## Eastern University, Sri Lanka

## Third Year First Semester Examination in Agriculture 2003/2004

## IRRIGATION AND WATER MANAGEMENT (AEN 3101)

***Answer All Questions*** ***Time Allowed: Three Hours***

---

01. (i) What do you mean by the following terms.

(a) Total Available Water Capacity.

(b) Depletion level.

(ii) A crop field area of 2 ha received 3600 $m^3$ of net water during irrigation. The field capacity and permanent wilting point are 30% and 10% respectively. The root zone depth of soil is 1 m and the bulk density of soil is 1.5 $g/cm^3$.

(a) Determine the level of depletion adopted.

(b) What is the moisture content at the beginning of the irrigation?

(c) If application efficiency is 80%, calculate the gross volume of water required for irrigation.

(d) If the consumptive use of crop is 20 mm/day, determine the irrigation interval.

(e) Calculate the moisture content at 50% depletion level.

02. One hectare was irrigated with a stream size of 19 lit/sec for 6 hours. The available water capacity of the soil is 27 % by volume and the irrigation was given at 60% depletion level. If the effective root zone depth is 60cm and the water application efficiency is 60%, determine the water storage efficiency.

03. It is given that $\mathbf{I = 0.57\ T^{0.7}}$.....Eq.(1).. Where, I – accumulated infiltration (cm), T – Elapsed time (min).

i. Determine the average infiltration rate over a period of 60 minutes from the beginning.

ii. Determine the average infiltration rate between 60 and 120 minutes.

iii. Rewrite the equation (re-compute the constant and the coefficient) to indicate the I in centimeter and the T in hour.

iv. Drive the infiltration rate (i) function from equation (1) (indicate the units).

...../2

04. (i) Discuss relative advantages and disadvantages of overhead irrigation and localized irrigations systems

(ii) What are the major causes that lead to inefficient water use at the farm level and suggest methods to overcome these farm water management problems?

(iii) Critically evaluate how the water use efficiency can be increased by adopting micro-irrigation systems.

05. a. What are the key elements of an IWRM (Integrated Water Resource Management) approach to sustainable development?

b. In your region, how critical is water in sustainable development? Briefly discuss.

c. Briefly explain the challenges of IWRM present to different stakeholders.

06. Write short notes on the followings.

(a) Soil compaction.

(b) Soil consistency.

(c) Kinds of soil water.

(d) Measurement of soil moisture.

.....