



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 6 Examination in Engineering: December 2015

Module Number: CE 6253

Module Name: Introduction to Ecological Engineering

[Three Hours]

[Answer all questions, each question carries TWELVE marks]

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- Q1. a) Explain the process of "Eutrophication" in water bodies and how they subsequently become green in color. [3 Marks]
- b) What is ecotoxicology? [2 Marks]
- c) Give an example for human-mediated invasive species distribution. [3 Marks]
- d) 'Chena cultivation has led to severe degradation of forest ecosystems'. Evaluate this statement. [4 Marks]
- Q2. a) The altitude of a particular location has an influence on the climatic conditions, thereby influencing the ecosystem distribution. Discuss this statement with examples. [3 Marks]
- b) Describe the factors that determine dissolved oxygen concentration in water. [3 Marks]
- c) A forest is an area with a high density of trees.
- i) What is the difference between rain forests and deciduous forests? [1 Mark]
- ii) What are the special adaptations of coniferous trees to survive in winter? [2 Marks]
- d) Compare the characteristics of lentic and lotic freshwater ecosystems. [3 Marks]
- Q3. a) Describe three possible applications of Ecological engineering. [3 Marks]
- b) Constructed wetlands are identified as an eco-friendly technology in treating domestic wastewater.
- i) What are the design parameters of a constructed wetland? [2 Marks]
- ii) What are the parameters to be measured in an effluent from a constructed wetland that is treating domestic wastewater? [3 Marks]
- c) Describe the situations where constructed wetlands are the most appropriate method of treating domestic wastewater. [4 Marks]

Q4. Propose solutions for each of the following situation applying ecological engineering principles.

- a) A river has been observed to have high nutrient concentration.
- b) A city is subjected to frequent flash floods.
- c) A grassland ecosystem tends to be fragmented.

[4x3 Marks]

Q5. Green roofs are one type of the sustainable ecosystems that can be developed in modern city centers.

- a) List three benefits of having green roofs.

[3 Marks]

- b) List three major characteristics of a green roof that may effect on the performance of the green roof. Explain the behavior of one such characteristic.

[4 Marks]

- c) Green roofs may negatively affect the discharge water quality if selection of plants and maintenance is not appropriate. Analyze this statement.

[5 Marks]