



The Open University of Sri Lanka

Faculty of Engineering Technology

Industrial Studies and Technology Programmes

Final Examination- 2012/2013

AEX4237/ Irrigation and Drainage Engineering

Date : 23-07-2013
 Time : 0930-1230 hrs
 Duration : Three (03) hours

1. (a) Differentiate between the saline soils, sodic soils and saline sodic soils.
 (b) How salinization can be prevented through good water management practices.
 (c) In a farmland electrical conductivity of irrigation water is 1.65mmho/cm and an electrical conductivity of 6mmhos/cm of soil saturation extract is acceptable. If the net irrigation requirement is 6 mm/day, calculate the gross irrigation requirement and the leaching percentage.
2. (a) Briefly explain the causes of decline in ancient hydraulic civilization in Sri Lanka.
 (b) Discuss on the role of farmer organizations in water management in the Dry Zone of Sri Lanka.
3. (a) Briefly explain how catchment deforestation can affect on the irrigation scheme.
 (b) Discuss the impact of irrigation on human health giving examples.
4. (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 slop is 0.006. Assume that the canal has side slopes are 1.5 horizontal to 1 vertical. If the maximum depth of flow allowed is 1.6 m and the bed width of the canal is 1.8m, determine the maximum flow rate that can be conveyed in this canal.
5. (a) Differentiate between surface drainage and sub surface drainage systems.
 (b) For the drainage of an irrigated area drain pipes with radius of 0.1 m will be used. They will be based at a depth of 1.8 m below the soil surface. A relatively impermeable soil layer was found at the depth of 6.8 m from soil surface. Irrigation

loss is 40 mm and irrigation interval is 20 days. Hydraulic conductivity is given as 0.8mm/d for the soil. Assuming a root zone depth of 50 cm, find the spacing between two sub surface drainage pipes.

6. (a) Briefly explain the terms “Management allowable deficit” (MAD) and “Total allowable water” (TAW) in relation to irrigation.
- (b) The Reddish Brown Earth’s soil of the dry zone holds water 21 % of the dry weight of soil at Field capacity and 9% at PWP. If the allowable depletion percentage for Maize is at 40%, calculate the MAD in percentage dry weight of soil.
- (c) Calculate the NIR of Maize in the same soil, if the rooting depth is 40 cm and the soil bulk density is 1.5 g/cm^3 .
- (d) If the farm area is 3 ha and application efficiency is 70%, calculate the total volume of water required to satisfy the above net irrigation requirement.