

Answer all questions

Time allowed: Two hours



- Q 1. a) Write the operation principle of 'neutron probe'.
b) List the factors affecting soil water potential.
c) Briefly describe the factors affecting soil moisture characteristics with suitable diagrams.
- Q 2. a) Critically evaluate how the water use efficiency increased by the adoption of micro irrigation systems.
b) Briefly explain the influence of soil types on the furrow shape with suitable diagrams.
c) Briefly explain the effects of the following prevailing conditions in a border irrigation system with a suitable diagram.
- Long border strip
 - High infiltration rate
 - Mild slope
 - Small irrigation stream
- Q 3. a) List the effects of excess water on crop growth and development.
b) The total evapotranspiration requirement for maize crop is 890.39 mm and effective rainfall is 284.18 mm. If the available irrigation water has electrical conductivity $EC_w = 2.7$ mmhos/cm, irrigation is done by surface method and soil is slightly layered, medium textured with measured leaching efficiency $L_e = 70\%$. Electrical conductivity of the soil saturation extract $EC_e = 2.5$ mmhos/cm.
- (i) Determine the leaching requirement.
 - (ii) Calculate the total depth of irrigation water required to meet evapotranspiration and leaching requirements.

Q 4. a) Comment on the following statements;

- (i) 'Potential energy will be the key driving force of water'.
- (ii) 'Cultivation in highly saline soils is possible with drip irrigation'.

b) A farmer living in the dry zone wishes to grow brinjal in his field under irrigation. He approached an irrigation expert to seek assistance in planning his cultivation practices regarding irrigation. The irrigation expert collected the following data to provide advice to the farmer.

Moisture content at field capacity = 25%

Moisture content at permanent wilting point = 10%

Specific gravity of soil = 1.2

Depletion level = 50%

Root zone depth = 1.5 m

Area = 150 ha

Duration of cultivation = April 1st to July 31st

ET _{brinjal} : April	= 4.5 mm/ day
May	= 5.6mm/ day
June	= 7.5 mm/ day
July	= 9.3 mm/ day
August	= 10 mm/ day

Based on the above data,

- (i) How much water is needed for first and subsequent irrigation?
- (ii) Schedule the irrigation pattern for the growing period.