



The Open University of Sri Lanka
Faculty of Engineering Technology
Final Examination 2006
AEX3231 Soil Management, Tillage and Traction
AED2210 Cultivation and Soil Management

Date : 10-03-2007

Time : 1330-1630 hours

SECTION 2

SECTION A

- Q1. (a) Briefly explain the terms: "Soil structure" and "Soil texture".
- (b) Discuss how texture and structure of soil affect the crop growth.
- Q2. (a) What are the possible causes of soil compaction in agricultural lands.
- (b) How does it affect on crop growth?
- (c) Briefly describe the ways of reducing soil compaction.
- Q3. Discuss the different tillage techniques available for land preparation. Mention the applicability of each technique under Sri Lankan condition.
- Q4. Write short notes on following:
- (a) Mould board plough
 - (b) Disc plough
 - (c) Soil tilth
 - (d) Seeding techniques of paddy
- Q5. (a) Briefly discuss the main requirements for low land rice (paddy) cultivation.
- (b) What are the consequences of growing other field crops in a paddy field?
- Q6. (a) What are the characteristics of tropical environment that affect the crop yield?
- (b) Discuss the three (03) main traditional farming systems in Sri Lanka in relation to soil management and nutrient retention.

SECTION B

- Q1. (a) Explain what is meant by strength of soil.
(b) What factors affect the soil strength?
(c) Describe how soil could fail under the action of external loads.
- Q2. (a) Explain the terms: "Soil bulk strength" and "Soil clod strength".
(b) How do these bulk and clod strength values vary with the moisture content?
(c) How does one can make use of moisture content and modes of failure to control the tith?
- Q3. Failure occurs when a sample of soil is subjected to two principal stresses σ_1 and σ_2 . If $\sigma_1 = 5\sigma_2$, **maximum shear stress** and the normal stress on the failure plane are 30kN/m^2 and 35kN/m^2 respectively, determine:
- The principal stress values
 - Cohesion of soil
 - Angle of internal friction of the soil
 - Shear stress on the failure plane