Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3170621 Date:19-12-2023

Subject Name: Design of hydraulic structures

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

			Marks
Q.1	**(a)**	Explain the classification of dams based on hydraulic design and according to use.	**03**
	(b)	Briefly explain Arch dam with figure.	**04**
	(c)	Write a short note on foundation treatment of gravity dam.	**07**
Q.2	**(a)**	Explain the Practical profile of a gravity dam.	**03**
	(b)	Briefly explain "Roller compacted concrete gravity dam".	**04**
	(c)	Design the practical profile of a concrete gravity dam for the given data. RL of base of dam = 65 m, RL of HFL = 130 m Safe compressive stress is concrete = 3000 kN/m^2 Specific gravity of concrete = 2.4, Height of waves = 1.0 m	**07**
		OR	
	(c)	Explain the Swedish slip circle method of analyzing the stability of an earth dam slopes.	**07**
Q.3	**(a)**	Explain about Flow Net. Also write its characteristics.	**03**
	(b)	What is meant by pore pressure and what is its significance in design of earthen dams?	**04**
	(c)	What are the factors affecting selection of site for a dam? Discuss them briefly.	**07**
		OR	
Q.3	**(a)**	Explain Zoned embankment type dam with neat sketch.	**03**
	(b)	Differentiate between a low gravity dam and a high gravity dam.	**04**
	(c)	What are the various causes of failures of earth dam?	**07**
Q.4	**(a)**	Explain briefly various foundation seepage control measures.	**03**
	(b)	Explain Side channel spillway with neat sketch.	**04**
	(c)	What are "rock fill dams" and what are their advantages over earthen dams? Draw a neat sketch of the cross section of a rock fill dam.	**07**
		OR	
Q.4	**(a)**	Explain ogee fall with sketch.	**03**
	(b)	Write a note on (i) Chimney drain (ii) Relief wells.	**04**
	(c)	Discuss bucket type energy dissipators with neat sketches.	**07**
Q.5	**(a)**	Discuss the merits and demerits of installing spillway gates.	**03**
	(b)	Define energy dissipaters. What are the needs to provide it?	**04**
	(c)	Define spillway. What is the purpose of its provision? What are the essential requirements? Where is the spillway located?	**07**
		OR	

Q.5	**(a)**	Write brief note on “Cavitation in Ogee Spillway”.	**03**
	(b)	Briefly discuss the component parts of a chute spillway	**04**
	(c)	Enlist different types of USBR stilling basin and explain any one of them.	**07**

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