Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

BIOLOGY **5090/32**

Paper 3 Practical Test **October/November 2025**

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 **12** pages. Any blank pages are indicated.

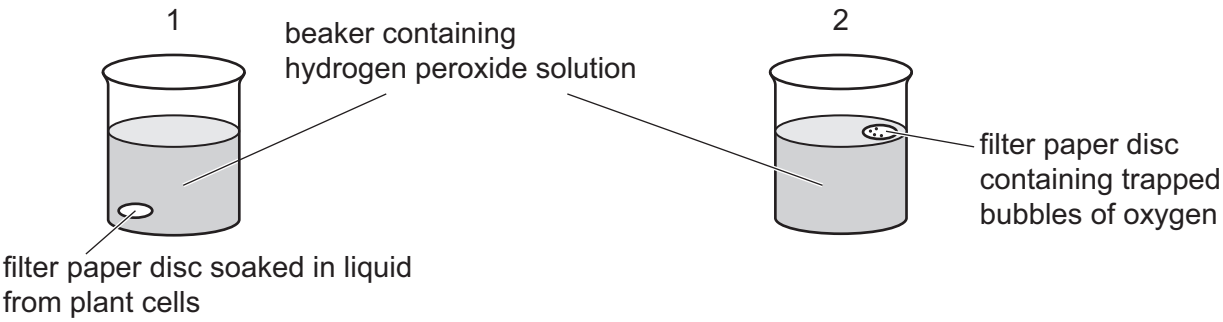
[Turn over

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

1 Hydrogen peroxide is a harmful waste product in living cells. The enzyme catalase breaks down hydrogen peroxide into water and oxygen.

You are going to investigate catalase in tissues from different plants. Small filter paper discs can be placed on the cut surface of plant tissues to absorb liquid from the cells. The liquid might contain catalase.

Fig. 1.1 shows how you can tell if catalase is present in tissues from different plants.



A filter paper disc soaked in liquid from plant cells is dropped into the hydrogen peroxide solution and sinks to the bottom.

If catalase is present, bubbles of oxygen form. The bubbles of oxygen are trapped in the filter paper disc making it float to the surface.

Fig. 1.1

You are provided with pieces of tissue from three different plants (labelled **A**, **B** and **C**), small filter paper discs and a beaker of hydrogen peroxide solution.

Read through the following procedure carefully before you begin.

As hydrogen peroxide solution may cause damage to eyes, wear eye protection while you do this investigation.

- Cut the piece of plant tissue **A** in half.
- Use forceps to place a filter paper disc onto a cut surface of plant tissue **A**, to absorb liquid from the cells.
- Slowly and quietly count to 10.
- Use forceps to pick up the filter paper disc from the cut surface of plant tissue **A**.
- Drop the filter paper disc into the beaker of **hydrogen peroxide solution** and immediately start timing.
- The filter paper disc should sink to the bottom of the beaker. If it doesn't sink, then tap it gently with forceps so that it sinks.
- Observe the filter paper disc until it reaches the surface of the **hydrogen peroxide solution**, then stop timing. If a filter paper disc does **not** float within 4 minutes (240 seconds) stop timing and record the time taken for the filter paper disc to reach the surface as >240.
- In Table 1.1, record the time taken, to the nearest whole second, for the filter paper disc to reach the surface of the **hydrogen peroxide solution**.
- Use forceps to remove the filter paper disc from the beaker of **hydrogen peroxide solution** and place it in the **waste** container provided.
- Use the **rinsing water** to rinse the forceps. Dry the forceps before continuing.
- Repeat the procedure **two** more times with filter paper discs on the same cut surface of plant tissue **A**.
- Repeat all of the procedure for filter paper discs on plant tissue **B** and then again for plant tissue **C**, recording all your results in Table 1.1.

(a) (i) Complete Table 1.1 by calculating the mean times for the filter paper discs, from tissues **A**, **B** and **C**, to reach the surface.

Record your results to the nearest whole second.

Table 1.1

plant tissue	time taken for filter paper disc to reach the surface / seconds			
	disc 1	disc 2	disc 3	mean
A				
B				
C				

[5]

(ii) Using your results in Table 1.1, state what you can conclude about catalase in the plant tissues **A**, **B** and **C**.

tissue **A** .....

.....

tissue **B** .....

.....

tissue **C** .....

.....

[3]

(b) (i) Suggest why the filter paper discs were left on the cut surfaces of the plant tissues while you counted to the same number each time.

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..... [2]

(ii) Suggest a suitable control for this investigation.

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..... [1]

[Total: 11]

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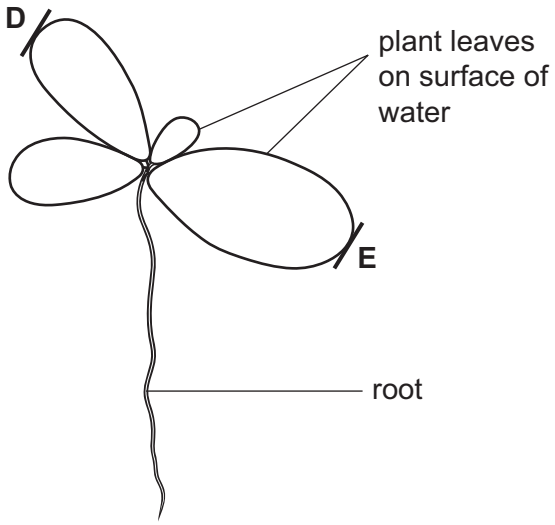
2 *Lemna* is a small green plant that floats on the surface of water in ponds and lakes. It consists of leaves that float and a root that hangs down in the water.

Fig. 2.1 shows a single plant that has four leaves. **D** and **E** indicate the maximum length of two of the plant's leaves.



magnification ×12

Fig. 2.1

(a) On Fig. 2.1, draw a straight line to join **D** and **E**. Measure the length of the line and record it.

..... mm

Calculate the **actual** maximum length of two of the plant's leaves and record it to the nearest whole number.

Space for working.

.....
[3]

(b) The population of this plant grows by each plant dividing into two smaller plants. These smaller plants then grow new leaves and divide again.

Some students decided to investigate the growth of *Lemna* plants. They placed six plants in a small beaker containing nutrients in distilled water (nutrient solution). They used a lamp to provide constant light.

(i) Suggest why the students added nutrients to the distilled water.

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..... [1]

The students decided to measure growth by counting the total number of leaves at the same time each day. At the start of the investigation there were 16 leaves in total on the plants.

Fig. 2.2 shows the beaker seen from above on day 4.

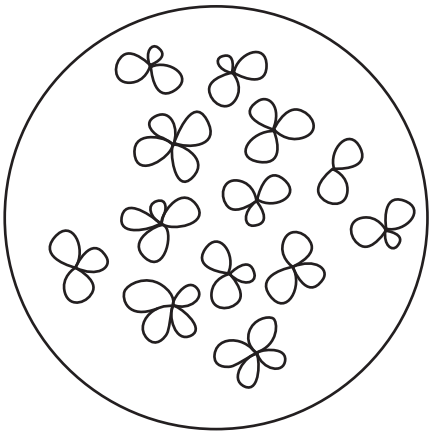


Fig. 2.2

(ii) Count the total number of leaves visible in Fig. 2.2 and enter the number in Table 2.1.

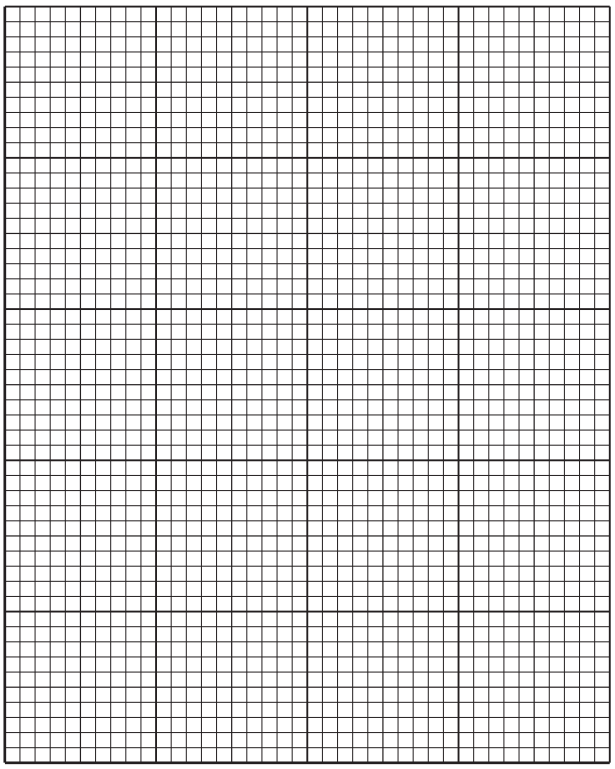
Table 2.1

time / days	total number of leaves
0	16
2	20
3	29
4	
5	55
6	83
7	91

[1]

(iii) On the grid, draw a line graph of the data shown in Table 2.1.

Join the points with ruled, straight lines.



[5]

(iv) Use your graph to estimate the total number of leaves that would have been present on day 1. Show your working on your graph.

total number of leaves on day 1 .....

[2]

(v) Predict the shape of the graph after day 7 if the investigation continues for another six days. Explain your answer.

prediction .....

.....

explanation .....

.....

[2]

(vi) Suggest **one** other method that the students could use to measure the growth of *Lemna*.

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..... [1]

(c) Plan an investigation to determine the effect of different concentrations of a nutrient solution on the growth of *Lemna*. Use the same method of counting the number of leaves that the students used in their investigation for measuring growth.

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..... [6]

[Total: 21]

3 Fig. 3.1 is a photomicrograph of cells from a plant epidermis that have been treated so that some of the cells are plasmolysed.

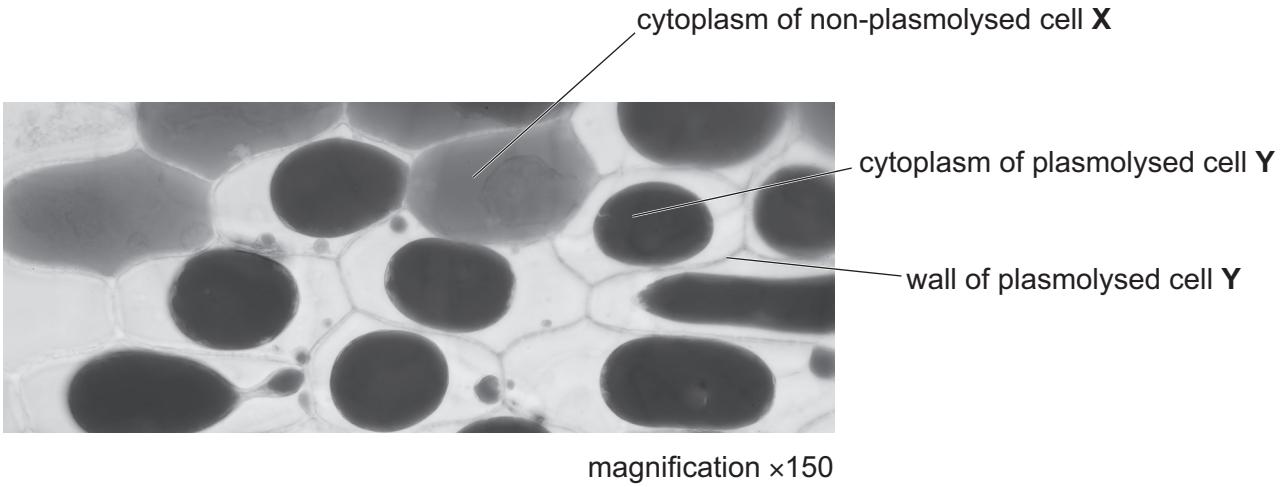

Fig. 3.1

(a) State **three** items of apparatus that you would need to use to observe the actual cells shown in the photomicrograph.

1 .....

2 .....

3 .....

[3]

(b) Make a large drawing of the **two** cells labelled **X** and **Y** as they appear in Fig. 3.1.

[3]

(c) Describe how you would treat cells from a plant epidermis so that they become plasmolysed.

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..... [2]

[Total: 8]

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