



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 6 Examination in Engineering: November 2016

Module Number: CE 6253

Module Name: Ecological Engineering

[Three Hours]

[Answer all questions, each question carries TWELVE marks]

- Q1. a) Define an 'ecosystem'. [2 Marks]
- b) Name four types of 'terrestrial ecosystems' in the world. [2 Marks]
- c) "Biologically diverse ecosystems are stable while less diverse ecosystems are highly productive and unstable." Support this statement with examples. [4 Marks]
- d) Each 100 m increase in the altitude results approximately 1° C decrease in the temperature. What is the influence of this on the spatial distribution of the ecosystems? Explain this in Sri Lankan context. [4 Marks]
- Q2. 'River channelization' has usually been done for different purposes across the globe. However, it is also a practice to restore some of the channelized rivers to the natural conditions at a later time.
- a) What are the objectives of the 'river channelization'? [3 Marks]
- b) Discuss possible reasons for restoring some of those rivers to natural conditions at a later time. [3 Marks]
- c) What are the ecological aspects that should be monitored in the projects on 'river restoration'? [3 Marks]
- d) In the process of 'ecosystem restoration', it takes a long time for an equilibrium state to be established. Give reasons for this. [3 Marks]
- Q3. a) 'Ecosystem restoration' is a major area of Ecological Engineering. Ecosystem restoration projects should be conducted after studying the original conditions of the ecosystem as well as similar ecosystems. Comment on the above situation with examples. [6 Marks]

b) i) The sub-surface flow wetlands are more suitable to be applied in tropical countries. Give reasons.

[3 Marks]

ii) Explain the pollutant removal mechanisms in constructed wetlands?

[3 Marks]

Q4. 'Green roofs' are one type of the sustainable ecosystems that can be developed in modern city centers.

i) Sketch a cross section of a typical 'green roof' and name all the layers.

[3 Marks]

ii) Explain the function of each of **four** selected layers among them.

[2 Marks]

iii) Discuss the influence of 'green roofs' on the quality of runoff water.

[3 Marks]

iv) Assume that you are the designer of a proposed office complex in the center of a modern city. Justify the investment for construction of a green roof to the project proponent.

[4 Marks]

Q5. a) Explain the consequences of 'global warming'.

[2 Marks]

b) Explain the process of 'eutrophication' in lakes.

[3 Marks]

c) Discuss major threats on 'forest ecosystems' in the present scenario.

[3 Marks]

d) "Invasive species distribution has threatened the biodiversity. Disturbed ecosystems are more liable to the invasion." Critically analyze this statement.

[4 Marks]