# B.Tech. Civil (Water Resources Engineering)
## Term-End Examination
## June, 2015

00566

## ET-536(A) : HYDRAULIC STRUCTURES – I

*Time : 3 hours*                    *Maximum Marks : 70*

*Note :* *Attempt any **five** questions. Each question carries equal marks. Use of non-programmable calculator only is allowed.*

1.  (a)  What are the empirical relations for estimating sedimentation rates of Indian rivers ? What do you understand by trap efficiency ? Discuss the effects of reservoirs on the environment.                    7

    (b)  What are the various factors to be considered in the selection of a dam site ? What are the various types of dams ? Give appropriate classification in brief.                    7

2.  (a)  What are the static and dynamic forces on a dam ? What is the function of a drainage gallery and where is it located in a dam ?                    7

    (b)  What are the causes of failure of a gravity dam ? What are the allowable factors for the dam and foundation for different loading conditions ?                    7

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**3.** (a) How will you test the stability of an earth dam constructed on cohesive soils ? Describe a membrane type of a rockfill dam with a suitable sketch. 7

(b) Describe the operation of reservoirs for the following : 7
   (i) Power generation
   (ii) Flood control
   (iii) Water supply

**4.** (a) Distinguish between weirs and barrages. What are the considerations for selecting the sites for headworks ? 7

(b) What types of gates are provided in a barrage ? Describe the salient features that are to be considered for designing a barrage. 7

**5.** (a) How do you define uplift pressure ? How can you provide safety against piping and uplift pressure ? 7

(b) Name the various types of spillways. Describe any two of them with suitable sketches. 7

**6.** (a) Why do you need an energy dissipator below a spillway ? What are the different types of energy dissipators provided ? 7

(b) Explain the area-velocity method and slope-area method for determining stream flow. How will you find average velocity ? 7

**7.** Write short notes on the following :                    $4 \times 3\dfrac{1}{2} = 14$

   (a)   Hollow Concrete Gravity Dams

   (b)   Dam Foundations Treatment

   (c)   Hydraulic Jump

   (d)   River Training Works

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