EASTERN UNIVERSITY, SRI LANKA
SECOND YEAR, FIRST SEMESTER EXAMINATION IN AGRICULTURE – 2012/2013
AC 2101: PROPERTIES AND APPRAISAL OF SOIL
PRACTICAL EXAM (Mar/ /Apr 2015)
Paper I Gr. 1

Time: 3 hours
Answer all questions

Q1) a. Explain the bulk density determination procedure by core method.

b. Two core samples were collected from different fields (A&B) to find out the bulk density. Using the data's, find out the bulk density of A& B.

Description	Sample A	Sample B
Core Height	6 cm	6 cm
Core Diameter	5cm	5 cm
Wet Weight of soil	230 g	212 g
Dry weight of soil	190 g	188 g

c. Discuss why sample A and B have different bulk density values?

d. Find out the porosity and moisture content of above two soil samples.

Q2) a. Explain the principle involved in determination of Flocculation and dispersion.

b. A student used the following chemicals to test the impact of those chemicals on flocculation and dispersion in a clay suspension.

1. 0.5N $CaCl_2$
2. 0.05N $CaCl_2$
3. 1 N $CaCl_2$
4. 2N $FeCl_3$
5. 2N $CaCl_2$

i. Arrange the chemicals in an order in which flocculation will be occur.

ii. Give the reason for your orders

Cont ..... /2

c. A student added Calcium solution and sodium solution in test tubes A and B ha clay suspension. He observed that ;

Test tubes A: Dispersed

Test tubes B: Flocculated

i. Explain the reason for the observation.

d. Discuss the effect of pH on flocculation and dispersion with examples.

Q3) a. Describe the colour of the given soil samples X, Y, Z in Wet and Dry basis.

b. Calculate the time interval taken by following size soil particles to reach 10cm depth in the water.

Particle diameter (μ)	Depth (cm)	Time		
		Hours	Min	Sec
20	10cm			
5	10cm			
2	10cm			

c. Identify the purpose of following chemicals in soil texture analysis

i. 1N sodium hexametaphosphate

ii. 30% H_2O_2.

iii. Concentrated HCl

Cont .....

Q4) A student placed 10 g soil samples in 2 reagent bottles P and Q. He added 0.05 g of straw in one bottle and 0.05 g of grass clippings in another bottle. He added some distilled water to each bottle and hanged up a ignition tube having 3ml of 1N NaOH. He kept this at 20^0C for one week. The bottles are given to you.

a. Explain the principle involved in the above determination
b. Find out the microbial activity in bottle P and Q
c. Based on the results locate straw and grass clippings in P and Q, with reason.
d. Give the reason for each steps in the above determination until titration.

Q5) a. A second year student took 20g of acidic soil farm "A" in a 500 ml conical flask and added 200ml of 0.02 M $Ca(HCO_3)_2$. He kept the flask in the shaker for 3hrs. And filtered the sample. 50 of the filtrate is lablelled as "L" and given to you.

i. Calculate the amount of $Ca(HCO_3)_2$ needed to reclaim 1 ha of that farm "A".
ii. Explain the principle involved in the above estimation.

b. i. Explain the principle involved in CEC estimation
ii. In CEC estimation "there may be a chance for under estimation and over estimation of CEC", Discuss the statement
iii. A students kept the leachate collected during CEC estimation for another estimation. Why?

Q6) a. Describe an experiment to compare the capillarity of sand and clay soils.

b. What are the factors determining the capillary rise?

c. What is the application of the knowledge of consistency?

d. Why is soil consistence determined under dry, moist and wet conditions?