



Cambridge O Level

CANDIDATE
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BIOLOGY

5090/03

Paper 3 Practical Test

For examination from 2023

SPECIMEN PAPER

1 hour 30 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 **10** pages. Any blank pages are indicated.

In order to plan the best use of your time, read through all the questions on this paper carefully before starting work.

- 1** You are going to determine the concentration of glucose solution **X**.
Benedict's solution is used to test for reducing sugars, such as glucose.

You are provided with Benedict's solution and five test-tubes containing 5 cm³ of:

distilled water labelled **W**

0.2% glucose solution labelled **A**

0.4% glucose solution labelled **B**

0.6% glucose solution labelled **C**

unknown glucose solution labelled **X**

- Using the measuring cylinder or syringe provided, add 5 cm³ of Benedict's solution to each of these five test-tubes.
 - Place the test-tubes in a beaker to use as a water-bath.
 - When ready, raise your hand to request hot water which the supervisor will pour into your water-bath. **Caution: the water will be hot.**
 - Record the start time when the hot water was added to the water-bath in **(a)(i)**.
 - Leave the test-tubes for 10 minutes. **While you are waiting, start Question 2.**
- (a) (i)** After 10 minutes remove the test-tubes from the water-bath and place them in the test-tube rack. Record the time.

start time

time when test-tubes removed

[1]

(ii) Record the colours of the contents of each test-tube in Table 1.1.

Table 1.1

| test-tube | glucose solution concentration (%) | observations |
|-----------|------------------------------------|--------------|
| W | 0.0 (distilled water) | |
| A | 0.2 | |
| B | 0.4 | |
| C | 0.6 | |
| X | unknown | |

[4]

(b) (i) Using your observations in Table 1.1, estimate the % concentration of glucose solution **X**.
 concentration of glucose solution **X**% [1]

(ii) Explain how you estimated this concentration.

 [1]

(iii) Suggest how you could determine a more accurate % concentration for glucose solution **X**.

 [2]

(c) Explain why it was important to test distilled water with Benedict's solution.

.....
..... [1]

(d) A student is given a 1.0% glucose solution.

Describe how the student should use it to produce 5 cm³ of 0.5% glucose solution.

.....
.....
.....
.....
..... [2]

Approximately 20 minutes after removing the test-tubes from the water-bath, observe them again and answer **1(e)(i)** and **1(e)(ii)**.

(e) (i) Describe the contents of the test-tubes now, compared to when you first placed them in the test-tube rack.

.....
.....
.....
..... [2]

(ii) Solids may form after the Benedict's test.
Suggest how you could separate any solid from a solution and obtain its mass.

.....
.....
.....
..... [2]

[Total: 16]

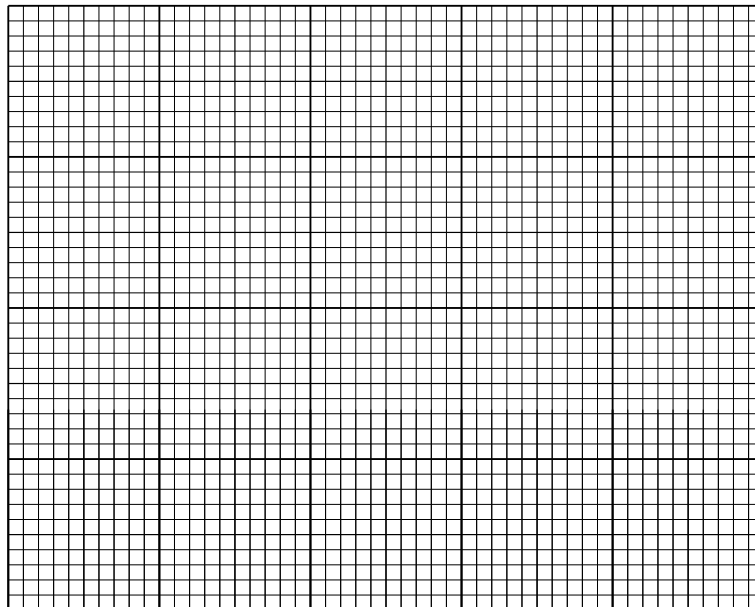
- 2 Carrots are a food containing vitamin C. They can be frozen to be preserved and stored.

Some students measured the vitamin C content of fresh and frozen carrots. They then boiled the carrots in water and measured the vitamin C content again. Their results are shown in Table 2.1.

Table 2.1

| carrots | vitamin C / mg per 100 g |
|----------------|-----------------------------|
| fresh | 5.9 |
| fresh, boiled | 3.6 |
| frozen | 2.5 |
| frozen, boiled | 2.3 |

- (a) Construct a bar chart of the data in Table 2.1 on the grid.



[4]

- (b) (i) State which boiled carrots contained the most vitamin C.

..... [1]

- (ii) Suggest **two** conclusions the students could reach from these results.

1

.....

2

.....

[2]

- 3 The potato is a plant that can store starch grains in its cells. Fig. 3.1 shows some of these starch grains as seen under a microscope.

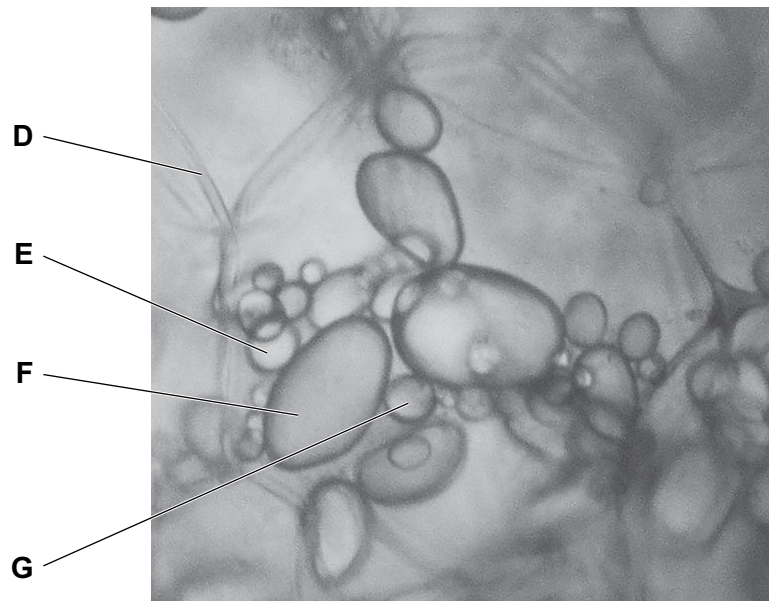


Fig. 3.1

- (a) Identify the structure labelled **D**.

..... [1]

- (b) Draw the starch grains labelled **E**, **F** and **G** as they appear in Fig. 3.1.

Grain **F** should be at least 60 mm long.

[3]

(c) (i) **On your drawing**, draw a line to indicate the maximum length of grain **F**.

Measure this length and record it.

..... mm [2]

(ii) The actual length of grain **F** is 0.03 mm. Calculate the magnification of your drawing to the nearest whole number.

Space for working

magnification × [2]

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

.....

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.....

.....

..... [3]

[Total:11]

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Question 3 © <https://commons.wikimedia.org/wiki/file:Potato-Amyloplasts.jpg>

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