

Surname	Centre Number	Candidate Number
First name(s)		0



GCSE



S25-3400U30-1B

MONDAY, 6 JANUARY – FRIDAY, 21 FEBRUARY 2025

BIOLOGY – Unit 3 (3400U30)

PRACTICAL ASSESSMENT

INVESTIGATING THE EFFECT OF SUBSTRATE
CONCENTRATION ON THE RATE OF ENZYME ACTION

SECTION B

1 hour

For Examiner's use only		
	Maximum Mark	Mark Awarded
Section B	24	

ADDITIONAL MATERIALSA calculator and your Section **A** exam paper.**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The total number of marks available for this section of the task is 24.

The number of marks is given in brackets at the end of each question or part-question.

This task is in 2 sections, **A** and **B**. You will have completed Section **A** in a previous lesson.

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SECTION BAnswer **all** questions.

2. (a) (i) State the independent variable in this experiment. [1]

.....

- (ii) State the range of the independent variable. [1]

.....

- (iii) State the dependent variable in this experiment. [1]

.....

- (iv) Complete the table below by stating **two** controlled variables in this experiment **and** describe how each was controlled. [4]

Controlled variable	How it was controlled

- (v) Describe how you could set up a control for this experiment. [2]

.....

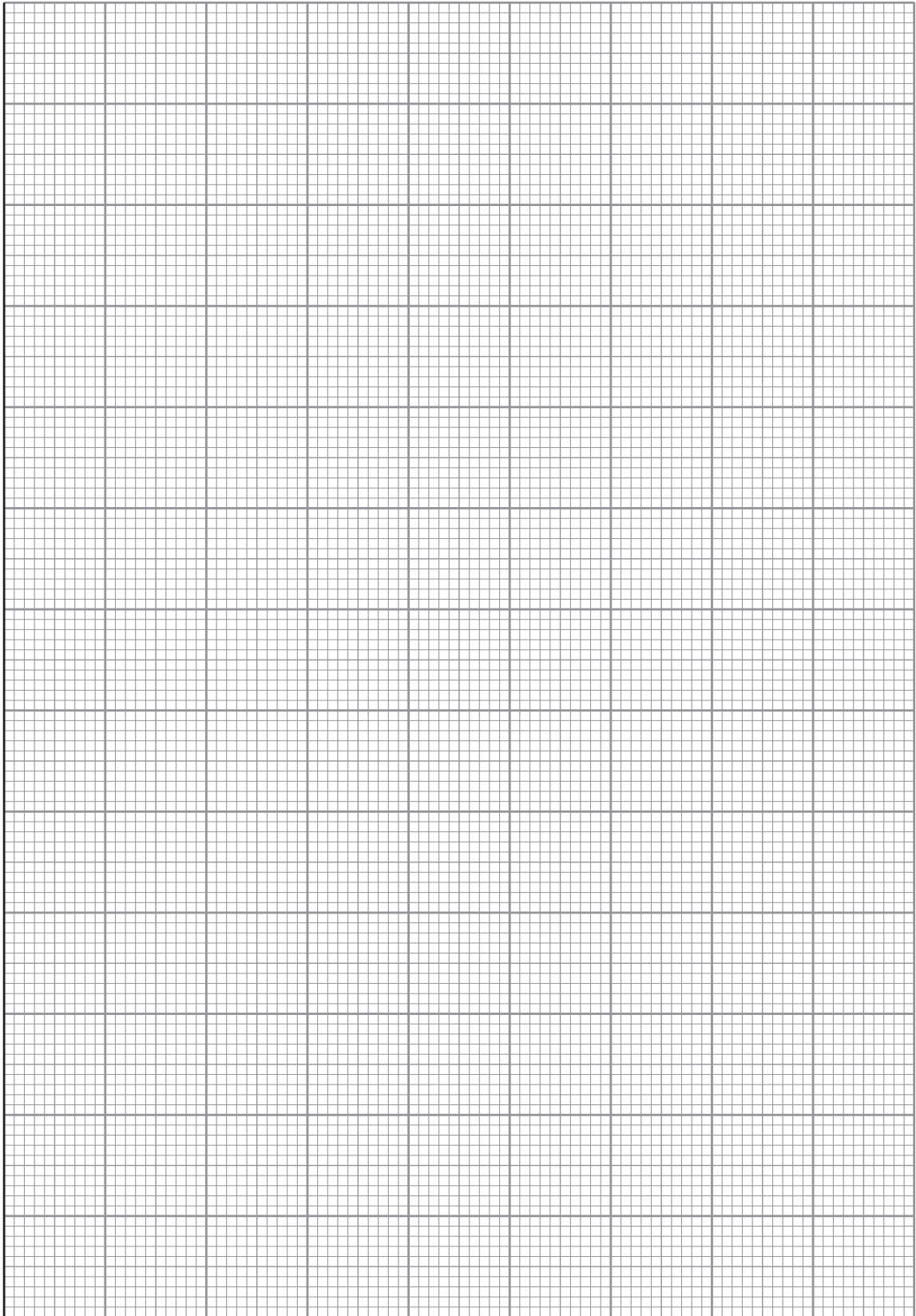
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- (b) Use your results from Section **A** to draw a graph of the time taken for the filter paper disc to sink and rise to the top (vertical axis) against the concentration of hydrogen peroxide solution (horizontal axis) on the grid opposite. [5]



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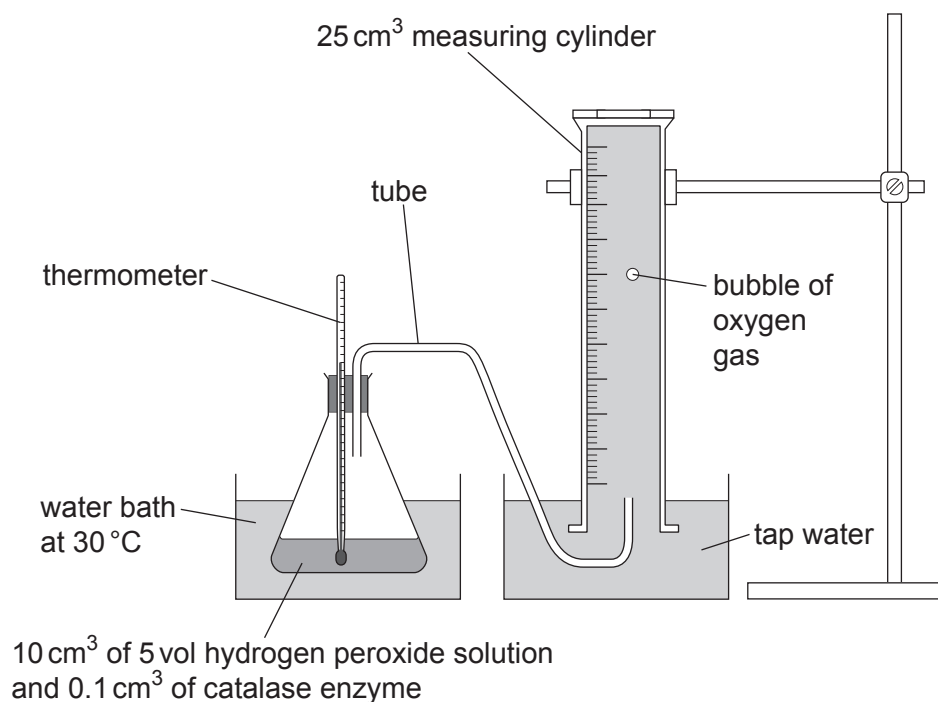
- (c) Use your graph to describe the relationship between the concentration of hydrogen peroxide solution and the time taken for the filter paper disc to sink and rise to the top.

[1]

- (d) State what you could do to check the reproducibility of your experiment.

[1]

- (e) Caitlin carried out a catalase experiment using a different method. This is shown in the diagram below.



Using this method, Caitlin collected these results.

Concentration of hydrogen peroxide solution (vol)	Volume of oxygen produced in 2 minutes (cm ³)				Mean rate of reaction (cm ³ /s)
	Trial 1	Trial 2	Trial 3	Mean	
5	3.5	3.5	4.0	3.7	0.031
10	5.0	6.0	7.0	6.0	0.050
15	8.0	8.5	8.5	8.3	

- (i) Calculate the mean rate of reaction for the concentration of 15 vol using the equation below:

[2]

$$\text{mean rate of reaction} = \frac{\text{mean volume of oxygen produced}}{\text{time of reaction}}$$

$$\text{mean rate of reaction} = \dots\dots\dots \text{cm}^3/\text{s}$$

- (ii) Use your knowledge of enzymes to explain the trend in the volume of oxygen produced in Caitlin's experiment.

[2]

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.....

.....



- (f) The table below states two inaccuracies in the experiment you carried out in Section A. Complete the table by identifying how each inaccuracy was overcome in Caitlin's method **and** explain why each is an improvement. [4]

Inaccuracy in your experiment	Improvement in Caitlin's method	Explanation of improvement
Temperature not controlled		
Using discs to compare the rate of oxygen production		

END OF PAPER

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