Diploma Programme
Programme du diplôme
Programa del Diploma

Biology
Standard level
Paper 1B

11 May 2026

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

Session number

1 hour 30 minutes [Paper 1A and Paper 1B]

Instructions to students

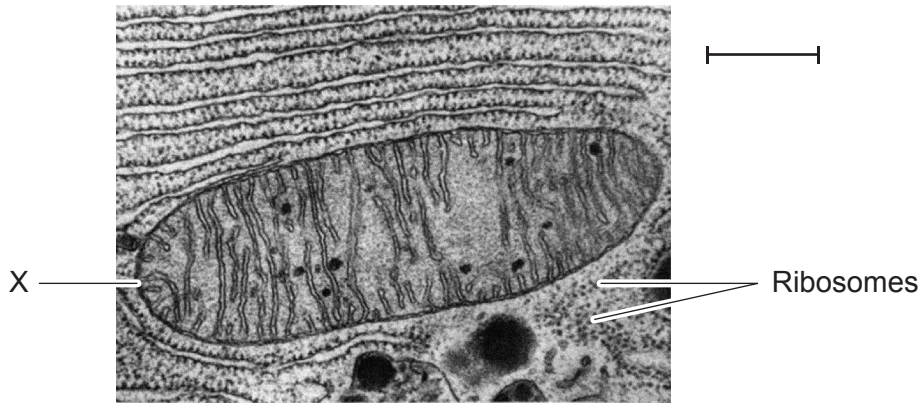
- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for paper 1B is **[25 marks]**.
- The maximum mark for paper 1A and paper 1B is **[55 marks]**.

2226 – 4020

9 pages

Answer **all** questions. Answers must be written within the answer boxes provided.

1. The electron micrograph shows part of an animal cell.



(a) (i) Identify the organelle labelled X. [1]

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(ii) State the function of X. [1]

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(iii) The magnification of the electron micrograph is 25 000×. Calculate the value of the scale bar in μm. [1]

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(This question continues on the following page)

(Question 1 continued)

(b) Compare and contrast the ribosomes shown in the electron micrograph with those found in prokaryotes. [2]

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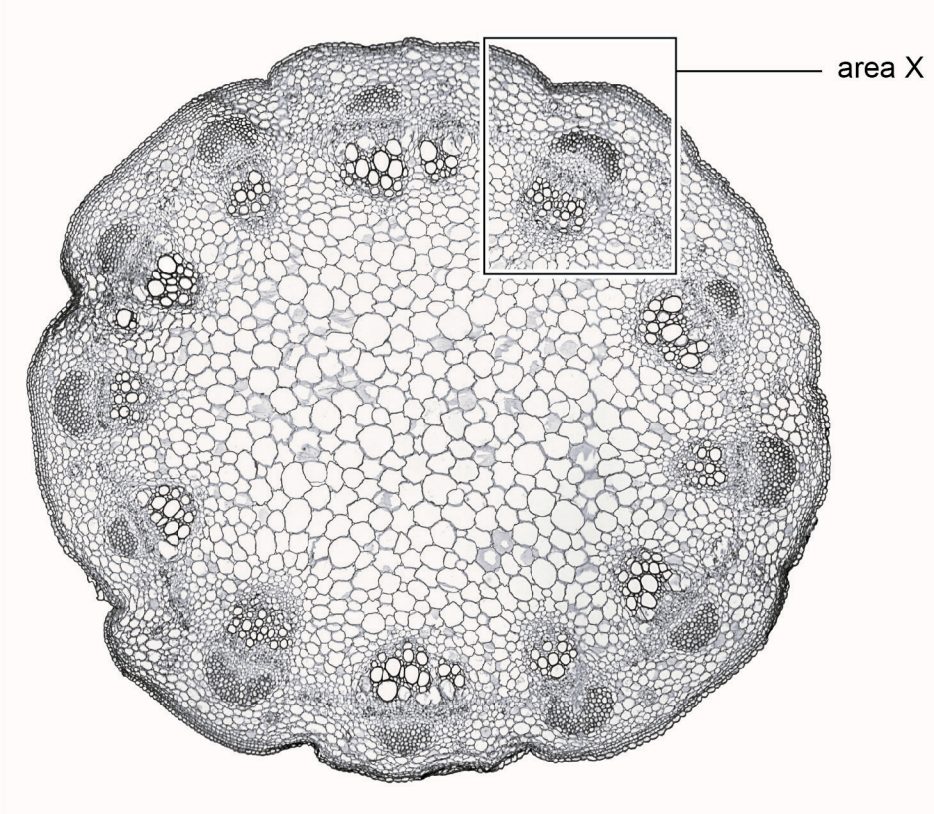
2. The micrograph shows a transverse section of the stem of alfalfa (*Medicago sativa*), which is adapted to temperate conditions.



(a) (i) Draw a labelled plan diagram of area X indicated in the micrograph. [3]

(ii) State the function of the phloem. [1]

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(Question 2 continued)

(b) The image shows some plants growing on a sandy shore in the United Kingdom.

Explain **two** adaptations for this environment that the grasses shown may have. [2]

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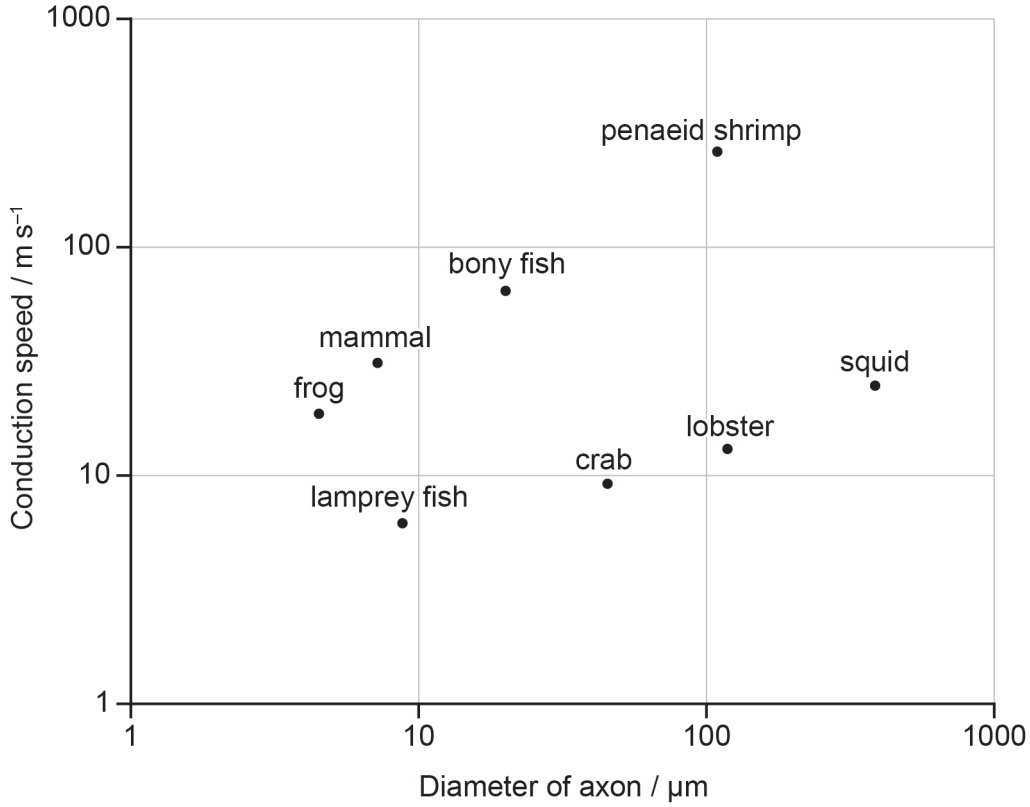
3. Researchers measured the conduction speed of axons in some vertebrate and invertebrate animals.



(a) (i) Identify the type of scales used on the x and y axes of this graph. [1]

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(ii) Suggest a reason that these scales are used. [1]

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(iii) Identify the relationship between axon diameter and conduction speed shown in the graph. [1]

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(Question 3 continued)

(b) Outline a structural feature of mammalian axons that allows them to have a similar conduction speed to squid axons. [1]

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(c) Describe the pathway of a pain reflex arc. [3]

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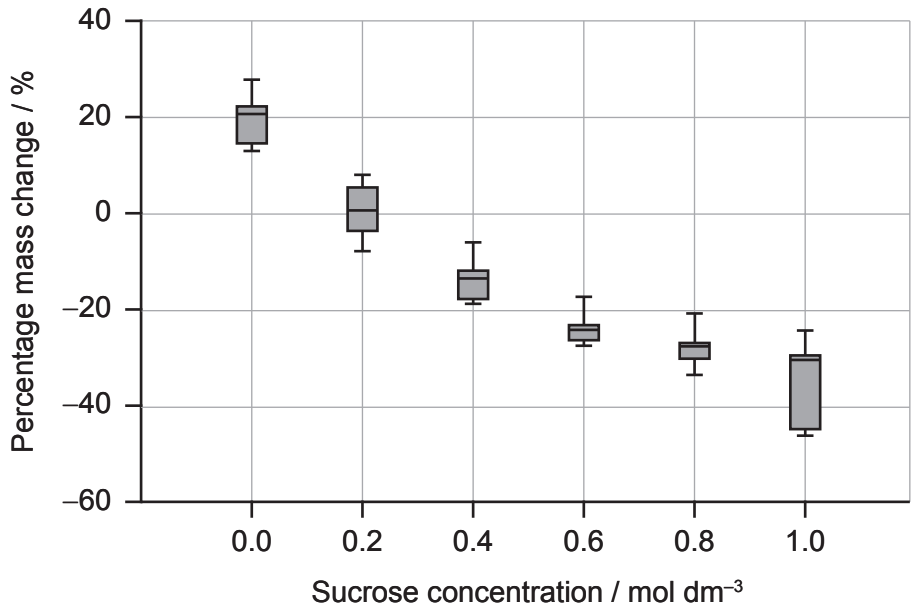
4. A student immersed plant tissue in sucrose solutions of different concentrations for two hours. There were 10 trials for each concentration. They measured the mass before and after immersion and calculated percentage (%) mass change. The graph shows their results.



(a) (i) Identify the type of graph. [1]

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(ii) Estimate the sucrose concentration that is isotonic to the plant tissue. [1]

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(Question 4 continued)

(b) Compare and contrast the data for plant tissues immersed in sucrose solutions of 0.6 and 0.8 mol dm^{-3}. [2]

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(c) Explain the results expected if this experiment was repeated on a freshwater unicellular organism lacking a cell wall. [3]

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References:

1. Used with permission of Elsevier Science & Technology Journals, from *The cell*, Don W. Fawcett, 1981; permission conveyed through Copyright Clearance Center, Inc.

2.(a) PeterHermesFurian, 2004. *Sunflower stem, Helianthus annuus, cross section, 8X light micrograph*. [image online] Available at: https://www.gettyimages.co.uk/detail/photo/sunflower-stem-helianthus-annuus-cross-section-8x-royalty-free-image/1985211048?phrase=helianthus+microscope&searchscope=image%2Cfilm [Accessed 5 August 2025]. Source adapted.

2.(b) Bolton, D., 2023. *Sand Dune and Grasses on Anglesey with Snowdonia in Rear of Image*. [image online] Available at: https://www.gettyimages.co.uk/detail/photo/sand-dune-and-grasses-on-anglesey-with-snowdonia-in-royalty-free-image/1536014709?phrase=Newborough+beach%2C+Anglesey [Accessed 2 May 2025]. Source adapted.

3. Hartline, D., 2015. [*Graph*]. [online] Available at: https://www1.pbrc.hawaii.edu [Accessed 4 April 2025]. Reference redacted. Source adapted.

4. DataClassroom Inc. 2022. *Potato osmosis lab*. [online] Available at: https://about.dataclassroom.com/ready-to-teach/potato-osmosis-lab [Accessed 4 April 2025]. Source adapted.

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