Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3170609 Date: 26/06/2023

Subject Name: Irrigation Engineering

Time: 10:30 AM TO 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What is the necessity of diversion head work? State different type of diversion head work.	**03**
	(b)	Why canal fall is provided? Enlist different types of canal fall.	**04**
	(c)	How water requirement of crops measured? Develop a relationship between duty and delta for a given base period.	**07**
Q.2	**(a)**	What is water logging? What are the ill effects of water logging?	**03**
	(b)	How does Lane's weighted creep theory differ from Bligh's creep theory? How creep length is to be determined in both the theories.	**04**
	(c)	A gravity dam 60.00 m. high had 6.50 m top width. Upstream face of dam is vertical. Base width is 46.50 m. Downstream face is inclined from top of the dam. Calculate self weight of the dam and moment @ toe of the dam. Take sp weight of dam material and water equals to 24 and 10 KN/m^3.	**07**
		OR	
	(c)	A gravity dam stores 70 m of water on upstream side and there is 10 m of water on downstream side. Base width of dam is 60 m and drainage gallery is located 12 m away from heel. Draw uplift pressure diagram and calculate total uplift force and its moment about toe.	**07**
Q.3	**(a)**	What is khosla's observation in design of permeable foundations?	**03**
	(b)	Calculate the balancing depth of a channel section having bed width equal to 12 m and side slopes of 1:1 in cutting and 2.25:1 in filling. The bank embankments are kept 2.40 m higher than the ground level and crest width of bank is kept as 1.50 m.	**04**
	(c)	What are the modes of failure of an earthen dam? Explain how to ensure safety against each mode.	**07**
		OR	
Q.3	**(a)**	Enlist factors to be considered while selecting site for a dam.	**03**
	(b)	Write short note on: Alignment of canal	**04**
	(c)	Design trapezoidal canal to carry a 5 m^3/sec of water using Lacey's theory. Take silt factor equal to 1. Also determine bed slope.	**07**
Q.4	**(a)**	State the type and advantage of canal lining.	**03**
	(b)	Narrate causes and preventive measures of water logging.	**04**
	(c)	Weir is constructed to store 5 m of water on a 23 m horizontal floor. 6.50 m deep upstream and 7 m deep downstream piles are provided. Calculate floor	**07**

thickness and uplift pressure at a point 10 m and 16 m away from the upstream end. Assume sp.gr of floor material = 2.24. Adopt Bligh's theory.

OR

Q.4 **(a)** Explain irrigation efficiency. **03**

(b) What is meant by limiting height of a gravity dam? Determine limiting height of a concrete gravity dam for (i) Allowable stress in concrete 3000 KN/m^2 (ii) Specific gravity of concrete 2.4 and (iii) Specific weight of water 10 KN/m^3. **04**

(c) What is meant by cross drainage work? Where it is provided? Enlist different types of cross drainage work and its suitability. **07**

Q.5 **(a)** Differentiate between suspended load and bed load. **03**

(b) Discuss the various methods of assessment of irrigation water charges. **04**

(c) Discuss the effect of earthquake on a gravity dam. How to determine inertia force and hydrodynamic force. **07**

OR

Q.5 **(a)** Discuss salient features of Kennedy's theory for design of canal. **03**

(b) Draw typical section of an earthen dam of 26 m height indicating the various parts of the dam. **04**

(c) Design trapezoidal concrete canal for following data **07**

a. Design discharge 225 m^3/sec
b. Bed slope 1 in 2500
c. Side slope 1:1
d. B/D ratio 4.20.
e. Manning's Coefficient 0.015

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