

Pearson Edexcel International Advanced Level

Friday 12 June 2026

Morning (Time: 1 hour 20 minutes)

Paper

reference

WBI16/01A

Biology

International Advanced Level

UNIT 6: Practical Skills in Biology II

Question Paper

You must have:

Answer Book (sent separately), Scientific calculator, ruler, HB pencil.

Do not return this question paper with the answer book.

Turn over ►

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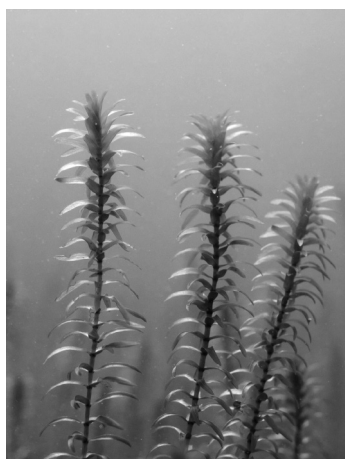
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Pearson

Answer ALL questions in the Answer Book.

- 1** The photograph shows an aquatic plant, Canadian pondweed.



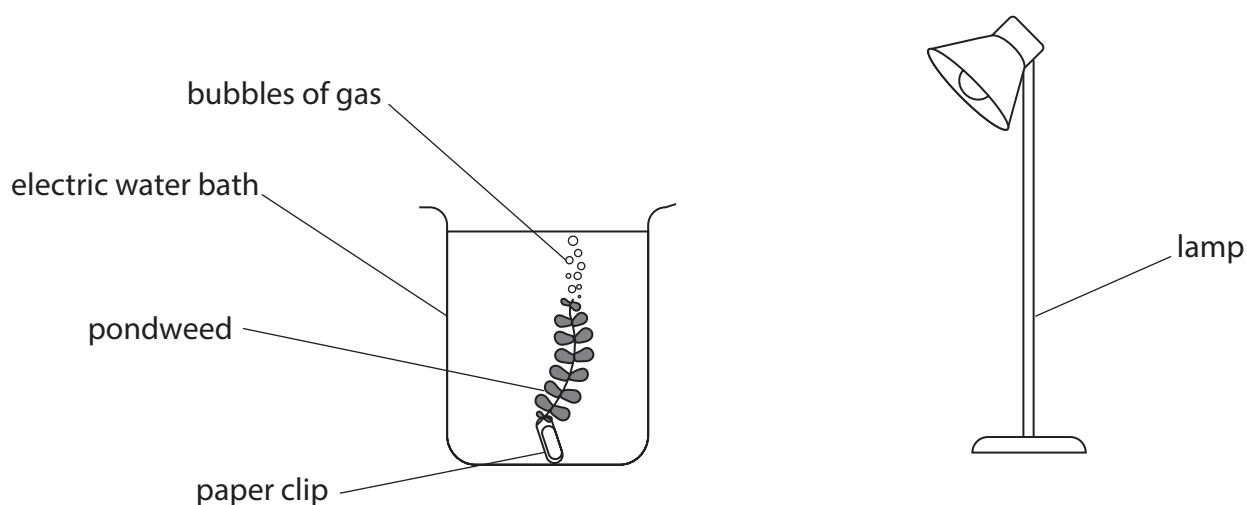
(Source: © Mikko Suonio/Alamy Stock Photo)

If the stem of the plant is cut underwater, bubbles of gas are released from the cut end of the stem as the plant photosynthesises.

The effect of temperature on the rate of photosynthesis can be investigated using the following method:

- cut a piece of pondweed and attach a paper clip to one end of it to weigh it down
- place it in an electric water bath set at 10 °C, positioned close to a lamp
- record the number of bubbles produced in one minute
- repeat this five times
- repeat the investigation with a second piece of pondweed with the water bath set at 20 °C.

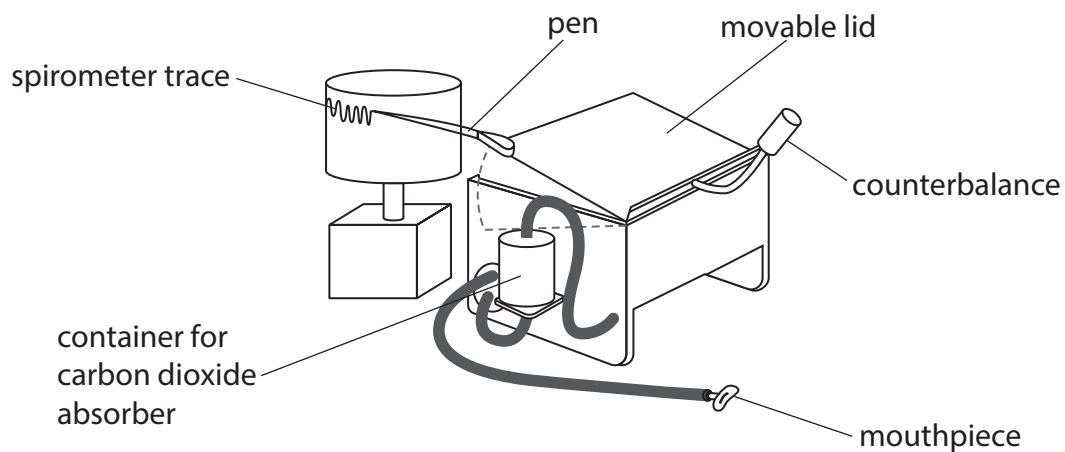
The diagram shows the apparatus used.



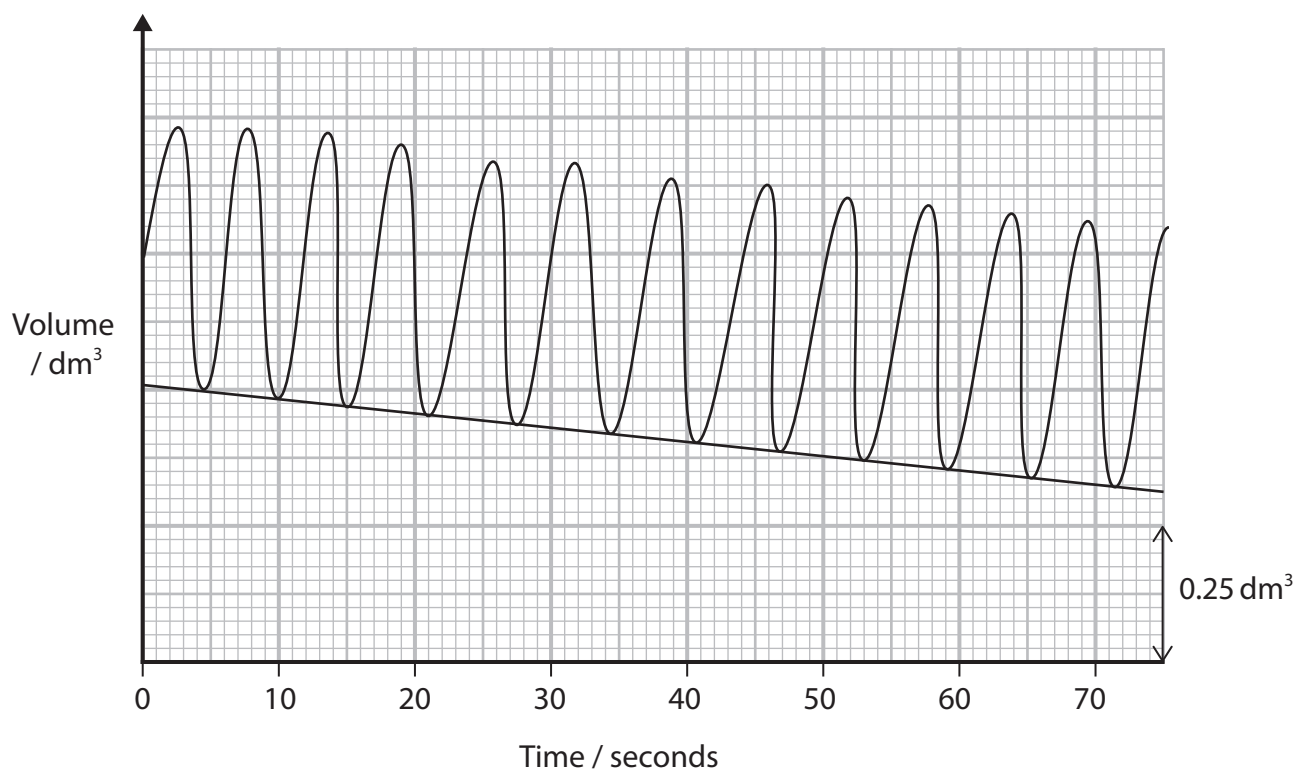
- 1 (a) (i) Name the independent and dependent variables in this investigation. (2)
- 1 (a) (ii) Describe how the method of collecting the results could be improved in this investigation. (2)
- 1 (a) (iii) Explain **two** improvements to this method that would make this investigation **valid**. (4)
- 1 (a) (iv) State why the investigation is repeated five times at each temperature. (1)
- 1 (b) (i) Explain how **changes** in temperature affect the rate of photosynthesis. (4)
- 1 (b) (ii) In this investigation the rate of photosynthesis at 10 °C was 17.6 bubbles per minute.
- The temperature coefficient for photosynthesis is Q_{10} .
- Predict the rate of photosynthesis at 20 °C. (1)

(Total for Question 1 = 14 marks)

- 2 The diagram shows a spirometer that can be used to investigate human lung function.



The spirometer trace is from a person at rest.



- 2 (a) (i) Determine the respiratory minute ventilation from this spirometer trace.
Give your answer in dm^3 per minute. (2)

- 2 (a) (ii) Calculate the oxygen consumption from this spirometer trace.
Give your answer in dm^3 per minute to **two** significant figures. (2)

- 2 (b) A group of students wanted to find out if the height of a person had any effect on tidal volume.

Each student measured their height and then used the spirometer to find their tidal volume.

The table shows the results for this group of students.

Student	Height / m	Tidal volume / dm^3
A	1.63	0.51
B	1.83	0.57
C	1.57	0.49
D	1.65	0.50
E	1.80	0.68
F	1.60	0.54
G	1.75	0.69

- 2 (b) (i) Give a suitable null hypothesis for this investigation. (1)
- 2 (b) (ii) State **two abiotic** variables that could affect the resting tidal volume of a person. (2)
- 2 (b)(iii) State **two other biotic** factors that could affect the resting tidal volume of a person. (2)
- 2 (b)(iv) Plot a suitable graph in the Answer Book to display this data. (3)

- 2 (c) The students produced the following table to calculate the correlation coefficient.

Student	Height / m	Rank of height	Tidal volume / dm ³	Rank of tidal volume	d	d^2
A	1.63	3	0.51	3	0	0
B	1.83	7	0.57	5	2	4
C	1.57	1	0.49	1	0	0
D	1.65	4	0.50	2	2	4
E	1.80	6	0.68	6	0	0
F	1.60	2	0.54	4	-2	4
G	1.75	5	0.69	7	-2	4

- 2 (c) (i) Calculate the correlation coefficient, r_s , using the formula:

(2)

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

Where:

Σ = the sum of

d = the difference between each pair of ranks

n = the size of the sample (number of pairs of values)



- 2 (c) (ii) The table shows some critical values for this statistical test.

Number of pairs of values	Level of significance (p)		
	0.10	0.05	0.01
4	1.000	–	–
5	0.900	1.000	–
6	0.829	0.886	1.000
7	0.714	0.786	0.929
8	0.643	0.738	0.881
9	0.600	0.700	0.833
10	0.564	0.648	0.794

Explain the conclusion that can be drawn from this investigation.

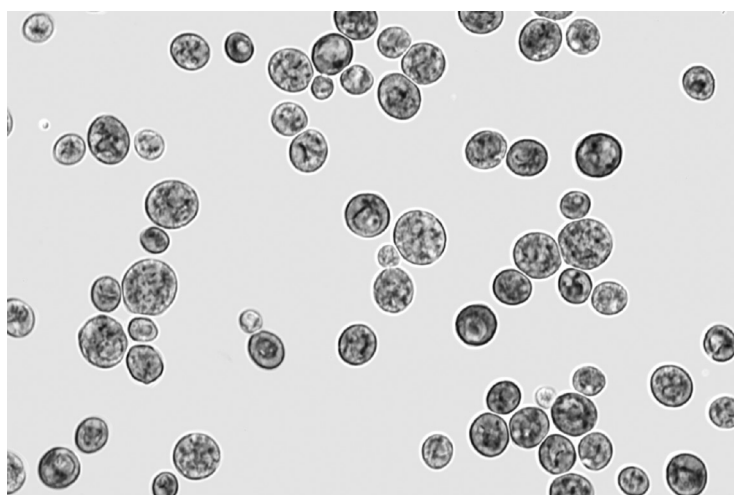
Use your calculated r_s value and the table of critical values to support your answer.

(3)

(Total for Question 2 = 17 marks)

- 3 Yeast is a single-celled organism that is widely used in brewing and baking.

The photograph shows yeast cells as seen using a light microscope.



(Source: © Herve Conge, ISM / Science Photo Library)

A student thought that the type of sugar provided to the yeast might affect the rate of **anaerobic** respiration of the yeast.

The following hypothesis was formed:

Yeast will have a faster rate of **anaerobic** respiration when provided with glucose, compared with when it is provided with sucrose.

Plan an investigation to find evidence to support or reject this hypothesis.

- 3 (a) (i) Describe preliminary practical work that you might undertake to ensure your proposed method would provide quantitative results. (3)
- 3 (a) (ii) Identify **one** risk you might encounter when carrying out this investigation and how you could reduce this risk. (2)
- 3 (b) Devise a detailed method, including how you would control and monitor important variables. (9)
- 3 (c) Describe how your results should be recorded, presented and analysed in order to draw conclusions from your investigation. (3)
- 3 (d) Suggest **two** limitations of your proposed method. (2)

(Total for Question 3 = 19 marks)

TOTAL FOR PAPER = 50 MARKS

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

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Biology

International Advanced Level

UNIT 6: Practical Skills in Biology II

Answer Book

You must have:

Question paper (sent separately)

Scientific calculator, ruler, HB pencil

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Show all your working in calculations and include units where appropriate.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Answer All Questions in the Answer Book

Question 1

1 (a) (i)

(2)

Independent variable

Dependent variable

1 (a) (ii)

(2)

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1 (a) (iii)

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1 (a) (iv)

(1)

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1 (b) (i)

(4)

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1 (b) (ii)

(1)

Answer

(Total for Question 1 = 14 marks)



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Question 2

2 (a) (i)

(2)

Answer

2 (a) (ii)

(2)

Answer



2 (b) (i)

(1)

2 (b) (ii)

(2)

2 (b)(iii)

(2)



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2 (c) (i)

(2)

Answer

2 (c) (ii)

(3)

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(Total for Question 2 = 17 marks)



Question 3

3 (a) (i)

(3)

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3 (a) (ii)

(2)

Risk

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Control

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3 (b)

(9)

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3 (c)

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3 (d)

(2)

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(Total for Question 3 = 19 marks)

TOTAL FOR PAPER = 50 MARKS



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