

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VIII (NEW) EXAMINATION – SUMMER 2024****Subject Code:2180601****Date:21-05-2024****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.

- Q.1** (a) Explain how will you select the site for a dam. **03**  
 (b) Briefly explain the types of dam based on the functions served. **04**  
 (c) Describe the procedure to design a sharda type fall. **07**
- Q.2** (a) Explain toe as drainage for foundation of earth dam. **03**  
 (b) What are the uses of flow nets in an earth dam? **04**  
 (c) Discuss various causes of structural failure of earth dams. **07**
- OR**
- (c) Explain factors to be considering to arrive at a preliminary section of earth dam. **07**
- Q.3** (a) What are the functions of head regulator? **03**  
 (b) Discuss essential requirements of spillway. **04**  
 (c) Write a note on Indian standard stilling basins with a horizontal apron. **07**
- OR**
- Q.3** (a) Discuss factors affecting required spillway capacity. **03**  
 (b) What are the functions of cross regulator? **04**  
 (c) Explain the factors affecting the coefficient of discharge of an ogee spillway. **07**
- Q.4** (a) Describe practical profile of dam **03**  
 (b) Discuss roller compacted concrete gravity dams **04**  
 (c) Write a note on bucket type energy dissipaters. **07**
- OR**
- Q.4** (a) Briefly explain cavitation on spillway **03**  
 (b) Discuss energy dissipation when tail water rating curve is lower than the hydraulic jump curve. **04**  
 (c) Write a note on forces acting on a gravity dam. **07**
- Q.5** (a) Enlist methods to control seepage through foundations of earth dam. **03**  
 (b) Arrive at the discharge per unit length through an earth dam containing water up to height of 25m, if the coefficient of permeability is  $5 \times 10^{-6}$  m/s, and the number of flow channels and equipotential drops are 4 and 15 respectively. **04**  
 (c) Calculate the force due to wave pressure on a dam if the fetch of reservoir is 90 km and wind velocity is 75 km/hr. **07**
- OR**
- Q.5** (a) Explain rolled-filled earth dam. **03**  
 (b) Briefly explain types of rock-fill dam. **04**  
 (c) For a non-overflow portion of a concrete gravity dam as shown in below figure (1), determine maximum vertical stresses at the heel and toe of the dam. Assuming weight of concrete =  $23.5 \text{ kN/m}^3$ , and allowable stress in concrete is to be taken as  $2500 \text{ kN/m}^2$ . **07**

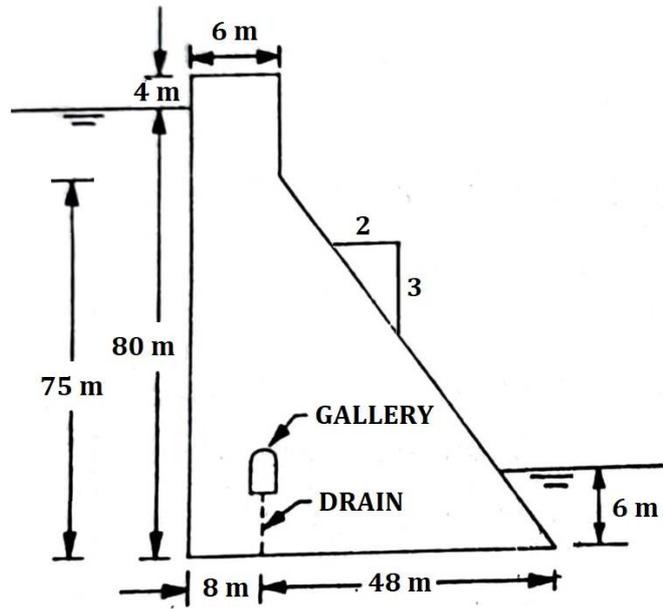


Fig (1)

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