Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2180601 **Date: 06/05/2017**

Subject Name: Design of Hydrauilic Structures(Departmental Elective - III)

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.**

Q.1	**(a)**	What is spillway? What are the requirements of spillway? Explain any two spillway with neat sketch,	**07**
	(b)	How location of canal fall should be decided? Also discuss design features of various components of impervious floor of Sarda type fall.	**07**
Q.2	**(a)**	Discuss radial type spillway gates. Also write short note on arch dam.	**07**
	(b)	Explain design considerations for an embankment dam.	**07**
		OR	
	(b)	Derive an expression to compute seepage discharge through body of dam with a horizontal drainage filter.	**07**
Q.3	**(a)**	Why position of phreatic line is to be predicted in dam section? Also compute seepage rate by using flow net.	**07**
	(b)	Discuss step wise design procedure of cross regulator and distributary head regulator.	**07**
		OR	
Q.3	**(a)**	Design practical profile of a gravity dam for the given data: • R.L. of base of dam = 47 m • R.L. of H.F.L. = 97 m • Safe compressive stress in concrete = 2450 KN/m^2 • Specific gravity of concrete = 2.4 • Height of waves = 1.5 m	**07**
	(b)	Enlist various causes of failure of an earth dam. Discuss only structural failure causes in earth dam.	**07**
Q.4	**(a)**	Discuss two dimensional method for stability analysis of gravity dam.	**07**
	(b)	Explain various energy dissipation measures adopted below spillway for relative up and down position of J.H.C & T.W.R.C. Also write brief note on cavitation in spillway.	**07**
		OR	
Q.4	**(a)**	Discuss normal stress and principal stress in elementary profile under reservoir full condition. Also enumerate various loading combinations specified by USBR & IS, used for design of gravity dam.	**07**
	(b)	Discuss uplift pressure force and earthquake force acting on a gravity dam.	**07**
Q.5	**(a)**	Describe design features of ogee spillway.	**07**
	(b)	How computation of hydraulic jump is carried out? Also write brief note on plunge pool.	**07**
		OR	
Q.5	**(a)**	Design the downstream profile, approach channel and discharge channel in case	**07**

of Chute spillway for given data:

- Spillway crest level = 160 m
- Level of bottom of flank at which low ogee weir is provided = 145 m
- Design discharge = 4500 cumecs
- Numbers of span = 5
- Clear distance between piers = 10 m
- Thickness of each pier = 2.5 m

(b) Differentiate cross regulator and distributary head regulator. Why drainage gallery is provided within a dam section? **07**

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