



Cambridge O Level

CANDIDATE
NAME

--

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--



BIOLOGY

5090/04

Paper 4 Alternative to Practical

For examination from 2023

SPECIMEN PAPER

1 hour

You must answer on the question paper.

No additional materials are needed.

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 [].

This document has **10** pages. Any blank pages are indicated.

1 Glucose is a reducing sugar. Benedict's solution is used to test for the presence of a reducing sugar.

(a) Describe how you would use Benedict's solution to test for a reducing sugar in some fruit juice.

Include a suitable safety precaution in your answer.

.....

.....

.....

.....

..... [3]

Some students were given a 1.0% solution of glucose and some distilled water. They diluted the glucose solution to produce five solutions of different concentrations.

The students tested each of the solutions they had prepared with Benedict's solution. The concentrations of the solutions and the results of their tests are shown in Table 1.1.

Table 1.1

glucose solution concentration (%)	result of Benedict's test
0.0 (distilled water)	
0.1	slightly green
0.2	green
0.3	yellow
0.4	orange
0.5	red

(b) (i) The students also decided to test the distilled water with Benedict's solution.

Write the result of this test in Table 1.1. [1]

(ii) Explain why the students tested the distilled water.

.....

..... [1]

(c) The students compared the colour of their solutions after the same length of time.

State **three other** variables that the students should have controlled to make their results comparable.

- 1
 - 2
 - 3
- [3]

The students were then provided with a glucose solution **X** of unknown concentration. They repeated the Benedict's test in exactly the same way. They decided that the result was a yellowish-orange colour.

(d) (i) Using the results in Table 1.1, suggest what you can conclude about the % concentration of glucose in solution **X**. Explain how you reached this conclusion.

- conclusion
 - explanation
 -
- [2]

(ii) The students found it difficult to decide the exact colour of solution **X** after testing it with Benedict's solution.

Suggest a reason for this difficulty and a method which could be used to improve their confidence in deciding the colour.

- difficulty
 -
 - improvement
 -
- [2]

(e) Describe how the students could use a 1.0% glucose solution to produce 5 cm³ of a 0.5% glucose solution.

-
 -
 -
 -
- [2]

- (f) After the students had tested the glucose solutions with the Benedict's solution, they noticed that a solid had collected at the bottom of the test-tubes.

They decided that finding the mass of any solid formed was another way of measuring the concentration of glucose in the solution.

Suggest how the students could separate any solid from a solution and obtain its mass.

.....

.....

.....

..... [2]

[Total: 16]

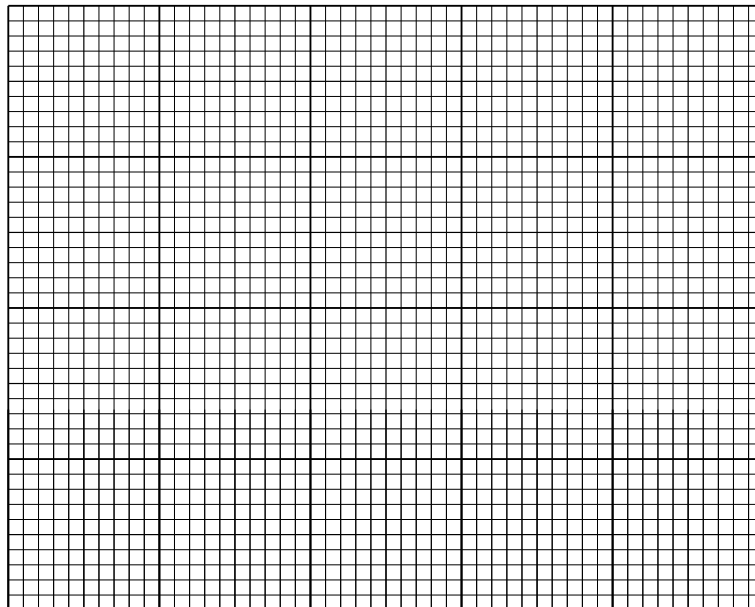
- 2 Carrots are a food containing vitamin C. They can be frozen to be preserved and stored.

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]

(c) Carrots can be cooked by heating them in an oven or by boiling them in water.

You want to investigate the effect of these two cooking methods on the vitamin C content of the cooked carrots.

Describe how you would do this investigation.

There is a simple test that can be used to measure vitamin C content. You do not need to know this test. Refer to **the vitamin C test** in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 13]

- 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.

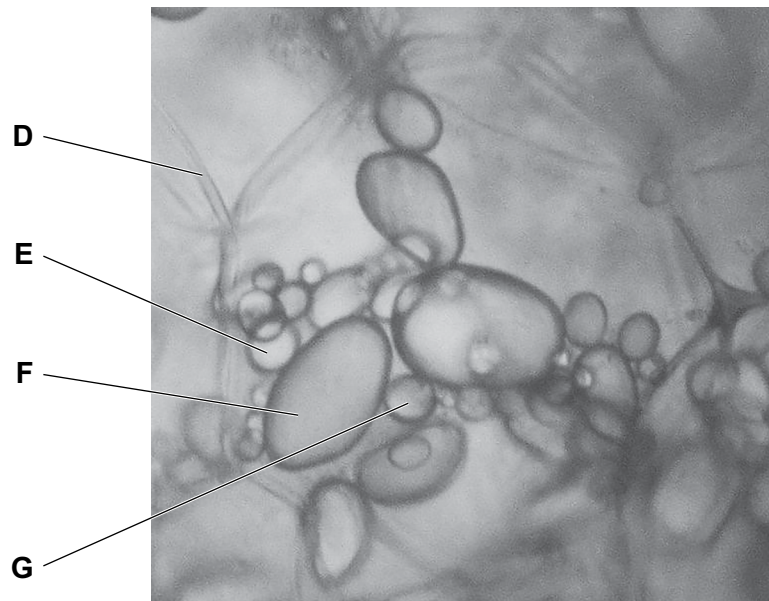


Fig. 3.1

- (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.

.....
.....
.....
.....
.....
.....
.....
.....
..... [3]

[Total:11]

Copyright Acknowledgements:

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

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.

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