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Biology
Higher level
Paper 1B

11 May 2026

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

Session number

2 hours [Paper 1A and Paper 1B]

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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 **[35 marks]**.
- The maximum mark for paper 1A and paper 1B is **[75 marks]**.



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

1. The electron micrograph shows part of a cell.



- (a) (i) Draw a labelled diagram of the structures of the mitochondrion that are visible in the micrograph.

[3]

- (ii) The organelles labelled X are also contained inside the mitochondria. Distinguish between X and these organelles inside the mitochondria.

[1]

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- (iii) Structure X synthesizes proteins for secretion out of the cell. State another organelle required for this process.

[1]

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(This question continues on the following page)



(Question 1 continued)

- (b) Explain how to prepare and view a temporary mount of a tissue such as onion (*Allium cepa*) epidermis.

[3]

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2. A student monitored their heart rate and blood pressure (BP) before, during and after (recovery period) exercise. The graph shows the data they collected.

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- (a) (i) Calculate the maximum increase in systolic blood pressure from the beginning of the investigation. [1]

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- (ii) Compare and contrast the change in heart rate and systolic blood pressure during the investigation. [2]

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(This question continues on the following page)



(Question 2 continued)

- (iii) Suggest a reason for the changes seen in diastolic blood pressure over the course of the investigation.

[1]

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- (b) (i) State the adaptation in the capillaries of some tissues for extremely rapid exchange. [1]

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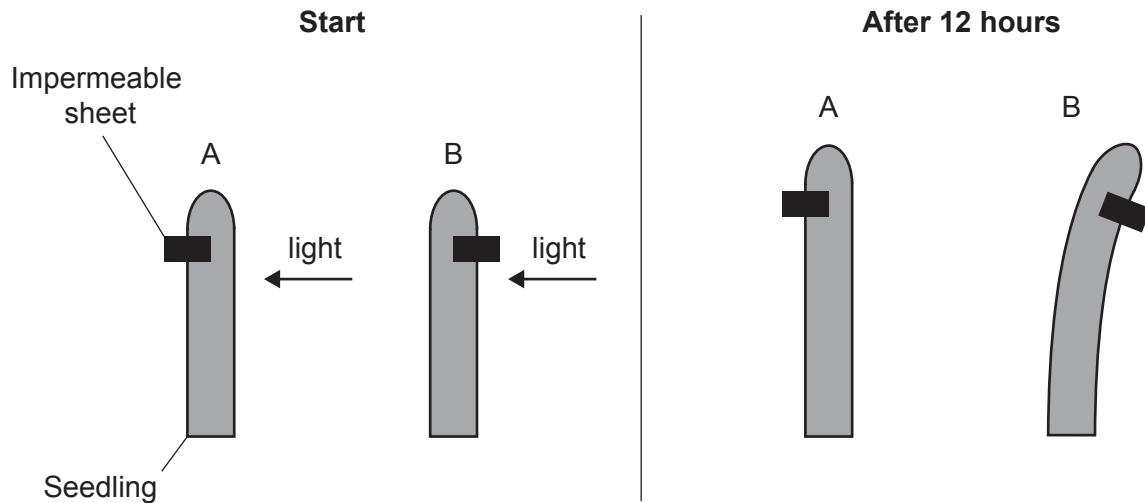
- (ii) Distinguish between the structure of arteries and veins.

[3]

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3. Researchers inserted small pieces of impermeable plastic sheet into opposite sides of two seedlings, A and B, that were growing vertically. They exposed the seedlings to unilateral light (light from one direction) for 12 hours. The diagram shows the results.



- (a) (i) Identify the response shown by seedling B.

[1]

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- (ii) Suggest a control for this investigation.

[1]

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- (iii) Explain the difference in the appearance of seedlings A and B after 12 hours.

[3]

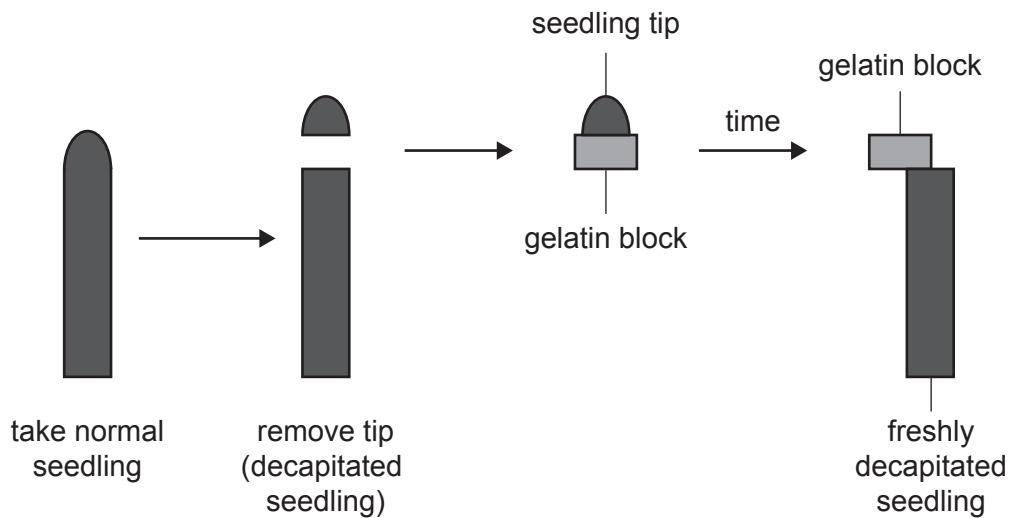
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(Question 3 continued)

- (b) In another experiment carried out in the dark, 10 tips of seedlings were removed. Each tip was placed on a separate block of gelatin, which can absorb chemicals. Every hour, a tip was removed from one gelatin block, and the block was placed on a freshly decapitated seedling, as shown in the diagram.



- (i) Once the blocks were added to the freshly decapitated seedlings, the seedlings were left for 48 hours before the results were recorded. Predict the results of the experiment.

[2]

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- (ii) Suggest a quantitative measurement for this experiment.

[1]

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- (c) Outline how the phytohormone ethylene (ethene) promotes fruit ripening.

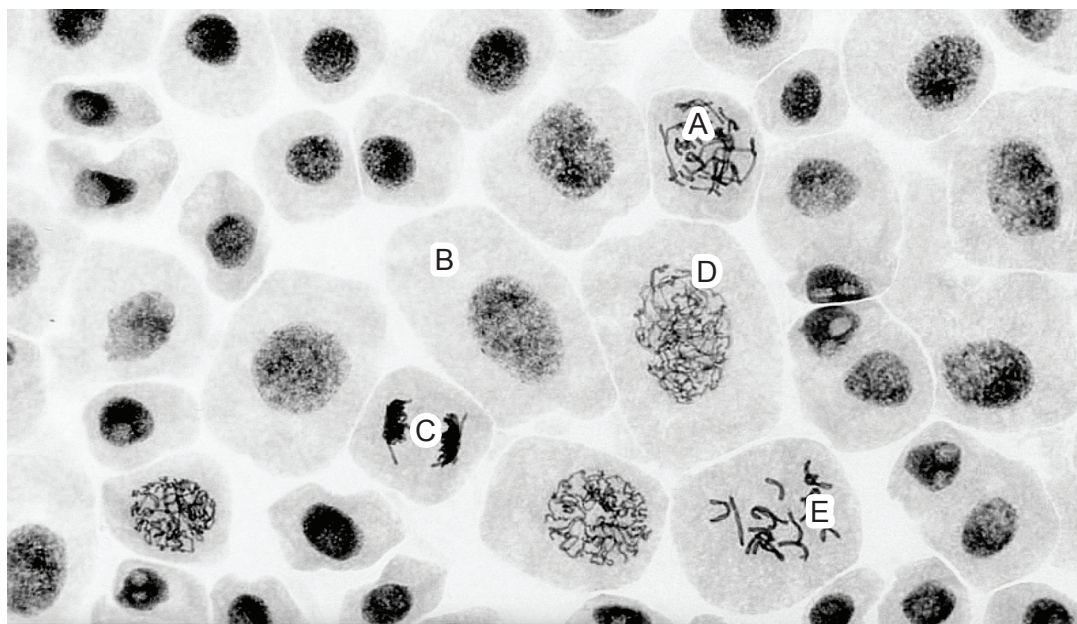
[1]

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4. Students examined cells from an onion (*Allium cepa*) root tip under the microscope. The micrograph shows a section through the tissue.



- (a) (i) List the letters of the cells in order of the phases of mitosis. [1]

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- (ii) Identify the phase shown in cell C. [1]

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- (iii) State **one** phase that is **not** shown in the micrograph. [1]

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(This question continues on the following page)



(Question 4 continued)

- (b) The mitotic index of 160 cells in meristem tissue was 0.25. Calculate the number of cells in cell division.

[1]

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- (c) Distinguish between the cells produced at the end of mitosis and meiosis.

[2]

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- (d) Onion plants are hermaphroditic. Discuss how hermaphroditic plants increase genetic variation in offspring.

[4]

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4. Doc. RNDr. Josef Reischig, CSc. https://commons.wikimedia.org/wiki/File:Mitosis_%28261_15%29_Pressed;_root_meristem_of_onion.jpg. Licensed under CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>.

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12EP10

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12EP11

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12EP12