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BIOLOGY

0610/52

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 **16** pages. Any blank pages are indicated.

- 1 You are going to investigate the rate of respiration in yeast using different concentrations of glucose.

You will use a 5% glucose solution to make a 1% glucose solution and a 4% glucose 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(a)(i).

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

Step 1 Label two small test-tubes **1%** and **4%**. Put the small test-tubes in the test-tube rack.

Step 2 Put 1 cm³ of 5% glucose solution into the small test-tube labelled **1%**.

Put 4 cm³ of 5% glucose solution into the small test-tube labelled **4%**.

Step 3 Put 4 cm³ of distilled water into the small test-tube labelled **1%**.

Put 1 cm³ of distilled water into the small test-tube labelled **4%**.

Step 4 Raise your hand when you are ready for hot water to be added to the water-bath.

Step 5 Pour yeast suspension into the small test-tube labelled **1%** until it is completely full.

Step 6 Keep the small test-tube upright and carefully place a large test-tube over the top of the small test-tube labelled **1%**. Gently push the small test-tube up to the top of the large test-tube, as shown in Fig. 1.1A.

Step 7 Keep the small test-tube in place with your finger and then quickly turn the test-tubes so they are inverted, as shown in Fig. 1.1B. It does not matter if a small amount of air remains at the top of the small test-tube when it is inverted.

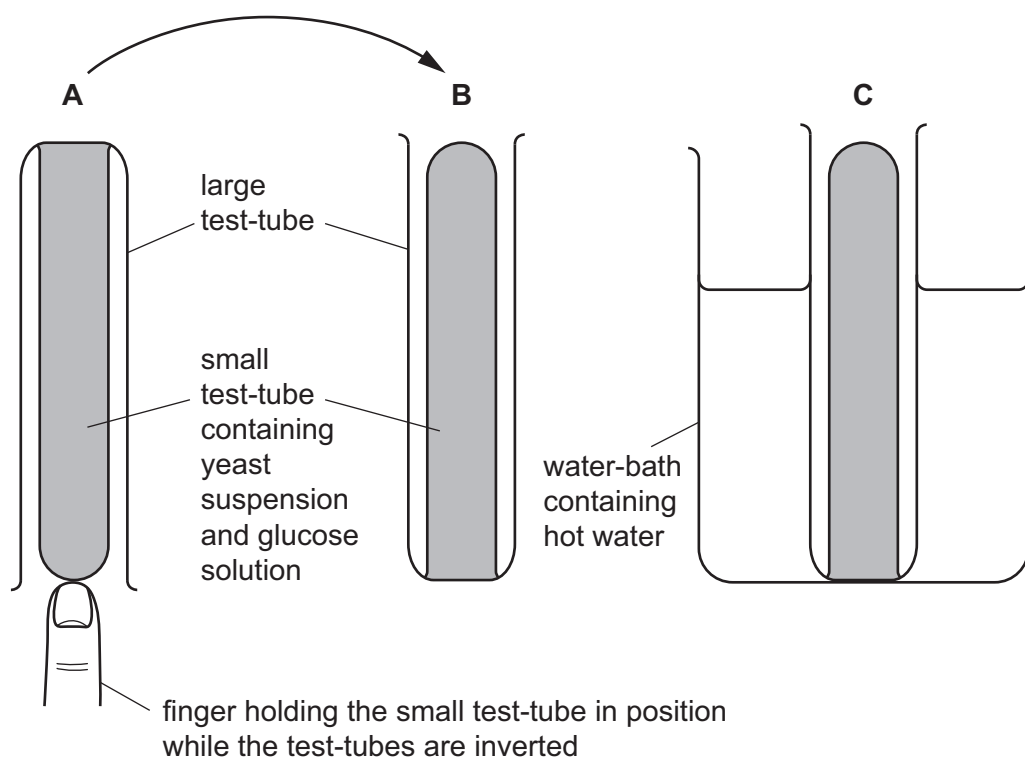


Fig. 1.1



- Step 8 Put the large test-tube and the small test-tube labelled **1%** into the water-bath, as shown in Fig. 1.1C.
- Step 9 Start the stop-clock and wait for five minutes.
- Step 10 After five minutes, stop the stop-clock and use the ruler to measure the height of the yeast suspension in the **large** test-tube, as shown in Fig. 1.2. Record the measurement in your table in **1(a)(i)**.

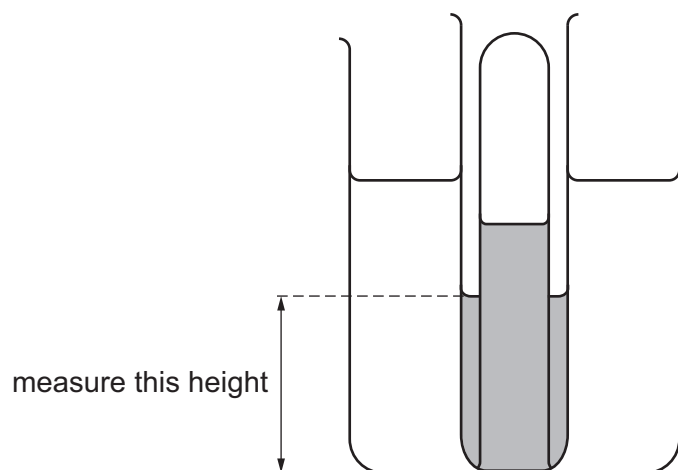


Fig. 1.2

- Step 11 Remove the test-tubes from the water-bath, and place them back in the test-tube rack.
- Step 12 Pour yeast suspension into the small test-tube labelled **4%** until it is completely full.
- Step 13 Repeat steps 6 to 10 with the small test-tube labelled **4%** and the remaining empty large test-tube.





(a) (i) Prepare a table and record your results.

[4]

(ii) State a conclusion for your results.

.....

.....

..... [1]

(iii) State the independent and dependent variables in this investigation.

independent variable

.....

dependent variable

..... [2]

(iv) Describe how the temperature of the water-bath could be maintained.

.....

.....

..... [1]



- (v) Identify **one** possible source of error when measuring the height of the yeast suspension in step 10.

.....

 [1]

- (b) A student extended the investigation by using more concentrations of glucose solution.

Calculate the volumes of 5% glucose solution and distilled water that are needed to make 5 cm³ of a 3% glucose solution.

volume of 5% glucose solution cm³

volume of distilled water cm³
 [1]

- (c) Sports drinks often contain glucose, which is a reducing sugar.

State how you could test a sample of a sports drink for reducing sugar.

.....

 [2]

- (d) (i) The ethanol emulsion test can be used to show that a sample of food contains fat.

State the result of a positive test.

..... [1]

- (ii) Suggest **one** safety precaution that should be followed when using ethanol.

.....

 [1]

[Total: 14]





2 Plan an investigation to determine the effect of exercise intensity on heart rate in humans.

[6]





- 3 (a) Fig. 3.1 is a photograph of a necklace starfish, *Fromia monilis*.

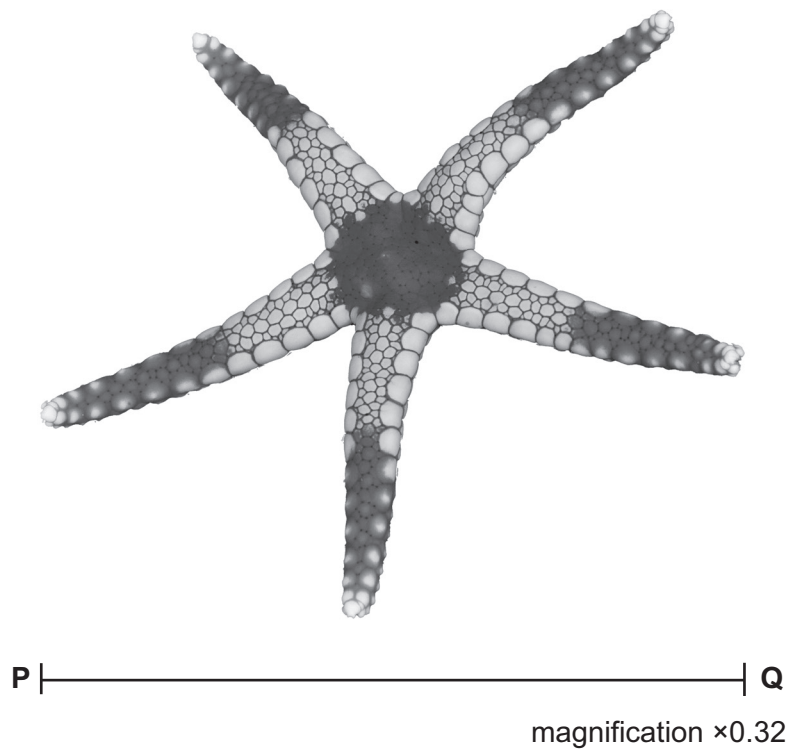


Fig. 3.1





- (i) Draw a large diagram of the necklace starfish shown in Fig. 3.1.

[4]

- (ii) Line **PQ** in Fig. 3.1 represents the diameter of the necklace starfish.

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

length of **PQ** mm

Calculate the actual diameter of the necklace starfish using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line PQ in Fig. 3.1}}{\text{actual diameter of the necklace starfish}}$$

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

Space for working.

..... mm

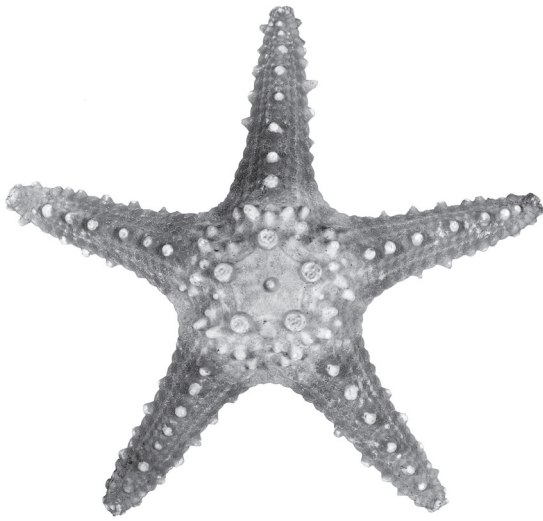
[3]

[Turn over]



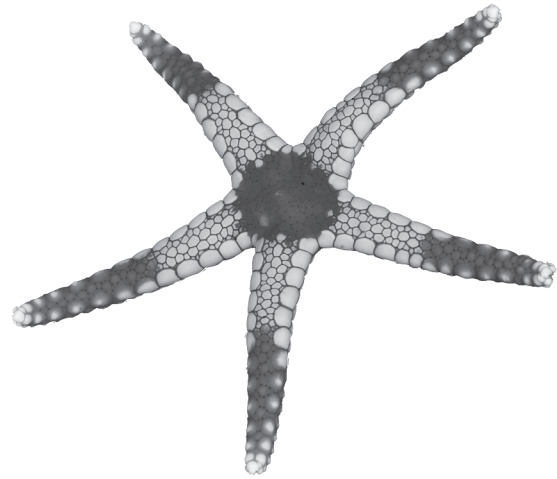
- (iii) Fig. 3.2 is a photograph of a spiny starfish, *Marthasterias glacialis*. Fig. 3.3 is a photograph of a necklace starfish.

The magnifications of the photographs are **not** the same.



spiny starfish

Fig. 3.2



necklace starfish

Fig. 3.3

State **two** ways the spiny starfish in Fig. 3.2 differs from the necklace starfish in Fig. 3.3, and **one** way it is similar.

Do **not** include references to size in your answer.

difference 1

.....

difference 2

.....

similarity 1

.....

[3]



(b) Seven-armed starfish live in the sea.

Scientists investigated the distribution of seven-armed starfish, *Luidia ciliaris*, in one region.

- Photographs of 20 m² areas of seabed were taken at different depths.
- The depth of the water in each area was measured when the water was at its highest level (high tide).
- The numbers of seven-armed starfish in each photograph were counted.
- All photographs were taken on the same day in July.

- (i) State **two** ways that the method used by the scientists ensured that the numbers of seven-armed starfish counted at different depths could be compared.

1

.....

2

.....

[2]

The results of the investigation are shown in Table 3.1.

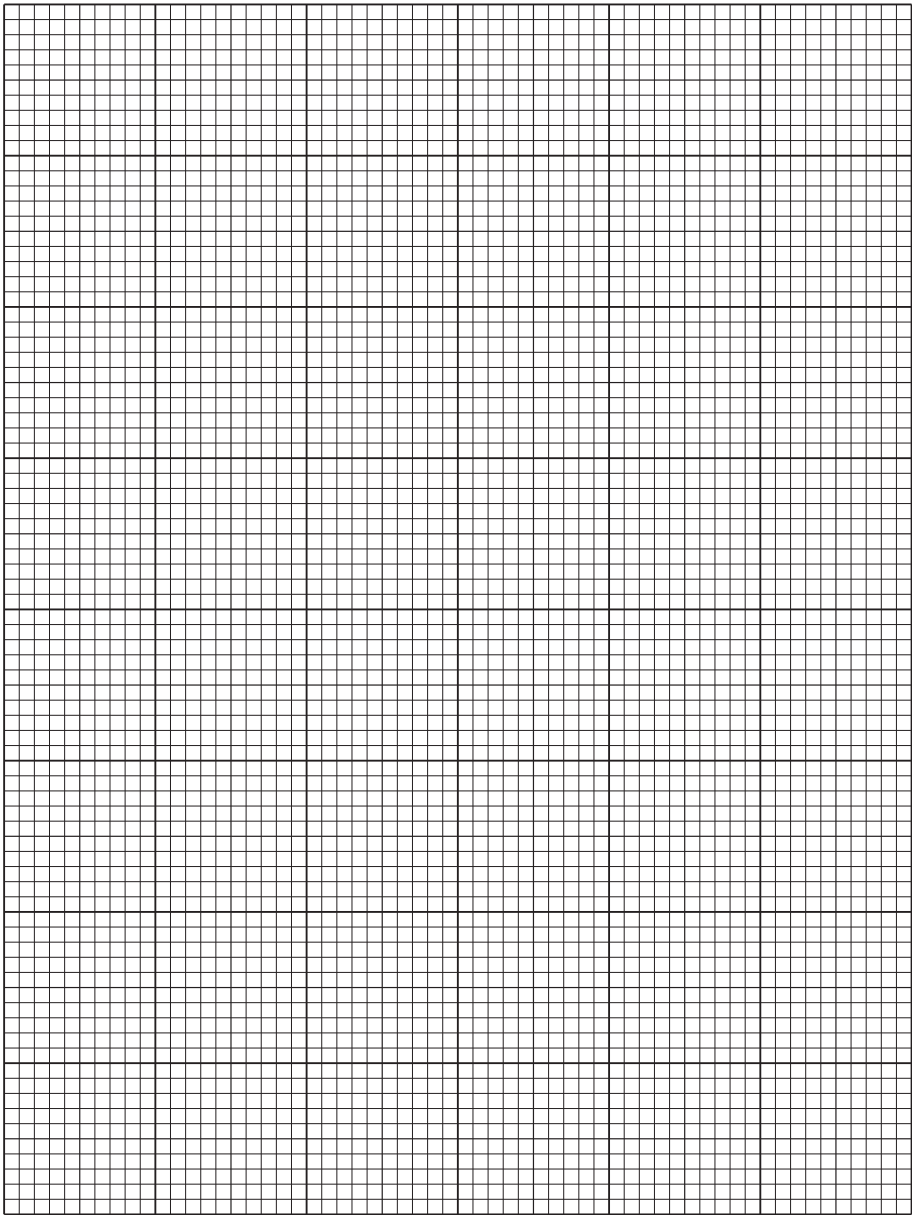




Table 3.1

| depth/m | number of seven-armed starfish counted |
|-----------|--|
| 0.0–9.9 | 337 |
| 10.0–19.9 | 1486 |
| 20.0–29.9 | 1243 |
| 30.0–39.9 | 241 |
| 40.0–49.9 | 121 |

(ii) Plot a histogram on the grid of the data in Table 3.1.



- (iii) State the depth range in Table 3.1 at which most seven-armed starfish were found.

.....m [1]

- (iv) Using the information in Table 3.1, calculate the total number of seven-armed starfish that were photographed at all depths, and use this value to calculate the percentage of starfish that were photographed in the 0.0–9.9m range.

Express the percentage as a whole number.

Space for working.

total number of seven-armed starfish photographed

percentage of seven-armed starfish photographed at 0.0–9.9m%
[3]

[Total: 20]









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