

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00517

December, 2017

ET-536(A) : HYDRAULIC STRUCTURES – I

Time : 3 hours

Maximum Marks : 70

*Note : Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

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1. (a) Classify spillways on the basis of their permanent features with the help of neat diagrams. 7
 - (b) Why do we need energy dissipators arrangement downstream of a spillway and what are the different types of energy dissipators ? Explain with neat and labelled sketches. 7
 2. (a) Explain with the help of Froude number, the expression of hydraulic jump. What is its significance ? 7
 - (b) Write down the purposes of spillway gates and the factors influencing the selection of spillway gates. 7

3. (a) What are the advantages and disadvantages of locating headworks in a boulder or trough stage ? 7
- (b) (i) Explain the procedure of considering the wind forces in the design of a dam. $3\frac{1}{2}$
- (ii) Distinguish clearly between a Low Gravity Dam and a High Gravity Dam. $3\frac{1}{2}$
4. (a) What purposes do galleries serve ? What is the function of a drainage gallery ? 7
- (b) How is the water pressure accounted for in the non-overflow and spillway portion of the dam ? 7
5. (a) What are the various water stops provided in the gravity dam ? What is the necessity of temperature control in a gravity dam ? How does thermal cracking occur ? 7
- (b) What are the various types of failures in earth dams ? Explain with the help of a diagram. 7
6. (a) On what consideration will you select the top width of an earthen dam ? Also, explain how different types of dams are selected on the basis of materials available. 7
- (b) Explain the term Full Reservoir Capacity and explain the principle and operation involved in it. 7

7. (a) How is the reservoir operated to meet the conservation needs ? Explain with different storage zoning. 7
- (b) How do waves affect the stability of a dam ? How do you compute wave pressure ? Explain. 7
8. (a) Explain the purpose of foundation treatment for various types of dams. 7
- (b) Describe different components of weirs and barrages. 7
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