



The Open University of Sri Lanka
Faculty of Engineering Technology
Final Examination 2005/2006
AEX4237 Irrigation and Drainage Engineering
AED2216 Irrigation and water Management

Date : 03-04-2006

Time : 0930-1230 hours

SECTION 2

Answer any four (4) questions. All questions carry equal marks.

1. (a) What is the importance of Irrigation and drainage engineering in the Sri Lankan context?

(b) Define the following terms; crop period, duty of a crop, consumptive use, evapotranspiration and effective rainfall.

(c) The Reddish Brown Earth in the dry zone of Sri Lanka holds 21% and 9.5% of water respectively at field capacity and permanent wilting point (by weight). If the dry bulk density of soil is 1.3 g/cm^3 , determine the total water available for plants in this soil.

(d) If a Maize crop grown in the soil, mentioned in section (c) above, with a root depth of 1.2m and consumptive use of 8mm/day, determine the irrigation interval and volume, assuming irrigation at 50% depletion of the total available water.
2. Write a short essay on "The decline of the irrigation civilization in ancient Sri Lanka".
3. (a) What are the four main types of canals found in an irrigation scheme?

(b) Briefly explain Kennechy's critical velocity concept used in designing canals.

(c) Design a suitable section for an irrigation canal to convey $75 \text{ m}^3/\text{s}$ flowing through Reddish Brown Earth (Manning's $n=0.05$) with a bed slope of 0.2%. The section of the canal is trapezoidal with sides 1:1 (Vertical:Horizontal).

(d) Check if the flow in the above canal [(in section (c))] is in the non silting, non scouring range

4. Write short notes on any four (04) of the following.
- Types of dams
 - Factors affecting the site selection for dams.
 - Earth moving equipment
 - Canal operation and maintenance
 - Types of spillways
- 5.
- What are the basic methods of irrigation?
 - Compare the advantages and disadvantages of each method.
 - What are the crops suitable to be grown under each method and why?
 - Calculate the scheme water requirement in February for a 30 ha farm growing the following crops.

Crop	Area (ha)	Crop Water Requirement in February (mm/d)
Maize	15	5.4
Cotton	10	4.3
Vegetables	5	3.0

Assume that: Water application efficiency is 65%, Conveyance efficiency is 70%, Irrigation only takes place for 14 hours each day and 5 days each week.

6. (a) Discuss the drainage problems and practices in Sri Lanka .
- (b) What factors would you consider when assessing possibilities for the re-use of drainage water for irrigation? Outline a situation where the re-use of drainage water for irrigation is likely to be feasible.
7. (a) Explain what saline soils and sodic soils are. What are the main differences between the two?
- (b). Irrigation water has an electrical conductivity of 1.2 mmho/cm; where as, an electrical conductivity of 12 mmhos/cm in saturation extract of the soil is tolerable. If the net irrigation requirement is 6 mm/day, calculate the gross irrigation requirement and the leaching percentage.