

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**PDDC SEMESTER VII- EXAMINATION – SUMMER 2017**

**Subject Code: X70605****Date: 03/05/2017**

**Subject Name: Irrigation Water Management**  
**(Departmental Elective)**

**Time: 02.30PM to 05.00PM****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 how remote sensing and GIS can be used for monitoring of irrigated areas. **07**

- (b)** (i) Discuss the peculiar features of river systems in northern, central, peninsular, western and eastern parts of India. **07**  
(iii) Explain the water management issues of South Gujarat and that of Kutch in the state of Gujarat.

**Q.2 (a)** Explain the following criteria for land grading: soil profile condition, cropping pattern and the existing land slope. Give the recommended safe limits of slope for heavy, medium and light soils. **07**

- (b)** Enlist the design elements of border irrigation. Develop an expression for time required to cover an area 'A' in terms of average depth of sheet of flowing water 'y' and rate of flow 'q'. **07**

**OR**

- (b)** Draw a typical layout of check basin type of irrigation. Explain its adaptability and design considerations. **07**

**Q.3 (a)** State and explain the suitability of furrow irrigation. Explain the design consideration for furrow length and stream size. **07**

- (b)** Furrow 100 meter long and 75 cm apart are irrigated by an initial stream of 2 liters /second. The initial stream size is reduced to 0.5 liters per second after 30 minutes. The reduced stream size is continued for 1 hour. Estimate the average depth of irrigation. **07**

**OR**

**Q.3 (a)** Explain the similarities and differences in the hydraulics of border and check basin type irrigation **07**

- (b)** A lateral has 10 sprinklers 14 meters apart. The laterals are spaced 20 meters. Determine the amount of fertilizer to be applied for each setting for a recommended fertilizer dose of 85 kg/ha **07**

**Q.4 (a)** Differentiate between sprinkler and drip irrigation under the following heads: initial cost, operation and maintenance cost, ambient temperature, evaporation losses and distribution uniformity. **07**

- (b)** Determine the system capacity for a sprinkler irrigation system to irrigate 15 hectares of maize. Moisture to be replaced in soil is 6 cm. Irrigation efficiency is 70%. Irrigation period 10 days with pump operation for a duration of 20 hours each day. **07**

**OR**

- Q.4 (a)** Define: project efficiency, storage efficiency, application and conveyance efficiency and explain their utility as performance indicators of irrigation system. **07**
- (b)** Define field capacity, permanent wilting point, consumptive use and dry density. Develop an expression to relate these parameters to find the irrigation frequency. **07**

- Q.5 (a)** Draw sketches to explain different types of sub surface drainage systems **07**
- (b)** Determine the discharge in litres per second for a sprinkler head operating at  $2.8 \text{ kg/cm}^2$  having nozzle size 4 mm x 2.8 mm with discharge coefficient of 0.96. **07**

**OR**

- Q.5 (a)** (i) Give the function of irrigation water (ii) Define sodium absorption ratio and explain the different ways in which salt content of irrigation water expressed. **07**
- (b)** (i) Find the application rate in cm/hr for a sprinkler discharge at the rate of 0.95 liters/second application of water for sprinkler spacing 18 m x 24 m. **07**
- (ii) Explain leaching requirements and how it affects the irrigation efficiency.

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