RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B. Sc. (General) Degree in Applied Sciences
Third Year - Semester II Examination – July 2020

**PHY 3206 – SOIL PHYSICS**

**Time: Two (02) hours**

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Answer all questions

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1. a) Give a detailed description on the types of water associated with soil and determine their availability for plants. (20 marks)

   b) *"At the Wilting Point (WP) of a plant, the maximum tension that a plant can provide is balanced by the soil water tension"*. Explain the above statement. (05 marks)

   c) What is Field Capacity (FC) of soil and explain why the FC of clayey soil is higher than that of sandy soil. Use diagrams where appropriate. (15 marks)

   d) Does the Permanent Wilting Point (PWP) of the soil depend on the plant variety? Substantiate your answer. (10 marks)

2. a) Distinguish between "particle size classification of soil" and "textural classification of soil". (20 marks)

   b) The textural triangle given below describes the relative proportions of sand, silt and clay in various types of soils. Briefly discuss how the textural triangle is used to determine the textural class of a given soil. (15 marks)

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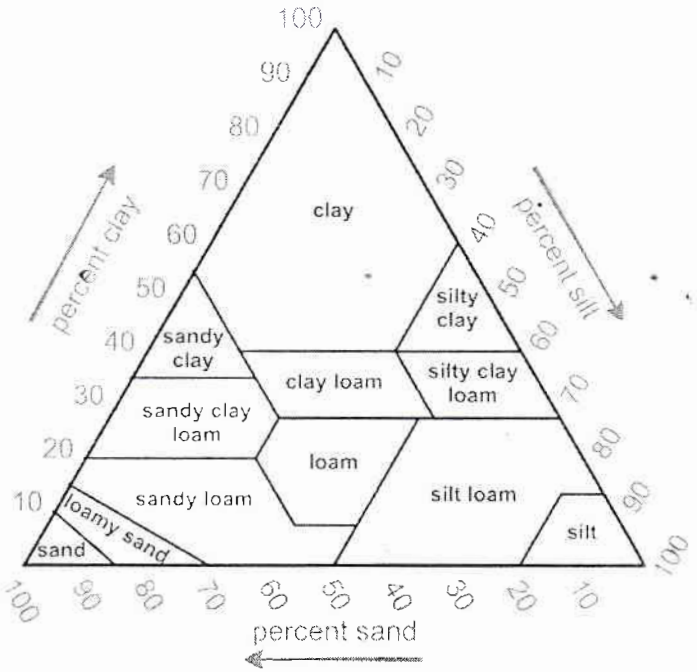


TEXTURAL TRIANGLE

c) Sketch the variation of the following quantities of soil as a function of particle size.

(i) Surface area (05 marks)
(ii) Plasticity (05 marks)
(iii) Absorptivity (05 marks)

3. a) What are the components of total soil moisture potential ($\phi_t$)? Explain each and every component briefly. (25 marks)

b) Deduce $\phi_t$ for saturated soil situations (Hydraulic Head). (05 marks)

c) Show that the Hydraulic Head at point A is equal to that of point B in the following saturated soil column. (10 marks)

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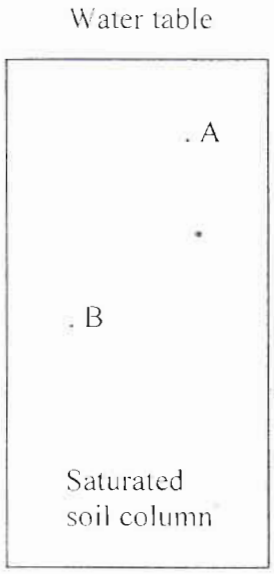


d) Explain in detail, a method used to determine the Saturated Hydraulic Conductivity of a highly permeable soil. (10 marks)

4. Write short notes on the following.

a) Particle density vs. bulk density of soil. (12 marks)

b) The effect of soil water content on thermal conductivity. (12 marks)

c) Soil puddling. (12 marks)

d) 1:1 clay minerals. (14 marks)

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