Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/52**

Paper 5 Practical Test **October/November 2021**

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	
Total	

This document has **12** pages. Any blank pages are indicated.

[Turn over

1 You are going to investigate the effect of temperature on the rate of respiration in yeast cells. When yeast cells respire they produce carbon dioxide gas.

Read all the instructions but DO NOT CARRY THEM OUT until you have drawn a table for your results in the space provided in 1(a)(i).

You should use the safety equipment provided while you are carrying out the practical work.

Step 1 Label the empty 250 cm^3 beaker **hot water-bath**.

Step 2 Raise your hand when you are ready for hot water to be put into your **hot water-bath**.

Step 3 Measure the temperatures of the water in the **hot water-bath** and in the beaker labelled **cold water-bath**. Record these values in Table 1.1 in **1(c)(i)**.

Step 4 Lay the balloons flat on the table. Use the marker pen to mark the widest point of each balloon, as shown in Fig. 1.1.

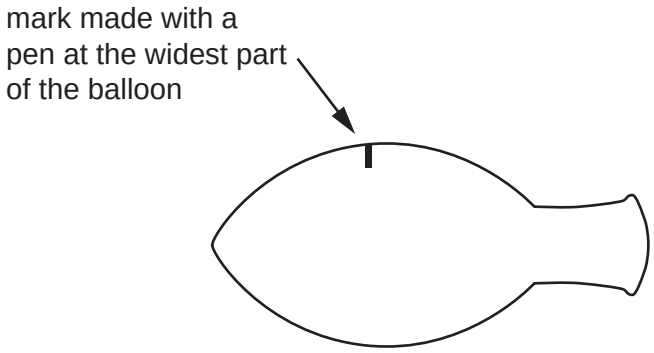

Fig. 1.1

Step 5 Stir the yeast suspension with the glass rod. Use the measuring cylinder to put 25 cm^3 of the yeast suspension into each of the test-tubes.

Step 6 Carefully stretch the open end of one balloon over the top of one test-tube, as shown in Fig. 1.2. Repeat this with the remaining balloon and the other test-tube.

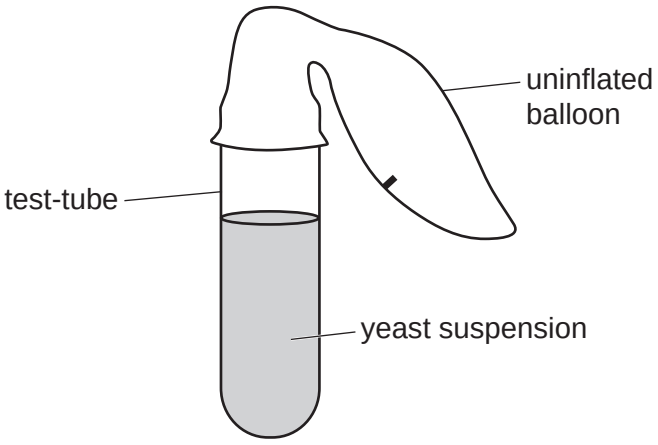

Fig. 1.2

Step 7 Place one test-tube in the **hot water-bath** and the other test-tube in the **cold water-bath**.

Step 8 Measure the circumferences of the balloons at 0 minutes. Do this by placing the string around the widest part of the balloon on the test-tube in the **hot water-bath**, at the mark you made in step 4. This is shown in Fig. 1.3.

Use the ruler to measure the length of the string that is required to wrap around the balloon once. This is the circumference of the balloon.

Repeat this with the balloon on the test-tube in the **cold water-bath**.

Record these measurements in your table in **1(a)(i)**.

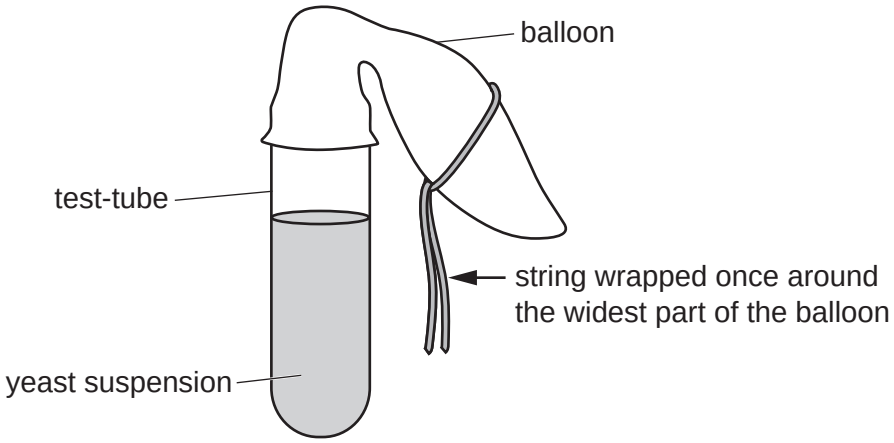

Fig. 1.3

Step 9 Start the stop-clock and leave the test-tubes in the water-baths.

Step 10 After 5 minutes, 10 minutes and 15 minutes repeat step 8. This will give you a total of four measurements for the circumference of each balloon.

Step 11 Measure the final temperatures of the water in the **hot water-bath** and in the **cold water-bath**. Record these values in Table 1.1 in **1(c)(i)**.

Do **not** remove the balloons from the test-tubes.

(a) (i) Prepare a table to record your results from step 8 and step 10.

[4]

(ii) State a conclusion for these results.

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..... [1]

(iii) Suggest why it was important to stir the yeast suspension in step 5.

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..... [1]

(iv) State **two** variables, other than stirring, that were kept constant in this investigation.

1 .....

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2 .....

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[2]

(b) (i) Balloons and string were used to collect and measure the gas produced by the yeast cells.

Suggest another, more accurate, method of collecting and measuring the gas.

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..... [1]

(ii) State the name of an indicator which could be used to show that the gas produced by the yeast is carbon dioxide and give the result of a positive test.

indicator .....

positive test result .....
[2]

(c) (i) Record your temperature measurements from step 3 and step 11 in Table 1.1.

Complete Table 1.1 by calculating the change in temperature in each water-bath from step 3 to step 11.

Table 1.1

water-bath	temperature in step 3 / °C	temperature in step 11 / °C	change in temperature / °C
hot			
cold			

[2]

(ii) Describe how the method could be modified to prevent a change in the temperature of the water-baths.

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..... [1]

[Total: 14]

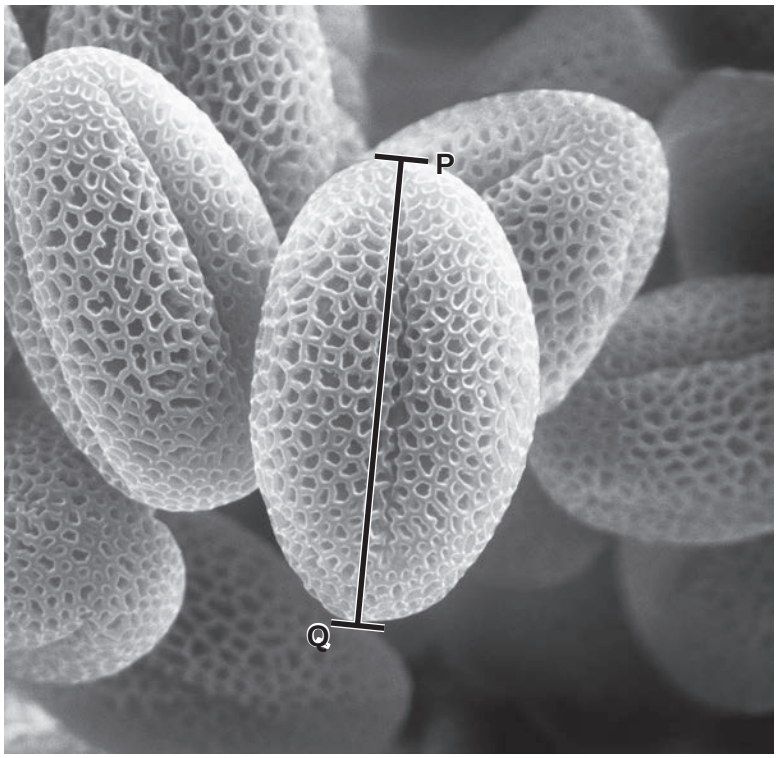
2 Fig. 2.1 is a photograph of a flower from the wind-pollinated grass plant, *Briza maxima*.

Fig. 2.1

(a) (i) Draw a large diagram of the flower in Fig. 2.1.

[4]

(ii) Fig. 2.2 is a photomicrograph of grass pollen grains.



magnification ×1500

Fig. 2.2

Measure the length of line **PQ** on Fig. 2.2.

length of **PQ** ..... mm

Calculate the actual length of the pollen grain using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ}}{\text{actual length of the pollen grain}}$$

Give your answer in millimetres and to **two** decimal places.

Space for working.

..... mm
[3]

(b) Scientists investigated the effect of wind speed on the average distance travelled by single pollen grains and groups of five pollen grains joined to form a clump. The pollen grains were dropped from a height of 2 m.

The results of the investigation are shown in Table 2.1.

Table 2.1

wind speed / m per s	average distance travelled by single pollen grains / m	average distance travelled by clumps of five pollen grains / m
0.0	0	0
0.2	38	21
0.4	81	39
0.6	118	55
0.8	154	70

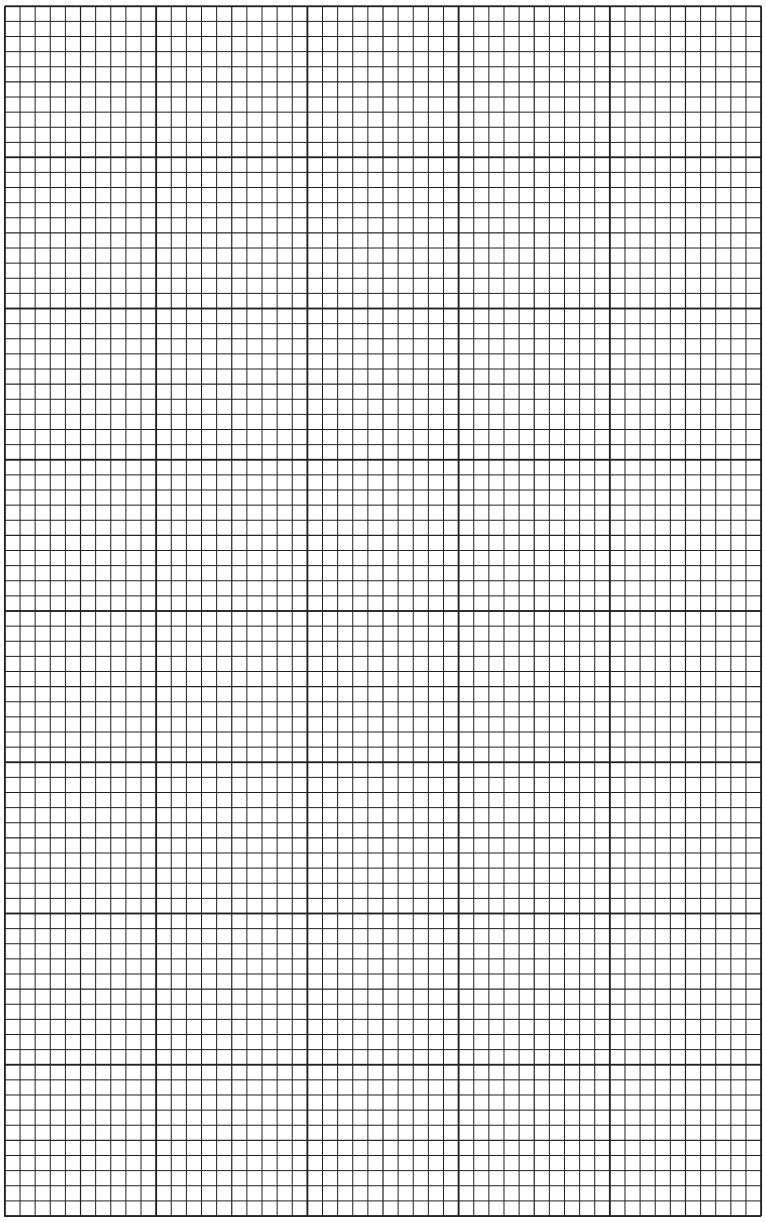
(i) Calculate the percentage decrease in the average distance travelled when the pollen grains fell as a clump compared to a single pollen grain, at a wind speed of 0.6 m per s.

Give your answer to **two** significant figures.

Space for working.

.....%
[3]

(ii) Plot a line graph on the grid of the data in Table 2.1. Include both sets of data and a key.



[5]

(iii) Use your graph to estimate the average distance travelled by **single** pollen grains at a wind speed of 0.5 m per s.

Show on your graph how you obtained your estimate.

..... m
[2]

(iv) Successful pollination results in fertilisation and the production of seeds.

State the test that would show that the seeds contain protein. Include the result of a positive test.

test .....

positive test result .....
[2]

(c) (i) Plan an investigation to determine the effect of temperature on the rate of transpiration from leaves.

You may wish to include the apparatus listed and any other apparatus that you think is suitable in your plan:

- leafy plants
- electronic balance
- thermometer
- string
- stop-clock

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..... [6]

(ii) Humidity also affects the rate of transpiration from leaves.

Suggest how you could change the humidity that the leaves are exposed to in a transpiration investigation.

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..... [1]

[Total: 26]

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