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**B.Tech. Civil (Water Resources Engineering)****Term-End Examination****June, 2011****ET-536(A) : HYDRAULIC STRUCTURES-I***Time : 3 hours**Maximum Marks : 70*

**Note :** Answer *any five* questions. All questions carry *equal* marks. Use of calculator is permitted. Assume appropriate data if *not* given.

1. (a) What do you understand by "Mass Curve"? 7  
Explain the use of mass curve to determine the possible "yield" from a reservoir of specific capacity.
- (b) Explain the purpose of providing galleries 7  
in a concrete dam.
2. Distinguish clearly between a low gravity dam and high gravity dam. Derive the expression used for such a distinction. Determine the limiting height of a low gravity dam of concrete, taking specific gravity of concrete as 2.39 and allowable compressive stress as  $339 \text{ t/m}^2$ . 5+5+4

3. (a) What is the importance of incoming Froud number ? How does it help in indicating the success of a Jump formation ? 7

(b) Show that for short horizontal channel of rectangular section, the Froud numbers before and after Jump formation are related by 7

$$\left[ \sqrt{(1+8F_1^2)} - 1 \right] \left[ \sqrt{(1+8F_2^2)} - 1 \right] = 4$$

4. (a) What is meant by piping on foundation of a weir ? Explain Bligh's method of safe guarding the foundation against the ill effects of piping. 7

(b) What is a spillway ? Describe its functions. 7

5. (a) How do you select earthen dam section to suit available materials ? 7

(b) Describe various types of rockfill dams. 7

6. (a) Discuss the functions of a canal head regulator. How are the crest levels of canal head regulator fixed ? 7

(b) Explain the advantages and disadvantages of locating headworks in a boulder or a trough stage. 7

7. Write short notes on the following :  $4 \times 3\frac{1}{2} = 14$
- (a) Design of an Arbitrary profile of a Gravity dam.
  - (b) Scouring sluices.
  - (c) Stream flow measuring devices.
  - (d) Adverse impacts of dams and reservoirs on environment.
8. Differentiate between the following :  $4 \times 3\frac{1}{2} = 14$
- (a) Diversion and Storage Dams.
  - (b) Firm and Design Yield.
  - (c) Weirs and Barrages.
  - (d) Entrance and Exit channels.
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