Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (Old) EXAMINATION – WINTER 2019

Subject Code: 180601 **Date: 27/11/2019**

Subject Name: Design Of Hydraulic Structures

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)**	Explain the classification of dams based on hydraulic design and structural design.	**07**
	(b)	Enlist various causes of failure of an earth dam. Discuss only structural failure causes in earth dam.	**07**
Q.2	**(a)**	Define phreatic line in earthen dams. Also discuss procedure for locating phreatic line in a homogeneous earth dam with a horizontal drainage filter.	**07**
	(b)	What is spillway? What are the requirements of spillway? Explain any two spillway with neat sketch.	**07**
		OR	
	(b)	Discuss factors affecting for the selection of dam site in detail.	**07**
Q.3	**(a)**	Define energy dissipaters. What are the needs to provide it?	**07**
	(b)	Design practical profile of a gravity dam for the given data: • R.L. of base of dam = 49 m • R.L. of H.F.L. = 98 m • Safe compressive stress in concrete = 2450 KN/m2 • Specific gravity of concrete = 2.4 • Height of waves = 1.5 m	
		OR	
Q.3	**(a)**	Explain the procedure for designing a Straight Glacis Fall .	**07**
	(b)	A homogenous earth dam has water depth of 25 m in the reservoir. The dam has free board of 3 m. The top width of earth dam is 6 m. The upstream slope of dam is 3 H to 1 V and downstream slope is 2 H to 1 V. The dam is constructed on an impervious strata. The coefficient of permeability of dam material (K) is 7×10^{-8} m/s. Plot the corrected seepage line on graph paper and estimate the seepage loss per unit length of the dam.	**07**
Q.4	**(a)**	Write a short note on inspection galleries and contraction joints in gravity dam.	**07**
	(b)	Draw a neat sketch of rock-fill dam. How is the seepage of water controlled through the body of rock-fill dam?	**07**
		OR	
Q.4	**(a)**	Explain for an earth dam the function of (i) cut-off trench (ii) horizontal filter and (iii) riprap with neat sketches.	**07**
	(b)	Explain how the storage capacity of reservoir and height of dam are determined.	**07**
Q.5	**(a)**	Explain with a neat sketch the functions of head regulator.	**07**
	(b)	Explain how the ogee spillway is designed .	**07**
		OR	
Q.5	**(a)**	Explain stability requirements of a gravity dam.	**07**
	(b)	Discuss the effect of inertia force and hydrodynamic pressure on gravity dam.	**07**