

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI(NEW) EXAMINATION – WINTER 2022****Subject Code:3160618****Date:17-12-2022****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) Explain the term ‘Specific energy in fluid flow’.	03
	(b) Explain with example the velocity distribution in open channel.	04
	(c) Derive the expressions for the critical depth in channels of various geometric shapes.	07
Q.2	(a) Explain the term ‘First Hydraulic Exponent (M)’.	03
	(b) Derive the basic equation of continuity for steady and unsteady open channel flow.	04
	(c) Write a note on compound channel sections.	07
OR		
Q.3	(a) Write a note on Manning’s roughness coefficient.	03
	(b) Discuss the types of uniform flow computation problems.	04
	(c) Explain the concept of shield’s analysis for uniform flow.	07
OR		
Q.3	(a) Write a note on prediction of flow regimes.	03
	(b) Derive the equations of hydraulic mean depth for triangular and trapezoidal channel sections of rigid boundary channels.	04
	(c) Explain the concept of equivalent roughness of a channel.	07
Q.4	(a) Discuss the characteristics of jump in a rectangular channel.	03
	(b) Discuss the permissible velocities in rigid boundary channels.	04
	(c) Give the classification of flow profiles based on channel category and region of flow.	07
OR		
Q.4	(a) What is gradually varied flow? What are the basic assumptions involved in analysis of GVF?	03
	(b) Explain the features of type M and type S profiles.	04
	(c) Design a concrete lined channel to carry a discharge of 300 cumecs at a slope of 1 in 6500. The side slopes of the channel may be taken as 1.5:1. The value of n for lining material may be taken as 0.013. Assume limiting depth of the channel as 4.0 m.	07
Q.5	(a) Write a note on location of hydraulic jump.	03
	(b) Explain: Undular jump, weak jump, oscillating jump, steady jump.	04
	(c) Derive expression for the discharge over circular and trapezoidal sharp-crested weir.	07
OR		
Q.5	(a) Enlist various numerical methods for solving St. Venant equation.	03
	(b) Explain (1) sluice gate (2) Standing wave flume.	04

(c) Derive the equation of motion for GVUF in a prismatic channel.

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