Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. SEMESTER III–EXAMINATION – WINTER 2015

Subject code: 2733301 **Date: 04/12/2015**

Subject Name: Design of Hydraulic Structures

Time: 2:30 PM to 5:00 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)** Classify the dams according to use, hydraulic design and material. **07**

(b) Describe the significance of Phreatic line and Flow net with neat sketch. **07**

Q.2 **(a)** Enlist various dams of Gujarat and describe the salient features of any one. **07**

(b) Enlist and explain various factors governing selection of type of dam. **07**

OR

(b) Enlist various types of spillway and their utility. **07**

Q.3 **(a)** Draw a neat sketch of components of earthen dam and write their functions. **07**

(b) An earth dam mad of homogeneous material has the following data: **07**

Co-efficient of permeability of dam material = 6 x 10^{-4} cm/sec ,
Top Level of Dam =205 mt ,Deepest river bed level=180 mt.,
H.F.L of Reservoir = 200 mt.,Width of top of the dam =4.5 mt
Upstream slope =3:1,Downstream slope =2:1
Determine the phreatic line for this dam section and discharge passing through the dam.

OR

Q.3 **(a)** Differentiate between elementary and practical profile of Gravity Dam. Also draw the sketches for both. **07**

(b) A Section of shown in figure-1 of gravity dam (non overflow portion) built of the concrete. By neglecting the earthquake effects calculate **07**

(1) Maximum vertical stress at the heel and toe of the dam
(2) The intensity of shear stress on horizontal plane near the toe.

Assume weight of concrete =23.5 Kn/m^3. Allowable strees in concrete=2500 kn/m^2

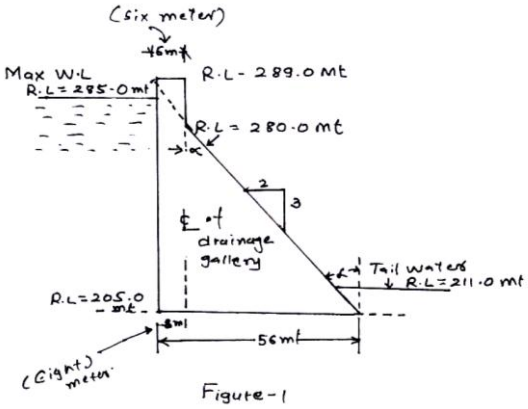

Figure-1

Q.4	**(a)**	Enlist various methods of stability analysis of Gravity dam and explain any one in detail.	**07**
	(b)	Write short note on : (1) Joints in Gravity Dam (2) Measures adopted to control seepage through foundation of earthen dam	**07**
		OR	
Q.4	**(a)**	Enlist various Design features of gravity dam	**07**
	(b)	Write shot notes on : (1) Roller Compacted concrete gravity dam (2) foundation treatment in gravity dam	**07**
Q.5	**(a)**	Answer the following: (1) Define Spillway and enlist factors affecting the spillway capacity (2) Cavitation on Spillway	**07**
	(b)	Define the terms Design Head ,Total Energy Head for spillway design and enlist steps involved in design of spillway	**07**
		OR	
Q.5	**(a)**	Draw the neat sketch of the stilling basin and its auxiliary accessories along with their functions.	**07**
	(b)	Explain the design criteria for filters in earth dams.	**07**

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