FACULTY OF AGRICULTURE - UNIVERSITY OF RUHUNA

Third Examination in B. Sc. Agricultural Resource Management & Technology / B. Sc. Agribusiness Management (PART I) – July 2016

SS3101 Land Resource Management **Time: 03 Hours**

Answer **05 (FIVE)** questions only

Each question carries a total mark of 100

1. I. a) How do you define land use? *(5 marks)*

   b) What are the major uses of land? *(10 marks)*

   c) Differentiate the terms 'land use planning' and 'land suitability evaluation'. *(15 marks)*

   II. a) What is meant by soil spatial variability? *(5 marks)*

   b) Give examples for small, medium and large-scale variability of the soil. *(20 marks)*

   c) What are the main steps involved in mapping the soil of a given area? *(20 marks)*

   d) Name modern technologies used for soil investigations and mapping. *(10 marks)*

   e) What is meant by delineating soil boundaries? *(15 marks)*

2. I. a) Explain briefly a saline soil? *(10 marks)*

   b) Name three qualitative characteristics in plants and soil which may help you to identify a saline soil. *(15 marks)*

   c) Describe the formation of saline seeps. *(15 marks)*

   d) Explain briefly the problems in managing the saline soils. *(10 marks)*

   II. a) Write an equation for Exchangeable Sodium Percentage (ESP). *(10 marks)*

   b) List five soil properties of actual acid sulfate (AASS) soils. *(15 marks)*

c) Describe briefly three possible techniques to manage acid sulfate soils. *(15 marks)*

d) In a crop cultivated land, the evapotranspiration is given as 400 mm/season. In the specific land, the leaching requirement is calculated as 0.15. Find total water requirement for a season which should be applied to fulfill the crop water requirements and to leach excess salts. (10 marks)

3. **I.** **a)** Define soil erosion. *(5 marks)*

b) Name five main types of water erosion. *(5 marks)*

c) Describe two main effects of wind erosion. *(10 marks)*

d) Explain briefly the three predominant processes of ice erosion. *(15 marks)*

II. **a)** Define 'soil conservation'. *(10 marks)*

b) What is meant by the Universal Soil Loss Equation? *(10 marks)*

c) Name the basic factors used in the Universal Soil Loss Equation. *(10 marks)*

d) Briefly explain the importance and use of the Universal Soil Loss Equation. *(10 marks)*

e) Name three disadvantages of the Universal Soil Loss Equation. *(10 marks)*

f) For a bare land, the rainfall factor is 115. Soil erodibility factor is 0.2. Slope length and gradient (L×S) factor is 0.5. The support practice factor is 0.50. Calculate the average annual soil loss (give units). *(15 marks)*

4. **I.** **a)** What do you understand by the term 'erosion control'? *(10 marks)*

b) Name four cover methods that can be used to control erosion in a sloping farmland in the wet zone of Sri Lanka. *(10 marks)*

c) State the four erosion control principles. *(10 marks)*

II. **a)** Explain briefly the following terms that are used in erosion control.

(i) Wind break *(10 marks)*
(ii) Fiber roll *(10 marks)*
(iii) Terracing *(10 marks)*
(iv) Cover crop *(10 marks)*
(v) Zero tillage *(10 marks)*

b) Explain in detail about the contour methods that can be used for erosion control with their importance in sloping farmlands in Sri Lanka. *(20 marks)*

5. **I.** **a)** Define land degradation. *(10 marks)*

b) What are the main causes of land degradation? *(20 marks)*

c) Out of the causes given above (**b**) and in your view, what is the most severe cause of land degradation in Sri Lanka? *(10 marks)*

II. **a)** State the processes involved in chemical degradation of land. Of those processes, what is the most relevant under Sri Lankan conditions? *(20 marks)*

b) Differentiate on-site and off-site impacts of land degradation. *(20 marks)*

c) Explain briefly an <u>off-site</u> impact of land degradation using a Sri Lankan example. *(20 marks)*

6. **I.** **a)** What is meant by sustainable land management? *(10 marks)*

b) State the principles for sustainable land management in farming systems. *(25 marks)*

c) What are the new technologies/options that could be used in sustainable land management? *(25 marks)*

II. **a)** Define ecosystem services. *(10 marks)*

b) State the types of ecosystem services generated by sustainable land management. *(30 marks)*