

21 JUL  
Eastern University, Sri Lanka

**EASTERN UNIVERSITY, SRI LANKA**  
**THIRD YEAR SECOND SEMESTER EXAMINATION IN AGRICULTURE**  
**SOIL PROPERTIES ACH 3201**

Answer all questions

Time: 2 hours

1. A final year Agriculture student carried out a research work in Batticaloa region by using 10t/ha poultry manure, 5t/ha rice straw and 10t/ha cattle manure as treatments with onion crop and obtained the following results.

Treatment	Nitrogen uptake (kg/ha)	Soil nitrogen (kg/ha)	NO <sub>3</sub> <sup>-</sup> leached (kg/ha)
Poultry manure	155	1087.3	2.78
Rice straw	27.7	414	2.82
Cattle manure	134.3	686.1	2.78
Control	30.4	239.6	28.6

- a. What may be the reason for high nitrogen uptake in poultry manure treatment than cattle manure and rice straw treatments.
- b. Explain the reason for the low nitrogen uptake in rice straw treatment than in other organic manure treatments.
- c. i. "Though the nitrogen content of rice straw treated soil is higher than control treatment, the nitrogen uptake in rice straw treatment is lower than control". Explain with reasons.  
ii. What are the precautions to be taken to prevent the problem quoted in c i.
- d. Discuss the effect of organic manures on nitrate leaching.
- e. Predict the major property of the soil used in this study.
- f. Write a brief conclusion for this study.

2. a. A soil "A" having a cation exchange capacity of 65 meq/100g soil and the base saturation is 90%, but after a heavy rain fall for a week the base saturation was reduced to 30%. Explain the reason for the sudden reduction in the base saturation, and explain the ways can be used to reclaim the soil prevailed in that area after the heavy rain fall.
- b. If the river band found in your area is fully covered by algal bloom, explain the reasons for the above observations and the precautions to be taken to prevent the above problem.

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3. A student did a study in his area and found out the followings.

Soil pH - 7.5

Electrical conductivity – 4.5 mmho/cm

Sodium adsorption ratio – 14

Exchangeable sodium percentage – 16 %

- a. What may be the reason for the above condition
- b. How can you reclaim the soil in the above area.

4. If a farmer in your area going to cultivate Brinjal in his area, and the extension officer in his area gave him a fertilizer recommendation for Brinjal cultivation in your area as

90 – 60 – 30 (90kg N, 60 kg  $P_2O_5$  and 30 kg  $K_2O$  / ha)

a. The available fertilizer material in your area is

Ammonium sulphate – ( 20 – 0 – 0)

Supper phosphate - ( 0 – 20 – 0)

Muriate of potash - (0 – 0 – 60)

- i. Calculate the amount of ammonium sulphate, supper phosphate and muriate of potash required to cultivate Brinjal in one hectare of your land.
- b. If another farmer in the same area going use amorphous ( 16 – 20 – 0) instead of supper phosphate to cultivate Brinjal.
- i. Calculate the amount of amorphous, ammonium sulphate and muriate of potash required to cultivate Brinjal in one hectare of your land.

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