Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 Level 1st Semester Examination – May/June 2017
MRT 355-2 Soil Physics

Uva Wellassa University

Instructions
Duration: 02 hours
Number of questions: Three (03)
Number of questions to be answered: Three (03)
Mark allocation: 100
Illustrate your answers with sketches/diagrams where necessary.

1.

a. Describe the five major processes involved in physical weathering leading to soil profile formations. (10 marks)

b. i. Explain the phase system in soil.

ii. Describe the conditions of existing of two phases of a soil out of the three. (10 marks)

c. Describe the following.

(i) Void ratio

(ii) Porosity (5 marks)

2.

a. What is meant by soil texture? Illustrate your answer with appropriate diagrams.

(5marks)

b. Show the relationship between bulk and particle densities. (5 marks)

c. Describe the available methods for particle size analysis (Mechanical analysis).

(10 marks)

d. The Pipette method of texture analysis was used to determine the time required for a particle (d = 2 μm) to settle to a depth of 10 cm. Calculate t and v using Stokes' law. Assume $\eta = 1.002 \times 10^{-2}$ g/cms^{-1} and g = 981 cm/s^2. (5 marks)

e. Describe research applications of particle size analysis. (10 marks)

3

a. What is meant by soil water content? (5 marks)

b. Write notes on

(i) Soil water characteristics curve (SWCC)

(ii) Standard methods to estimate soil water content (10 marks)

c. Draw the SWCC using the given data table (use the graph sheet). (10 marks)

pF (= log | ψ|, ψ in cmH_2O	Θ
0	0.51
1	0.48
1.5	0.36
1.8	0.25
2.5	0.22
4	0.17
6.2	0.12
7	0.002

d. A 100 cm soil column containing packed sand (saturated hydraulic conductivity is 100 cm/day) is placed vertically with an open bottom (p = 0). A constant 10 cm height of water is ponded continuously on the top surface. Calculate the steady water flux *Jw* through the soil. (15 marks)