Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3170609 Date:16-05-2025

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Differentiate between Saturation Capacity and Field Capacity.	**03**
	(b)	Elaborate various types of lining and give necessity of canal lining.	**04**
	(c)	Discuss the scope of Irrigation Engineering in context to climate change impacts.	**07**
Q.2	**(a)**	Enumerate the sign of bad drainage condition of an area.	**03**
	(b)	Elaborate the benefits that can be accrued from Irrigation projects.	**04**
	(c)	Explain the need of Irrigation in India and describe its development in the country.	**07**
		OR	
	(c)	Enlist the objectives of command area development? How are these achieved through command area development programmees?	**07**
Q.3	**(a)**	Enumerate the different terms by which duty can be improved.	**03**
	(b)	Explain duty and delta of canal water. Derive the relationship between duty and delta for a given base period.	**04**
	(c)	Explain with a neat sketch the layout of a modern canal system, carrying water from a barrage. Discuss as to how the duty of water increases as we move downstream from the head of the main canal towards the head of the water course.	**07**
		OR	
Q.3	**(a)**	Enumerate the different factors affecting duty.	**03**
	(b)	Explain the following terms:- a) Cash crops b) Paleo c) Kor watering d) Crop ratio	**04**
	(c)	Explain how will you proceed for determining the field irrigation requirement (FIR) for an important crop like wheat?	**07**
Q.4	**(a)**	Distinguish between Suspended load and Bed load	**03**
	(b)	An earthen channel with a base 3m wide and side slope 1:1 carries water with a depth of 1m. The bed slope is 1:1600. Estimate the discharge. Take value of N in Manning's formula N = 0.04.	**04**
	(c)	Discuss Canal. With the help of a neat sketch, illustrate the classification of canals based on their alignment.	**07**
		OR	
Q.4	**(a)**	Explain Lacey's concept of initial, final, and permanent regime.	**03**
	(b)	A trapezoidal channel has side slope 1:2 (H:V) and the slope of bed is 1 in 1500. The area of the section is 40. Find the dimensions and discharge of most economical section, if C = 50.	**04**
	(c)	Describe Kennedy's theory for the design of irrigation channels in alluvial soil (both cases). What are the limitations of Kennedy's theory?	**07**

Q.5	**(a)**	Explain Balancing depth and how it is determined?	**03**
	(b)	Elaborate the fundamental difference between Kholsa's theory and Bligh's Creep theory for seepage below a weir.	**04**
	(c)	Explain brief outline Kholsa's theory on the design of weirs on permeable foundation. Enumerate the various corrections that are needed in the application of this theory.	**07**

OR

Q.5	**(a)**	Explain brief Khosla's exit gradient concept.	**03**
	(b)	Distinguish between weir and barrage.	**04**
	(c)	Elaborate diversion head and indicate the various components of the system. Briefly indicate the function of each components with a neat sketch.	**07**

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