Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER					

3769040646

BIOLOGY **5090/32**

Paper 3 Practical Test **October/November 2022**

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.

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

1 Yeast is a microorganism that can use the sugar sucrose to obtain energy for growth. When yeast is added to a sucrose solution it grows, producing bubbles of a gas that cannot escape from the mixture and so the volume of the mixture increases.

You are going to investigate the effect of varying the concentration of sucrose solution on the growth of yeast, by measuring this increase in volume.

You are provided with a 5% sucrose solution, distilled water and four packets which each contain 1 g of dried yeast.

- Label four test-tubes, **A**, **B**, **C** and **D**.
- Add 15 cm^3 of 5% sucrose solution to test-tube **A**.
- Add 9 cm^3 of 5% sucrose solution to test-tube **B**.
- Add 3 cm^3 of 5% sucrose solution to test-tube **C**.

Use a clean measuring device to add distilled water to the test-tubes.

- Add 6 cm^3 of distilled water to test-tube **B** to make a 3% sucrose solution.
- Add 12 cm^3 of distilled water to test-tube **C** to make a 1% sucrose solution.
- Add 15 cm^3 of distilled water to test-tube **D**.
- Mark the side of each test-tube to indicate the level of the contents. This is the starting level for each test-tube.

You are provided with a beaker to use as a water-bath for the test-tubes.

Raise your hand when you are ready to be supplied with hot water for the beaker. Use cold water to adjust the temperature to approximately 45 °C.

Place test-tubes **A**, **B**, **C** and **D** in the beaker.

Leave the test-tubes in the water-bath for 5 minutes.

After 5 minutes the temperature of the water-bath should be between 35 °C and 40 °C. If necessary use hot or cold water to adjust the temperature.

(a) **(i)** Record the temperature of the water-bath. .... °C [1]

- Add the contents of one packet of yeast to each test-tube.
- Use the glass rod to stir the yeast in each test-tube to mix it well. Wipe the rod clean between using it in each test-tube.

(ii) Record the time. This is your start time.

start time ....

Five minutes after the start time measure the distance from the starting level to the top of the yeast mixture in each test-tube. Record your results in the table.

After **10 minutes** from the start time repeat the measurements from the starting level to the top of the yeast mixture for each test-tube. Record your results in the table.

test-tube	**percentage sucrose solution**	**height of yeast mixture / mm**	
		after 5 minutes	**after 10 minutes**
A	5		
B	3		
C	1		
D	0		

[6]

Any change in the height of the mixture in each test-tube indicates a change in its volume and so of how much the yeast has grown.

(iii) Use your results to describe the effect of sucrose concentration on yeast growth.

....

....

....

....

....

.... [3]

(iv) Suggest an explanation for your results with 0% sucrose solution (distilled water).

....

....

....

.... [1]

(b) Describe **two** possible sources of error in this investigation and suggest how the method could be improved.

source of error 1 ....

....

improvement 1 ....

....

source of error 2 ....

....

improvement 2 ....

....
[4]

(c) Yeast uses sucrose to obtain energy for growth.

Suggest a simple method to demonstrate that this process requires enzymes to be present in the yeast.

....

....

....

....

....

.... [3]

[Total: 18]

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2 A student thought that seeds might germinate better in the dark than in the light.

To investigate this she set up six identical Petri dishes each with 20 seeds on moist filter paper. Three of these dishes she placed in the dark and three under lights in the laboratory. The lights were left on all the time.

After each 24-hour period she counted and recorded the total number of seeds in each dish that had germinated. She then calculated the mean numbers of seeds (to the nearest whole number) that had germinated in the light and in the dark.

Her results are shown in the table.

time / hours	**seeds germinated / mean number per Petri dish**	
	light	**dark**
0	0	0
24	0	5
48	11	15
72	13	16
96	15	17

(a) (i) Construct line graphs of the data for seeds germinated in the light and in the dark using the same axes on the grid below. Join the points with straight lines.

[5]

(ii) Use your graph to estimate the mean number of seeds that had germinated after 36 hours in the dark. Show your working on the graph.

mean number of seeds .... [2]

(iii) Use the data and your graph to suggest what the student could conclude about the effect of light and dark on the germination of these seeds.

....

....

....

.... [2]

(b) **(i)** State **two** variables other than light that the student should have controlled in her investigation.

....

.... [2]

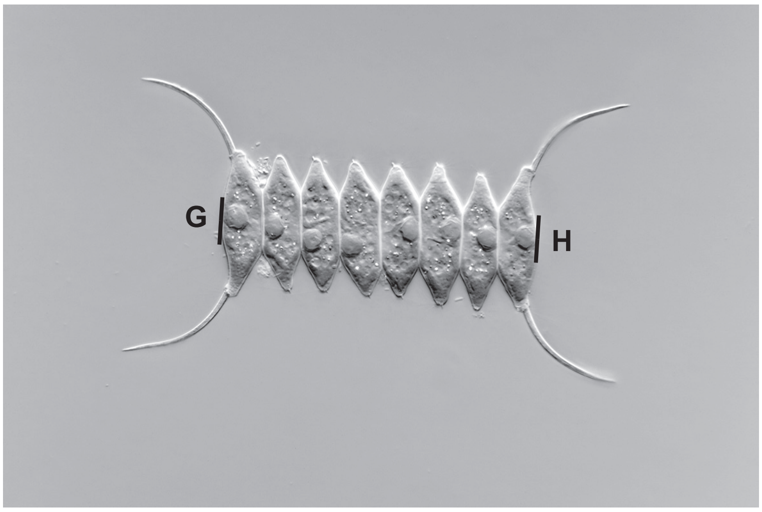
(ii) Suggest **one** reason for using 20 seeds in each of the Petri dishes in this investigation.

....

.... [1]

[Total: 12]

3 The photomicrograph shows a simple plant that lives in ponds and lakes.



magnification ×630

(a) In the space below make a large drawing of the plant as it appears in the photomicrograph.

[5]

(b) Draw a straight line on the photomicrograph to join lines **G** and **H**. Measure the length of this line and record it.

....

Use your measurement to calculate the actual length of the plant. Round your answer to 3 decimal places.

Space for working.

.... mm

[3]

(c) Describe how you would find out whether a sample of pond water contained this plant.

....

....

....

....

....

.... [2]

[Total: 10]

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