

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VIII(NEW) EXAMINATION – SUMMER 2019****Subject Code:2180601****Date:13/05/2019****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.

		MARKS
<b>Q.1</b>	(a) Explain the measures adopted to control seepage through foundation of Earthen dam.	<b>03</b>
	(b) Explain the function of stilling basin with a neat sketch.	<b>04</b>
	(c) Discuss the function and design criteria of chute spillway.	<b>07</b>
<b>Q.2</b>	(a) Explain Energy dissipation works.	<b>03</b>
	(b) Write a short note on Maintenance on hydraulic structure.	<b>04</b>
	(c) Explain the various modes of failure and stability criteria of gravity dams.	<b>07</b>
	<b>OR</b>	
	(c) Enlist various methods of stability analysis of Gravity dam and explain any one in detail.	<b>07</b>
<b>Q.3</b>	(a) Explain cavitation on Spillway.	<b>03</b>
	(b) Define Spillway and enlist factors affecting the spillway capacity	<b>04</b>
	(c) Why position of phreatic line is to be predicted in dam section? Also compute seepage rate by using flow net.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Explain Plunge pools.	<b>03</b>
	(b) Difference between Earthen dam and Gravity dam	<b>04</b>
	(c) Enlist and explain various factors governing selection of type of dam.	<b>07</b>
<b>Q.4</b>	(a) What would be the maximum depth of elementary profile of a dam if the safe limit of stress on the masonry should not exceed 150 tonnes /m <sup>2</sup> ? Assume unit weight of masonry = 2.4.	<b>03</b>
	(b) Explain Swedish Slip circle method.	<b>04</b>
	(c) What do you understand by the elementary profile and a practical profile of gravity dam? How is the limiting height of a gravity dam calculated?	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Explain Pore Pressure.	<b>03</b>
	(b) Discuss the functions of Dam. Classify various types of dam and write their functions	<b>04</b>
	(c) Compute the discharge over an ogee weir with coefficient of discharge equal to 2.4 at a head of 2m. The length of spillway is 100m. The weir crest is 8m above the bottom of the approach channel having the same width as that of the spillway (consider velocity of approach).	<b>07</b>
<b>Q.5</b>	(a) Define the following terms: 1) Riprap 2) free board 3) Galleries	<b>03</b>
	(b) Write the criteria for safe design of Earthen Dams.	<b>04</b>
	(c) Write a short note on: (1) Features of Sardar Sarovar Dam (2) Relief Well.	<b>07</b>

OR

- Q.5** (a) Explain the different types of Hydraulic jump with a neat sketch. **03**
- (b) A flow-net is plotted for homogeneous earthen dam of height 22m and free board 2m. Number of potential drops and flow channel are 10 and 4 respectively. The dam has a horizontal filter of 30 m length at a downstream end and the co-efficient of permeability of the dam material is  $5 \times 10^{-4}$  cm/sec. Calculate the discharge per m run of the dam. **04**
- (c) Draw the L-section of a rectangular crest Sarda type canal fall. Explain the design features of a Sarda fall. **07**

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