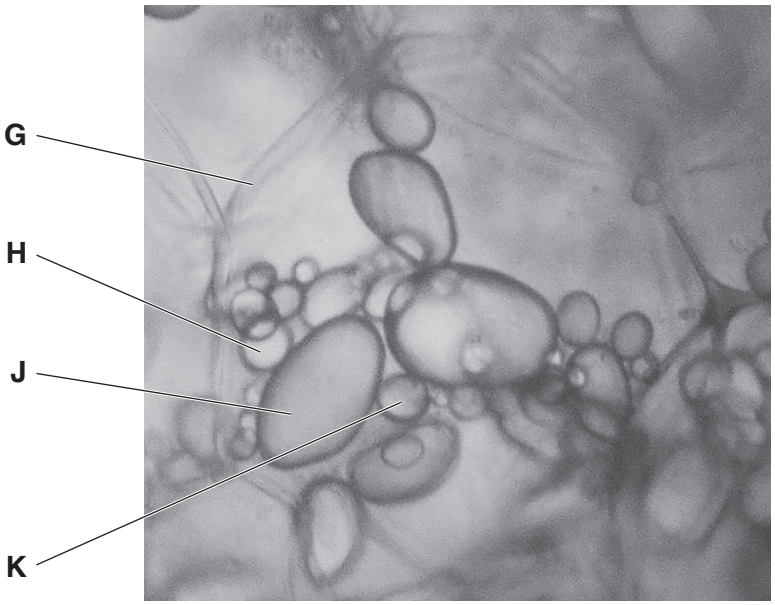

Fig. 3.1

(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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.....

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.....[4]

[Total: 12]

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