

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.

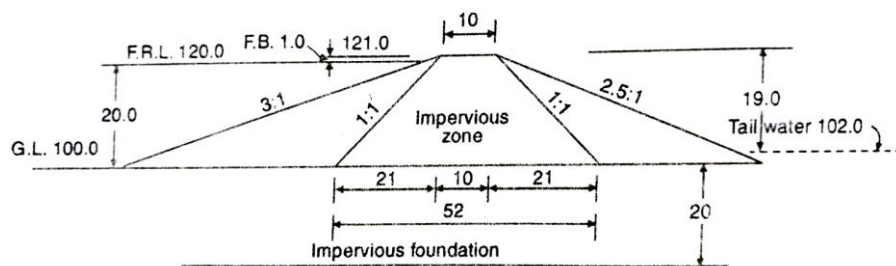
MARKS

- 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**

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 $0.2 \times 10^{-6} \text{ m/s}$.	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 .	07
	(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.	
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**
