bio letters

Biology
Standard and Higher level
A1.2 Nucleic acids
Paper 2

19 August 2026

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

Candidate name

1 hour 30 minutes

Instructions to candidates

- Write your candidate name in the boxes above.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- This paper only includes short and long answer questions; database questions for each topic are in separate worksheets.
- All of the questions are original and written by me.
- Although most questions focus on this topic only, some are linked to other topics. A few questions have intentionally similar answers to show you how questions can be phrased differently but ask about the same concept(s).
- The duration of this paper was scaled according to the number of marks available and based on how much time, on average, each mark is worth in examination settings. Since this is a practice paper, expect to need more time to complete it.
- **None of the questions are from IB past papers.**
- The maximum mark for this paper is **[60 marks]**.

19–08–2025

10 pages

Section A

1. All organisms have genetic material.

(a) State the difference between the genetic material of organisms and viruses. [1]

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(b) Explain why viruses are not considered living organisms. [1]

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(c) Describe the components of a nucleotide. [3]

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2. The chemical structure of DNA explains its biological role.

(a) State the reaction used to form a DNA poymer. [1]

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(b) Distinguish between phosphodiester and ester bonds. [1]

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(c) Outline how a strong backbone for DNA molecules is formed. [2]

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(d) Draw an annotated diagram of a nucleotide. [4]

3. Nucleic acids are the building blocks of polynucleotides.

(a) State the nitrogenous base found in RNA but not DNA. [1]

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(b) Explain the role of complementary base pairing. [3]

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(c) Outline the roles of three different RNA polymers. [3]

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4. There is variation within DNA molecules.

(a) State the number of possible nucleotide sequences in a DNA strand with 1000 bases. [1]

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(b) Outline the evidence for universal common ancestry. [2]

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(c) Explain how the structure of DNA enables the biodiversity on Earth. [3]

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5. **[AHL]** Histones have an important part in the nucleus of eukaryotes.

(a) Compare the roles of linker DNA and linker histone. [1]

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(b) Histone proteins are highly conserved across eukaryotes. Suggest a reason for this. [1]

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(c) Histones are proteins encoded by genes. Outline the role of DNA directionality in transcription and translation. [2]

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Section B

There are not enough answer boxes for all the questions in this section in order to save on printing paper. You can use the few answer boxes for brainstorming your responses, and then record your answers on a separate sheet of paper.

6. The structure of nucleic acids explains their functions.

(a) Explain how the structure of nitrogenous bases contributes to DNA's helical stability. [3]

(b) Describe the structure of DNA. [5]

(c) Compare and contrast the structure of function of DNA and RNA. [7]

7. **[AHL]** Understanding the structure of genetic material was a collective scientific effort.

(a) Describe the structure of a nucleosome. [4]

(b) Outline the role of Chargaff's data in understanding the structure of DNA. [4]

(c) Describe the Hershey–Chase experiment. [7]

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