

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER VII (NEW SYLLABUS) EXAMINATION- SUMMER - 2018

Subject Code: 2170609**Date: 03/05/2018****Subject Name: Irrigation Engineering****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

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

		MARKS
Q.1	(a) Define: Water application efficiency, Water conveyance efficiency and water distribution efficiency.	03
	(b) Define duty and delta and derive the relationship between the two.	04
	(c) Details of cropping pattern of an irrigated command area are shown in the following table. Calculate the discharge required in feeding canal based on average demand of the crop water requirement. Also calculate total storage required in the reservoir. Assume 15% conveyance losses in canals and 10% evaporation loss in the reservoir.	07

Crop	Season	Base period (days)	Duty at field (ha/cumec)	Crop area (ha)
Rice	Kharif	120	1600	1500
Wheat	Rabi	120	850	1700
Sugar Cane	Perennial	360	900	1100

Q.2	(a) Differentiate between weir and barrage.	03
	(b) Explain the function of the following: Divide wall, Under sluice, Fish ladder and Upstream block protection.	04
	(c) Discuss Khosala's method of independent variables to design a weir.	07

OR

- | | | |
|------------|---|-----------|
| (c) | Using Bligh's creep theory, calculate thickness of downstream floor at every 5 m from the downstream end. Also check whether the floor length is sufficient. Use the following details: | 07 |
|------------|---|-----------|
- (i) Length of upstream floor = 20 m
 - (ii) Length of downstream floor = 30 m
 - (iii) Head on upstream side = 4 m
 - (iv) Head on downstream side = 0 m
 - (v) Depth of upstream pile = 5 m
 - (vi) Depth of downstream pile = 6 m
 - (vii) Bligh's Creep coefficient, $C = 18$
 - (viii) Weight density of concrete = 24 KN/m^3

- Q.3** (a) Give classification of dams. **03**
 (b) Enlist the forces acting on the gravity dam and explain uplift pressure in details. **04**
 (c) Explain method to draw seepage line through homogeneous earth dam. **07**

OR

- Q.3** (a) Give classification of various irrigation methods. **03**
 (b) Write short note on soil-water-plant relationships. **04**
 (c) Compare drip and sprinkler irrigation systems with their advantages and disadvantages. **07**
- Q.4** (a) What are the limitations of Kennedy's theory? **03**
 (b) Write short note on canal alignment. **04**
 (c) Design an irrigation channel in alluvial soil using Lacey's silt theory, given the following data: **07**
 (i) Full supply discharge = 12 m³/sec
 (ii) Lacey's silt factor = 1.0
 (iii) Channel side slopes = 0.5:1.

OR

- Q.4** (a) Differentiate between contour canal and ridge canal. **03**
 (b) Design a channel for discharge of 50 cumecs in non-alluvial soil having maximum permissible velocity of 0.9 m/sec. The available bed slope is 1 in 4000. Assume Manning's N = 0.025. **04**
 (c) Discuss Lacey's regime theory. **07**
- Q.5** (a) With a neat line sketch, explain aqueduct. **03**
 (b) Why canal falls are provided? Explain any one type of canal fall. **04**
 (c) Discuss functions of head regulator and cross regulator. **07**

OR

- Q.5** (a) Discuss canal escapes in brief. **03**
 (b) Write design procedure for Sarda type of fall. **04**
 (c) Discuss causes of water logging. What are the remedial measures for it? **07**
