

University of Ruhuna- Faculty of Technology

Bachelor of Biosystems Technology Honours Degree  
Level 4 (Semester I) Examination, June 2023  
Academic year 2021/2022

Field Methods in Hydrogeology – BSTE 4152

INDEX NO: .....

**STRUCTURED AND ESSAY TYPE (TIME 1 and 1/2 HOURS)**

- Answer all questions in PART A
  - Answer to the structured questions in PART A must be done in the spaces provided.
  - Answer only Two questions from PART B
  - Answers to Essay type questions in PART B must be done on the answer books.
  - All questions carry equal marks
  - Only non-programmable calculators are permitted.
  - Mobile phones are NOT permitted.
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**PART A: STRUCTURED TYPE (Compulsory)**

1. a) Using suitable illustrations explain major components of a hydrogeological framework?  
(10 Marks)

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b) What are the key benefits of understanding the local and regional hydrogeological framework important? (10 Marks)

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c) What factors influence the hydrogeological framework? (10 Marks)

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d) Enlist common challenges associated with mapping hydrogeological frameworks? (10 Marks)

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e) Distinguish the difference between ground water and water table. (10 Marks)

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f) Using a suitable illustration depicts a water table contour map? (10 Marks)

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g) What information can be collected from a water table contour map? (10 Marks)

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h) Enlist main Applications of Water Table Contour Maps (05 Marks)

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i) How can water table contour maps be used in land-use planning? (05 Marks)

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j) How you identify recharge and recharge Areas in a continue map (10 Marks)

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k) What are the major Limitations and Challenges when developing contour maps? (10 Marks)

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**PART B: ESSAY TYPE (Answer Two questions only)**

1.
  - a) What are the different types of aquifers and how do they differ in terms of their characteristics and properties? (25 Marks)
  - b) Explain major following aquifer parameters.
    - I. Porosity
    - II. Specific yield
    - III. Specific retention
    - IV. Coefficient of permeability
    - V. Transmissibility (25 Marks)
  - c) How do human activities such as land use changes, groundwater pumping, and pollution impact aquifers? (25 Marks)
  - d) What are the challenges and implications of managing and protecting aquifers in the face of climate change and growing water demands? (25 Marks)

2.
  - a) What are the purposes of aquifer testing and enlist major aquifer testing methods? (20 Marks)
  - b) Explain different drilling techniques. (20 Marks)
  - c) Explain major steps of well installation process (20 Marks)
  - d) What are the major safety considerations when performing a drilling and well installation (20 Marks)
  - e) What are the purposes of Stream Dye Tracer Test and Soil tension test and explain the procedures of performing those tests? (20 Marks)

3.

- a) Enlist key physical, chemical and biological parameters that consider during water sampling. (20 Marks)
- b) Explain different water quality indicators with their importance (20 Marks)
- c) Enlist advantages and disadvantages of composite sampling (20 Marks)
- d) Explain different steps of sample collection process (20 Marks)
- e) Explain how pH, Turbidity and dissolved oxygen can provide insights into the quality and suitability of water for various purposes. (20 Marks)

**@@@@@@@@@@@@ End of the paper -Good Luck@@@@@@@@**