Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3170621 Date:29/12/2021

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)**	How do you classify dams according to (i) hydraulic design (ii) material of construction?	**03**
	(b)	Discuss the factors governing the selection of a particular type of dam	**04**
	(c)	Explain briefly how grout curtain and drainage affect uplift pressures in gravity dams	**07**
Q.2	**(a)**	Explain the elementary profile of a gravity dam	**03**
	(b)	What useful purpose is served by a dam? What are the ill effects of dam construction?	**04**
	(c)	Explain briefly with neat sketches, the different forces that may act on a gravity dam. Indicate their magnitudes, directions and locations.	**07**
		OR	
	(c)	Explain the Swedish slip circle method of analyzing the stability of an earth dam slopes	**07**
Q.3	**(a)**	Discuss the causes of failure of earth dam	**03**
	(b)	Differentiate between a low gravity dam and a high gravity dam	**04**
	(c)	Write a note on the necessity and method of foundation treatment of dams	**07**
		OR	
Q.3	**(a)**	Draw a section of an earth dam of 20 m height indicating the various parts of dam	**03**
	(b)	How are pore pressures and uplift pressures controlled in rigid dams?	**04**
	(c)	Differentiate between horizontal and vertical piping in earth dams. Suggest permanent measures to check vertical piping	**07**
Q.4	**(a)**	Write a note on (i) Chimney drain (ii) Relief wells	**03**
	(b)	Discuss the priming arrangements used in saddle syphon spillways	**04**
	(c)	Explain the procedure of determination of Phreatic line when the dam section is homogeneous and without filter	**07**
		OR	
Q.4	**(a)**	Briefly describe an Ogee spillway	**03**
	(b)	Discuss the checks required to investigate the stability of earthen dam	**04**
	(c)	Write the procedure to design the stilling basins	**07**
Q.5	**(a)**	What are spillways and what is their necessity?	**03**
	(b)	Discuss briefly the component parts of a chute spillway	**04**
	(c)	Discuss the types of spillway gates	**07**
		OR	
Q.5	**(a)**	Discuss the merits and demerits of installing spillway gates	**03**
	(b)	Write a note on U.S.B.R. basins	**04**
	(c)	Discuss the various methods used for energy dissipation below spillways	**07**

****

Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022

Subject Code:3170621 Date:10/06/2022

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

			MARKS
Q.1	**(a)**	Classify different types of Dams.	**03**
	(b)	Write a short note on Dam Sites Investigations.	**04**
	(c)	Enlist and explain Foundation Treatment Methods.	**07**
Q.2	**(a)**	What are the factors affecting the selection of site for a dam?	**03**
	(b)	Why is it important to carry out Subsurface Exploration before the construction of dam?	**04**
	(c)	Determine the seepage through foundation for the given dam section (fig. 1) using Darcy's formula. Assume Coefficient of permeability as 0.2×10^{-6}m/s.	**07**

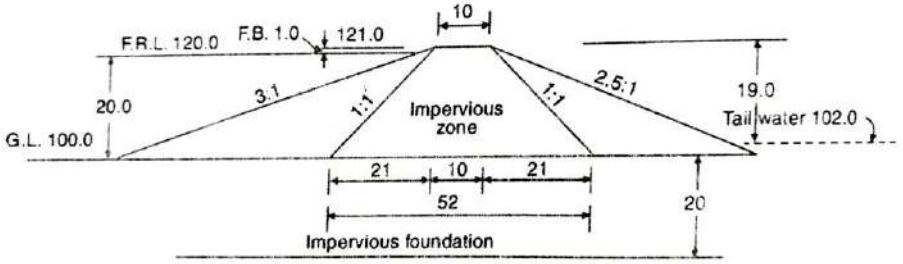

Fig. 1

OR

	(c)	Give answers to the following questions by considering that the safe limit of stress on the masonry should not exceed 350 tonnes/m^2 and weight of masonry is 2.4 tonnes/cum. (a) What should be the maximum height of elementary profile of a dam? (b) Determine base width. (c) Find the value of H and B, if uplift intensity factor is 0.67 and factor of safety is 2.	**07**
Q.3	**(a)**	Enumerate various forces acting on gravity dam.	**03**
	(b)	Enlist the advantages and disadvantages of gravity dam over other dams?	**04**
	(c)	Explain with neat sketch the practical profile of a Gravity Dam	**07**

OR

Q.3	**(a)**	What are the different causes of failure of gravity dams?	**03**
	(b)	Differentiate between high dam and low dam.	**04**
	(c)	Enlist and explain types of galleries with their importance with function.	**07**
Q.4	**(a)**	Give a detailed classification of earth dams.	**03**

	(b)	What are the different side slope protection measures are provided in the earth dams?	**04**
	(c)	Enlist and explain the causes of failure of earth dams.	**07**
		OR	
Q.4	**(a)**	Clarify the importance of core and casing for the earth dam.	**03**
	(b)	What are the measures taken for the seepage control and cutoff?	**04**
	(c)	Write a short note on drainage system for the earth dam.	**07**
Q.5	**(a)**	Specify the components of spillway.	**03**
	(b)	Write a brief note on cavitations/erosion of spillway surface.	**04**
	(c)	Differentiate between ogee spillway and chute spillway.	**07**
		OR	
Q.5	**(a)**	Why is energy dissipation necessary below overflow spillway?	**03**
	(b)	Explain energy dissipation by formation of hydraulic jump.	**04**
	(c)	Enlist the design criteria for stilling basin. Also explain IS standardized basins.	**07**

****