EASTERN UNIVERSITY, SRI LANKA

THIRD YEAR SECOND SEMESTER EXAMINATION IN AGRICULTURE- 2003/2004

AEN 3201 SOIL & WATER CONSERVATION ENGINEERING AND METEOROLOGY (2: 20/20)

Answer all questions
Time: 2 hours

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01. (a) Define the terms 'Accelerated erosion' and 'Geologic erosion'
    (b) List the causes for soil erosion.
    (c) Briefly discuss the processes of Soil erosion.
    (d) Briefly describe the effects of soil erosion?

02. (a) How do you measure the size of a Raindrop?
    (b) Calculate the EI_{30} and KE>25 indices of Rainfall erosivity for the storm data given below;

Time from the start of storm (min)	Rainfall (mm)
1 – 10	1.2
11 – 20	5.1
21 – 30	5.8
31 – 40	2.4

(Note: KE = 11.9 + 8.7 log I. I_{30} = 24 mm/h when energy of rainfall in $J/m^2/mm$).

03. Write short notes on the following;
    (a) Sediment transport
    (b) Normal forms of erosion
    (c) Erodibility of soil

04. (a) Distinguish between climate and weather.
    (b) Comment on the factors considered in selecting a site for a meteorological field station.
    (c) Briefly comment on how the location of Batticaloa meteorological station will affect the quality of data being gathered.
    (d) Comment on how the presence of vegetation will affect the local climate of an area.

2. A. A third year Agriculture student did a soil analysis in two different areas (soil A and soil B)and got the following observations.

Property	Soil A	Soil B
Organic matter content	30 %	5 %
Cation Exchange Capacity	65 meq/100g soil	10 meq/100g soil
Total Exchangeable Bases	90 %	90 %

i. Explain the suitability of soil A and soil B in agriculture.

ii. The student added same amount of ammonium sulphate to soil A and soil B, and after one week he found that the pH of soil B was reduced but in soil A the pH was maintained at the same level. Explain the reason for this change.

iii. How can you improve the soil B.

B. A farmer wanted to add some organic manure to his soil, but he doesn't know the influence of carbon content of organic matter on the availability of nitrogen. Explain him the influence of carbonaceous material on the availability of nitrogen to plants.

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

Soil pH - 7.5

Electrical conductivity - 5 mmho / cm

Sodium adsoption ratio - 10

Exchangeable Sodium Percentage - 13%

i. What may be the reason for the above condition

ii. Name the problem and process of formation of this soil.

iii. How can you reclaim the above problematic soil.

B. "Inorganic fertilizers cause some environmental hazards". How can you prevent the problems?

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A student going to cultivate a crop in his area. The fertilizer recommendation for that crop is 90- 60- 30 (90kg N, 60kg P_2O_5 and 30kg K_2O / ha).

The available fertilizer material is

Ammonium sulphate – (20 -0 -0)

Super 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 that crop in his one hectare land.

B. If another student in the same area going to use a fertilizer mixture (12 -12 -12) instead of muriate of potash

i. Calculate the amount of ammonium sulphate, fertilizer mixture and supper phosphate required to cultivate the same crop in one hectare land.

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