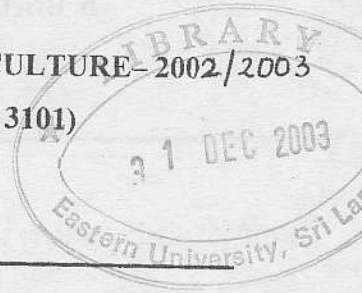# EASTERN UNIVERSITY, SRI LANKA

THIRD YEAR FIRST SEMESTER EXAMINATION IN AGRICULTURE- 2002/2003

IRRIGATION AND WATER MANAGEMENT (AEN 3101)

Answer all questions

Time: 03 hours

1. a. What are the kinds of soil water and state their availability to the plants?

   b. What is the importance of 'critical point' of water availability?

   c. The soil moisture contents of a field just before and after a thorough irrigation were 18 and 30 percent respectively. If the permanent wilting point is 12 %, what was the depletion level adopted for the above irrigation?

2. A farmer living in the dry zone wishes to grow chillies in his 3 ha field under irrigation. He approached a research officer to seek assistance in planning his cultivation practices. The research officer was able to collect the following data:

   > Moisture content at field capacity and Permanent wilting point are 24 % and 12 % respectively.
   >
   > Moisture content of air dried soil = 3 %
   >
   > Bulk density of the soil = 1.4 gcm^{-3}
   >
   > Depletion level for chillies = 50 %
   >
   > Maximum rooting depth of chilli = 60 cm
   >
   > Duration between transplanting and final harvest = 120 days and transplanting date is 15th of March.
   >
   > ET_{chilli} during four quarters of growing season are 5,6,6.5 and 6 mm/day respectively.
   >
   > Efficiency of irrigation = 80 %

   i.   How much water is needed for first and subsequent irrigation?

   ii. Schedule the dates for first 5 irrigations

3   a. What are the natural conditions favour sub irrigation systems?

b. Briefly explain the evaluation of infiltration rate in furrow irrigation system.

c. The following conditions maintained for an evaluation of border irrigation system;

    Long border strip   Mild slope

    High infiltration rate   Small irrigation stream

    i.   Briefly explain the results of above evaluation with a suitable diagram

    ii.   How would you improve the above irrigation

4.   a. Briefly describe the principles of sprinkler operation

b. The discharge rate from a sprinkler head is 1.5 m^3/hr. If the night time spacing of 20 m x 10 m is reduced to 10 m x 10 m during day time to overcome the effect of wind, calculate the application rate in both cases.

c. If the basic infiltration rate of the soil is 10 mm/hr, comment on the suitability of the above change in spacing.

5.   Critically discuss the following statements;

a.   Distribution patterns of adjacent sprinklers should overlap to achieve higher distribution uniformities

b.   Cultivation in highly saline soils is possible with drip irrigation

c.   In fertigation, fertilizer application should be finished within 70-80 % of the duration of irrigation

d.   Control head is essential for the successfulness of the drip irrigation system.

6.   a.   Briefly describe the effect of excess water on crop

b.   How do you plan a field drainage system in an area.

c.   What are the assumptions use in Hooghoudts' equation

d.   Briefly explain the special features of subsurface drainage.