Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/53**

Paper 5 Practical Test **October/November 2025**

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	
3	
Total	

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

© UCLES 2025

1 Yeast cells produce an enzyme called invertase. Invertase catalyses the breakdown of sucrose into reducing sugars. Sucrose is **not** a reducing sugar.

You are going to investigate the effect of two different concentrations of invertase extract on a sucrose solution.

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

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

Step 1 Label three test-tubes **A**, **B** and **W**.

Step 2 Use a syringe to put 2 cm^3 of sucrose solution into all three test-tubes.

Step 3 Use a clean syringe to put 2 cm^3 of 100% invertase extract into test-tube **A**.

Step 4 Use a clean syringe to put 2 cm^3 of 10% invertase extract into test-tube **B**.

Step 5 Use a clean syringe to put 2 cm^3 of distilled water into test-tube **W**.

Step 6 Put all three test-tubes into the beaker labelled **warm water-bath** for 15 minutes.

Continue with the other questions while you are waiting.

Step 7 After 15 minutes, measure the temperature of the water in the warm water-bath.

View solution

(a) Record the water-bath temperature you measured in step 7.

temperature of the water ..... °C [1]

Step 8 Use a clean syringe to add 4 cm^3 of Benedict's solution to all three test-tubes.

Step 9 Raise your hand when you are ready for hot water to be added to the beaker labelled **hot water-bath**.

Step 10 Place all three test-tubes into the hot water-bath and start the stop-clock. Leave the test-tubes in the water-bath for five minutes.

Step 11 After five minutes, record the **colour** of the liquid in each test-tube in your table in **1(b)**.

© UCLES 2025

(b) Prepare a table and record your results.

View solution

[4]

(c) State a conclusion for the results shown in test-tube **A** and test-tube **B**.

View solution

.....

.....

..... [1]

(d) Explain the purpose of test-tube **W**.

View solution

.....

.....

.....

..... [2]

(e) State the independent variable in this investigation.

View solution

..... [1]

(f) Explain why the test-tubes were placed in the warm water-bath in step 6.

View solution

.....

.....

..... [1]

(g) Explain why a clean syringe was used in steps 3, 4 and 5.

.....

.....

..... [1]

[Total: 11]

View solution

2 A student investigated the effect of temperature on the rate of respiration in yeast cells.

They used the apparatus shown in Fig. 2.1.

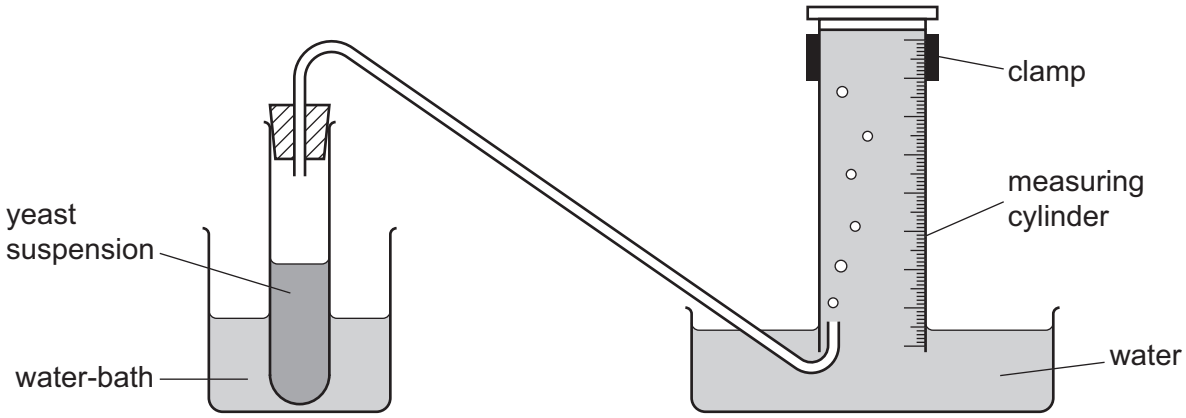


Fig. 2.1

The student used this method:

- Put 25 cm^3 of yeast suspension into a test-tube.
- Put the test-test into a water-bath and add water at 10 °C to the water-bath.
- Leave the apparatus for five minutes before moving on to the next step.
- Start a stop-clock and count the number of bubbles produced by the respiring yeast cells in three minutes.
- Repeat the procedure using a water-bath maintained at different temperatures.

View solution

(a) (i) State **two** variables that the student kept constant in this investigation.

1 .....

.....

2 .....

.....

[2]

(ii) State **one** possible source of error when measuring the dependent variable **and** suggest an improvement to this method of measuring.

error .....

.....

improvement .....

.....

.....

[2]

View solution

(b) Table 2.1 shows the results of the investigation.

View solution

Table 2.1

water-bath temperature / °C	number of bubbles produced in 3 minutes	rate of bubble production / bubbles per minute
10	33	11
20	45	15
30	79	
40	112	37
50	124	41
60	37	12

(i) Calculate the rate of bubble production at 30 °C.

Give your answer to an appropriate number of significant figures.

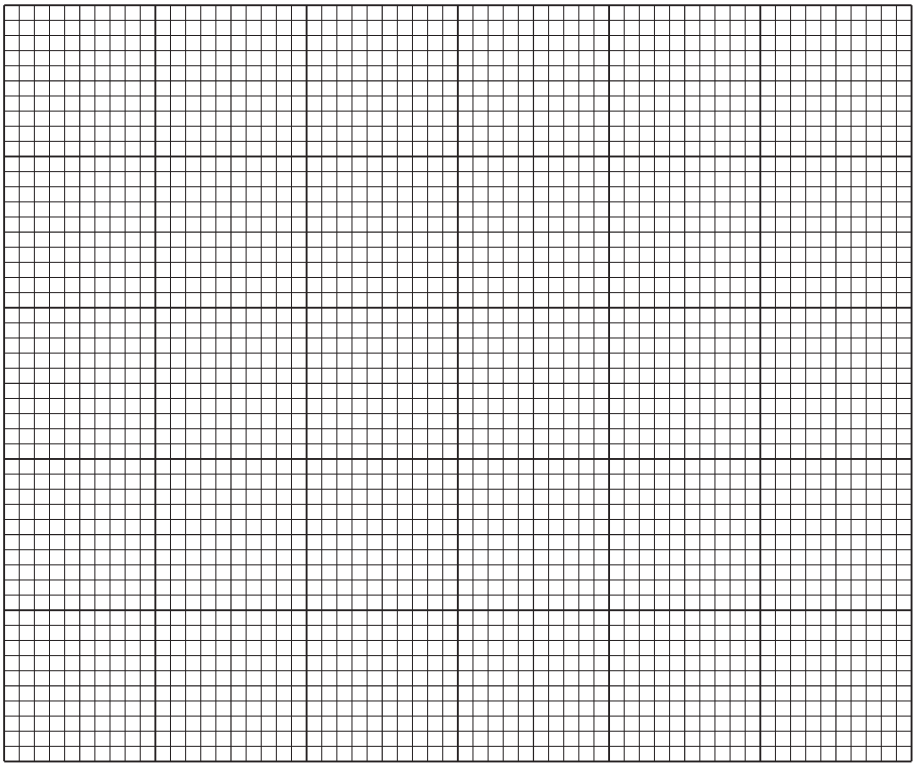
Space for working.

..... bubbles per minute [2]

© UCLES 2025

(ii) Plot the data in Table 2.1 on the grid to show the effect of temperature on the **rate** of bubble production.

View solution



[4]

(iii) Describe the results of this investigation.

View solution

.....

.....

.....

.....

..... [2]

(c) Describe how the student could confirm that the gas produced is carbon dioxide.

View solution

.....

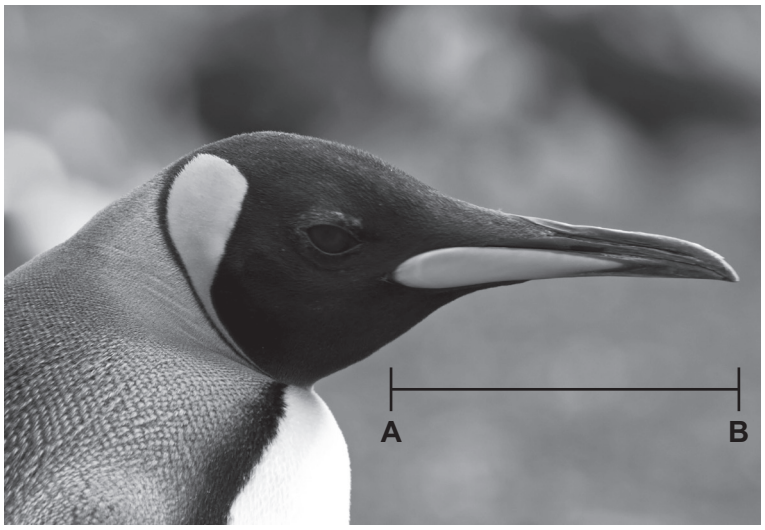
.....

..... [2]

[Total: 14]

3 **(a)** Fig. 3.1 is a photograph of the head of a king penguin.

View solution



magnification ×0.42

Fig. 3.1

(i) Make a large drawing of the head of the king penguin shown in Fig. 3.1.

[4]

View solution

(ii) The length of line **AB** represents the length of the penguin's beak.

Measure the length of line **AB** in Fig. 3.1.

length of line **AB** ..... mm

Use your measurement and the formula to calculate the actual length of the penguin's beak.

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ in Fig. 3.1}}{\text{actual length of the penguin's beak}}$$

Give your answer to **one** decimal place.

Space for working.

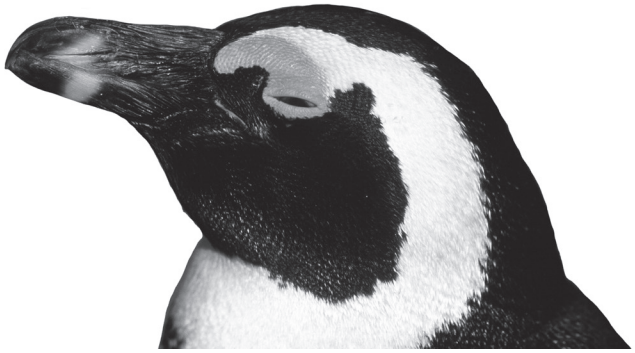
..... mm
[3]

(b) Fig. 3.2 shows the heads of a gentoo penguin and a black-footed penguin.

View solution



gentoo



black-footed

not to scale

Fig. 3.2

Other than size, state **two** ways the gentoo penguin differs from the black-footed penguin in Fig. 3.2.

1 .....

.....

2 .....

.....

[2]

(c) Penguins are covered in feathers. The feathers reduce heat loss by insulating the birds from the cold.

View solution

A beaker of hot water can be used to represent a penguin.

Plan an investigation to determine the effect of the thickness of an insulating material on heat loss in a beaker of hot water.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 15]

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2025