



The Open University of Sri Lanka  
Faculty of Engineering Technology  
Bachelor of Industrial Studies Honors  
(Agriculture)  
Final Examination – 2020/2021  
**AGI4555 Irrigation and Drainage  
Engineering**

**Date** : 05-02-2022  
**Time** : 9.30 – 12.30  
**Duration:** Three (03) hours

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**SECTION II:** Answer any **four** (04) questions. All questions carry equal marks.

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- (1) (a) Discuss the water control and measuring structures in canals.
- (b) An irrigation canal is constructed in sandy clay soils where the Manning's roughness coefficient is 0.28 and the mean bed slope is 0.007. Assume that the canal has side slopes are 1.4 horizontal to 1 vertical. If the maximum depth of flow allowed is 1.6m and the bed width of the canal is 1.8m, determine the maximum flow rate that can be conveyed in this canal.
- (2) (a) State the importance of making an irrigation schedule.
- (b) Define the following terms regarding an irrigation system.
- i. Application Efficiency
  - ii. Conveyance efficiency
  - iii. Project efficiency
- (c) Chillies with a root depth of 0.8 m was planted in an irrigation scheme in the North-Central Province of Sri Lanka. This area

consists of reddish-brown earth soil with field capacity and permanent wilting point of 22% and 10% on volume basis respectively. The bulk density of the reddish-brown earth soil is 1.50 g/cm<sup>3</sup>. Allowable management deficit is assumed at 50% allowable depletion. Calculate the following.

- (i) Total allowable water.
- (ii) Net irrigation requirement.

If the application efficiency is 80%,

- (iii) Calculate the gross irrigation requirement.

- (3) (a) Differentiate between reference evapotranspiration ( $ET_0$ ) and crop evapotranspiration ( $ET_c$ ).
  - (b) Discuss direct methods to estimate evapotranspiration.
  - (c) When  $p=0.29$  and mean daily temperature is 21.5 °C, calculate the reference evapotranspiration ( $ET_0$ ) in mm/day using Blaney-Criddle method.
- (4) (a) What are the basic methods of irrigation?
  - (b) Compare the advantages and disadvantages of each method.
  - (c) What are the crops suitable to be grown under each method and why?
  - (d) 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% and Irrigation only takes place for 14 hours each day and 5 days each week.

- (5) (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 mmhos/cm; whereas, 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.

- (b) Great Irrigation works by King Parakramabahu I
- (c) State the functions of irrigation department in Sri Lanka
- (d) Acid Sulphate soils in Sri Lanka

**End of paper**

