

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER-VII EXAMINATION – WINTER 2015

Subject Code: X70605**Date: 04/12/2015****Subject Name: Irrigation Water Management,****Time: 10:30pm to 1:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain the design concepts and design criteria for sprinkler irrigation for diameter of laterals and mains, height of risers and nozzle diameter. **07**
- (b) Discuss the parameters which make drip irrigation a better choice than sprinkler irrigation. **07**
- Q.2** (a) (i) Enlist the crops which are tolerant to high water tables. (ii) Name the plants and trees which act as ‘natural pumps’ and should be grown in high water table areas to lower the water table. (iii) Explain the advantages and disadvantages of surface drainage system provided in agricultural field. **07**
- (b) Draw sketches and illustrate the various sub surface drainage systems and explain their suitability. **07**
- OR**
- (b) (i) Draw the curve to illustrate optimum moisture content for healthy growth of plants, over irrigation and under irrigation. (ii) Why is over irrigation harmful (iii) Why saline soils are not conducive to plant growth. **07**
- Q.3** (a) Mention the various stages of crop growth. Explain critical stage requirement. Work out a relationship between dry density, optimum moisture content, and field capacity to give depth of water to be applied to the crop. **07**
- (b) Describe a field method and write the statistical expression to find the uniformity coefficient of distribution of irrigation water for sprinkler system **07**
- OR**
- Q.3** (a) Enlist and explain the parameters to evaluate the performance of canal irrigation system **07**
- (b) Explain leaching requirements and illustrate how it affects the application efficiency. Compare the quality and suitability of ground water and surface water used for irrigation. **07**
- Q.4** (a) How will you identify canals, reservoirs and agricultural fields by visual interpretation of remotely sensed images. Explain the concepts involved in distinguishing between an irrigated and unirrigated area by processing a remotely sensed image in a GIS software. **07**
- (b) Discuss the advantages and suitability of furrow irrigation. How will you decide: furrow spacing, furrow length and slope. For a given soil is the same slope applicable for border irrigation? **07**
- OR**
- Q.4** (a) Discuss the Indian water resources scenario with respect to spatial and temporal variation of rainfall, overall water availability in major basins, ultimate irrigation potential and the potential created in the country. **07**
- (b) Explain the merits and demerits of water cooperative societies and highlight how community participation helps in more efficient use of irrigation water. **07**

- Q.5 (a)** Explain the factors affecting land slope in agricultural fields. Give the approximate value of land slope for heavy, medium and light soils. **07**
- (b)** A tube well is having a capacity of 4000 liters per hour and operates 20 hours each day during the irrigation season. How much area can it command if the irrigation interval is 20 days and depth of irrigation is 7 cm. **07**

OR

- Q.5 (a)** Explain briefly the following methods to calculate earthwork volumes during agricultural operations (i) Prismoidal method (ii) Four point method. Why is the four point formula preferred. **07**
- (b)** An area of 1 hectare was irrigated in 10 hours with a stream of 30 liters/second. Depth of root zone was 1 meter and available moisture holding capacity is 16cm/meter. Irrigation was given when 50% of moisture was depleted. Water application efficiency was 60%. Determine the water storage efficiency. **07**
