



88046005

BIOLOGY
STANDARD LEVEL
PAPER 2

Wednesday 10 November 2004 (afternoon)

1 hour 15 minutes

School code

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Candidate code

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INSTRUCTIONS TO CANDIDATES

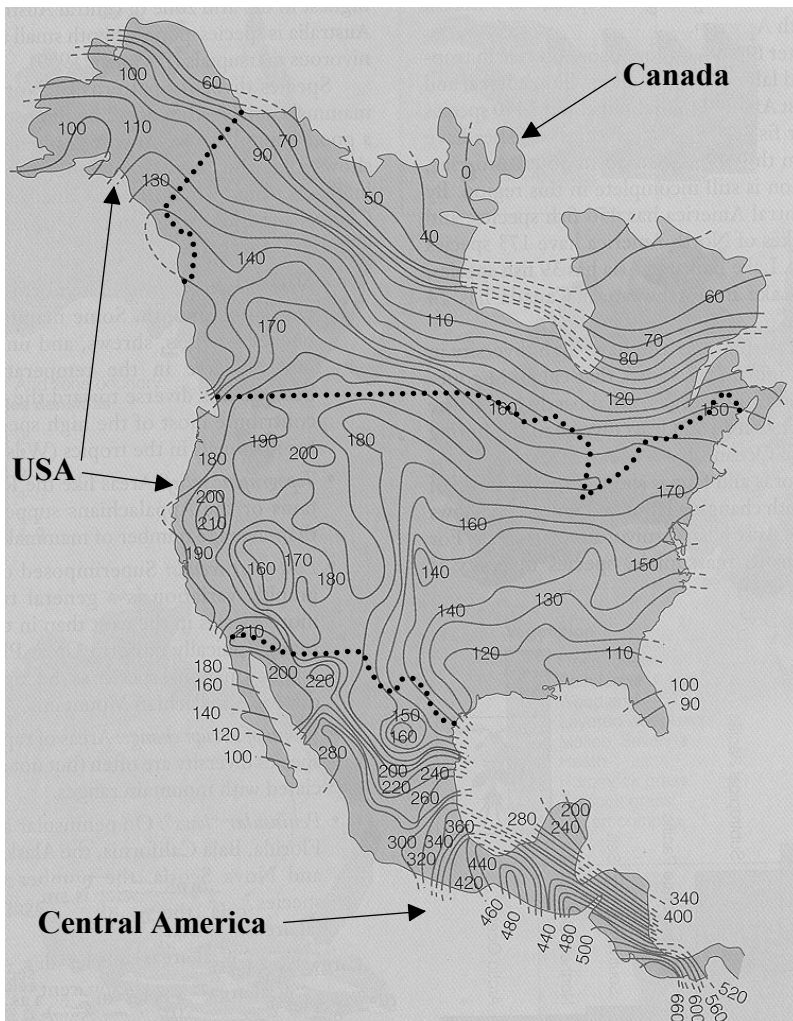
- Write your school code and candidate code in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all of Section A in the spaces provided.
- Section B: answer one question from Section B. Write your answers on answer sheets. Write your school code and candidate code on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.
- At the end of the examination, indicate the numbers of the questions answered in the candidate box on your cover sheet and indicate the number of sheets used in the appropriate box on your cover sheet.

SECTION A

Answer **all** questions in the spaces provided.

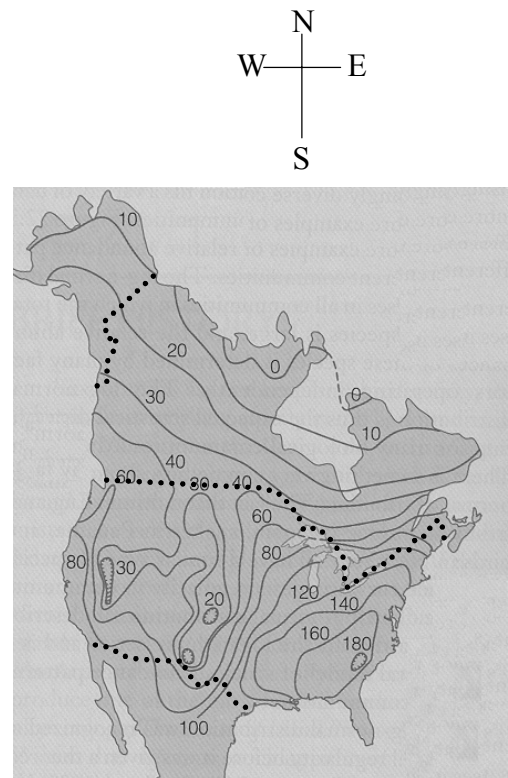
- The number of species in ecological communities varies considerably. One type of research involves studying the numbers of species and their distribution patterns in different regions of the world. The two maps below show the distribution pattern of bird species in North and Central America and the distribution pattern of the 620 tree species found in North America*. The contour lines on both maps connect points with the same number of species.

* North America: includes Canada and the USA.



Distribution of bird species in North and Central America

[Source: Charles J Krebs, (2000) *Ecology*, Addison-Wesley publishing, pages 438–439]



Distribution of tree species in North America

- Identify the maximum number of bird and tree species found in North and Central America. [1]

Bird species

Tree species

(This question continues on the following page)

(Question 1 continued)

- (b) Compare the distribution pattern of bird species found in Canada with the distribution pattern of tree species. [2]

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- (c) Define the term *species*. [1]

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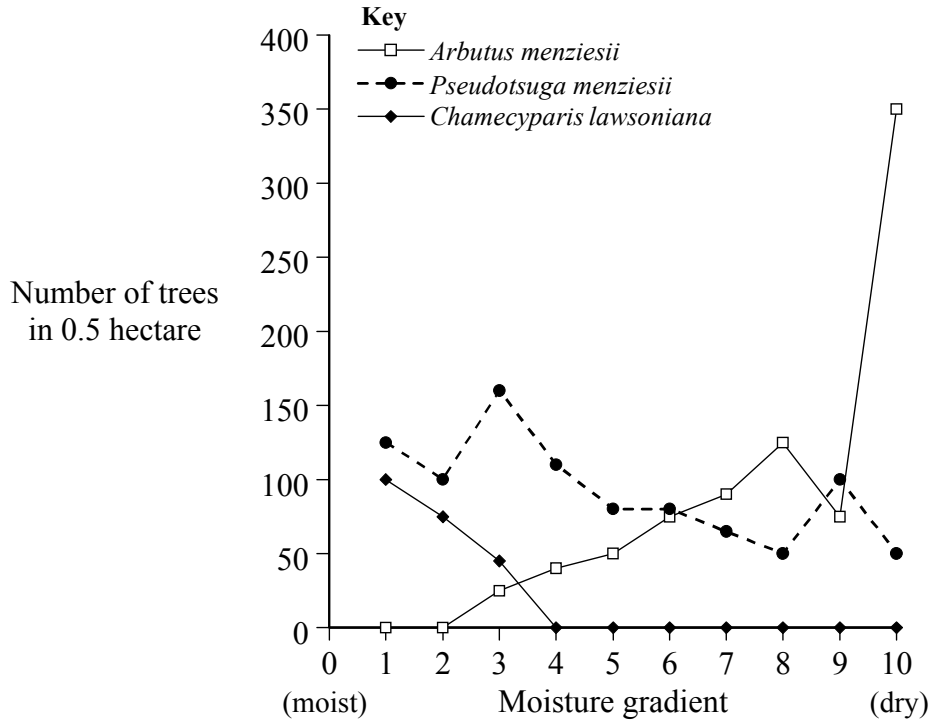
- (d) Suggest **two** reasons why no trees are found in parts of Northern Canada. [2]

1.
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2.
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(This question continues on the following page)

(Question 1 continued)

The graph below shows the distribution of three tree species along a soil-moisture gradient in western USA.



[Source: Charles J Krebs, (2000) *Ecology*, Addison-Wesley publishing, page 394]

(e) Identify the species [2]

- (i) most tolerant of dry conditions.
- (ii) with the widest range of moisture levels.

(f) Identify the moisture level at which there is [2]

- (i) most tree species diversity.
- (ii) the greatest density of trees.

(g) Each of the tree species has its maximum density at a different moisture level. Suggest reasons for this. [2]

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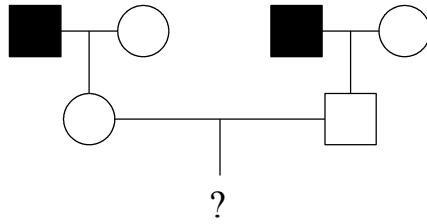
2. (a) Define the term *sex linkage*.

[1]

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(b) A male and female with normal color vision each have a father who is color blind. They are planning to have children. Predict, showing your working, the possible phenotypes and genotypes of male and female children.

[3]



Key
□ male
○ female
■ affected male
● affected female

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(c) Explain the relationship between Mendel's law of segregation and meiosis.

[3]

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(d) Distinguish the differences between animal cells and plant cells undergoing mitosis and cytokinesis.

[2]

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3. (a) Draw the structure of a fatty acid.

[1]

(b) Outline how monosaccharides are converted into polysaccharides.

[2]

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(c) Explain the effect of substrate concentration on enzyme activity.

[3]

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(d) Distinguish between the structure of DNA and RNA.

[3]

DNA	RNA
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SECTION B

Answer **one** question. Up to two additional marks are available for the construction of your answer. Write your answers on the answer sheets provided. Write your school code and candidate code on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.

4. (a) Draw a labelled diagram of the fluid mosaic model of the plasma membrane. [5]
- (b) Describe passive transport across a biological membrane. [5]
- (c) Explain, with reference to its properties, the significance of water as a coolant, a means of transport and as a habitat. [8]
5. (a) Draw a labelled diagram of a prokaryotic cell as seen in electron micrographs. [6]
- (b) Describe how human skin and mucous membranes act as barriers to pathogens. [4]
- (c) Explain the cause, transmission and social implications of AIDS. [8]
6. (a) Draw a labelled diagram to show the internal structure of the heart. [6]
- (b) Describe the response of the human body to low external temperatures. [4]
- (c) Explain the need for, and the mechanism of, ventilation of the lungs in humans. [8]
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