

**SULIT**

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First Semester Examination  
2022/2023 Academic Session

February 2023

**BAT308 – Limnology**  
***[Limnologi]***

Duration : 2 hours  
(Masa : 2 jam)

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Please check that this examination paper consists of THREE (3) pages of printed material before you begin the examination.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi TIGA (3) muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

**Instructions:** Answer **FOUR (4)** out of **FIVE (5)** questions, in English or Bahasa Malaysia. Each question carries 25 marks.

**Arahan:** Jawab **EMPAT (4)** daripada **LIMA (5)** soalan yang diberikan dalam Bahasa Inggeris atau Bahasa Malaysia. Tiap-tiap soalan bernilai 25 markah.]

In the event of any discrepancies, the English version shall be used.

*[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan. versi Bahasa Inggeris hendaklah digunapakai].*

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1. [a] Using a labelled diagram, illustrate the vertical zonation of a lake system based on abiotic and biotic factors.  
*[Dengan menggunakan gambar rajah berlabel, gambarkan pengezonan vertikal sistem tasik berdasarkan faktor biotik dan abiotik.]*
- (12 marks / 12 markah)
- [b] Explain seasonal thermal stratification in a temperate lake.  
*[Terangkan stratifikasi suhu bermusim di satu tasik temperat.]*
- (13 marks / 13 markah)
2. [a] Explain how the decay of dead plants in a lake results in reduced oxygen concentration and increased nitrate production.  
*[Terangkan bagaimana pereputan tumbuhan mati di dalam tasik mengakibatkan kepekatan oksigen berkurangan dan pengeluaran nitrat meningkat.]*
- (12 marks / 12 markah)
- [b] Differentiate the zonation of a river ecosystem based on abiotic and biotic factors.  
*[Bezakan pengezonan ekosistem sungai berdasarkan faktor abiotik dan biotik.]*
- (13 marks / 13 markah)
3. [a] Explain **THREE (3)** sources of loss of dissolved oxygen in a lake.  
*[Terangkan **TIGA (3)** punca kehilangan oksigen terlarut dalam tasik.]*
- (13 marks / 13 markah)

- [b] Using complete diagrams, illustrate the orthograde oxygen profile during summer and winter stratifications in temperate lakes.  
*[Dengan menggunakan gambar rajah lengkap, gambarkan profil oksigen ortogred semasa stratifikasi musim panas dan musim sejuk di tasik temperat.]*
- (12 marks / 12 markah)
4. [a] Describe the stages of eutrophication.  
*[Huraikan peringkat eutrofikasi.]*
- (13 marks / 13 markah)
- [b] Differentiate between oligotrophic and eutrophic lakes.  
*[Bezakan antara tasik oligotrofik dan eutrofik.]*
- (12 marks / 12 markah)
5. [a] Using examples, describe **TWO (2)** adaptive causes of cyclomorphosis.  
*[Dengan menggunakan contoh, huraikan **DUA (2)** penyebab penyesuaian 'cyclomorphosis'.]*
- (13 marks / 13 markah)
- [b] With the help of a diagram, determine the seasonal cycle of phytoplankton population in a temperate lake.  
*[Dengan bantuan satu gambar rajah, tentukan kitaran bermusim populasi fitoplankton.]*
- (12 marks / 12 markah)