Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER • 2014

Subject Code: 170602 **Date: 02-12-2014**

Subject Name: Irrigation Engineering

Time: 10:30 am - 01:00 pm **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)** Describe with the help of sketch various forms of soil moisture. Which of these moisture is mainly available for utilization by the plants? **07**

(b) Explain the terms (i) Duty (ii) Delta and (iii) Base period. Derive the relation between Duty, Delta and Base period. **07**

Q.2 **(a)** Explain the salient features of the drip irrigation system. What are the advantages and disadvantages of the drip irrigation? **07**

(b) Explain the procedure for designing an irrigation channel using Kennedy's theory, when Q, N, m & S are given. **07**

OR

(b) The base period, intensity of irrigation and duty of various crops under a canal system are given in table below. Determine the reservoir capacity if the canal losses are 20% and reservoir losses are 12%. Culturable commanded area is 20,000 hectares. **07**

Crop	Base period (days)	Duty of water at the field (hectare/cumec)	Intensity of irrigation (%)
Wheat	120	1800	20
Sugarcane	360	1700	20
Cotton	180	1400	10
Rice	120	800	15
Vegetables	120	700	15

Q.3 **(a)** Explain the procedure for designing an irrigation channel using Lacey's theory. **07**

(b) Design an irrigation channel by Kennedy's theory to carry a discharge of 50 cumec. Take N = 0.0225 and m = 1.05. Bed slope is 0.2m per kilometer. **07**

OR

Q.3 **(a)** What is canal lining? Explain advantages and disadvantages of canal lining. **07**

(b) Design a lined concrete channel, trapezoidal in section to carry a discharge of 200 cumec at a slope of 30cm/km. The Manning's N = 0.017, and side slopes are 1.5:1. The limiting velocity in the channel is 2m/s. **07**

Q.4 **(a)** Explain causes of failure of weirs on pervious foundation and their remedies. **07**

(b) Sketch the layout of a typical diversion head works and describe briefly the functions of the various components of diversion head works. **07**

OR

Q.4 **(a)** Describe Bligh's creep theory for the design of weir over pervious foundation. **07**

(b) What are the ill effects of water logging? How do you prevent water logging? **07**

Q.5 **(a)** Describe with the help of neat sketches the various types of cross drainage works. **07**

(b) What is canal fall? Why is it necessary to provide a fall in a canal? Explain with sketch Ogee fall. **07**

OR

Q.5 **(a)** List the various methods for estimating maximum flood discharge and explain unit hydrograph method. **07**

(b) What is an escape? What are different type of escapes? Explain working of each type. **07**

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