GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–VI EXAMINATION – WINTER 2025

Subject Code:3160618   **Date:25-11-2025**
Subject Name:Open Channel flow
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)**	What are the different types of channels?	**03**
	(b)	Explain the velocity distribution in open channel flow.	**04**
	(c)	Explain continuity and momentum equation for open channel flow.	**07**
Q.2	**(a)**	What is specific energy? Draw curve of it.	**03**
	(b)	Define: 1. Section modulus, 2. Alternate depths, 3. Sequent depths, 4. Flumes	**04**
	(c)	Derive differential equation of gradually varied flow with assumptions.	**07**
		OR	
	(c)	Explain surges in open channel and their types.	**07**
Q.3	**(a)**	Write on drawdown and back water curves.	**03**
	(b)	What is hydraulic jump? Explain applications of it.	**04**
	(c)	Explain classification of flow profiles with examples.	**07**
		OR	
Q.3	**(a)**	Calculate the critical depth and the corresponding specific energy for a discharge of 5 m³/s in the rectangular channel of width 2.0 m.	**03**
	(b)	What is energy dissipation? Define location of hydraulic jump.	**04**
	(c)	Explain and derive St. Venant's equation.	**07**
Q.4	**(a)**	Define gradually varied and rapidly varied flow.	**03**
	(b)	What is unsteady flow? What are the types?	**04**
	(c)	In a rectangular channel 3.5 m wide laid at a slope of 0.0036, uniform flow occurs at a depth of 2.0 m. Find how high the hump be raised without causing afflux?	**07**
		OR	
Q.4	**(a)**	A concrete lined trapezoidal channel (n=0.015) is to have a side slope of 1:1. The bottom slope is 0.0004. Find the bottom width of the channel necessary to carry 100 m³/s of discharge at normal depth of 2.5 m.	**03**
	(b)	What do you mean by non-scouring channels?	**04**
	(c)	Explain regimes of flow & prediction of regimes.	**07**
Q.5	**(a)**	What is Incipient motion?	**03**
	(b)	What are the types of bed forms? What is the difference between aggradation and degradation?	**04**
	(c)	A circular drainage pipe 0.80 m in diameter conveys a discharge at a depth of 0.30 m. If the pipe laid on the slope of 1 in 900, estimate the discharge. Manning's n=0.015.	**07**
		OR	
Q.5	**(a)**	Explain in brief Lacey's regime theory.	**03**
	(b)	A hydraulic jump takes place in a rectangular channel with sequent depths of 0.25 m and 1.5 m at the beginning and end of the jump respectively. Estimate the i) discharge per unit width of the channel and ii) energy loss.	**04**
	(c)	Write in brief about shield's analysis. Write in brief about flow resistance.	**07**