B.Tech. Civil (Water Resources Engineering)
Term-End Examination
00953   **June, 2018**

ET-536(A) : HYDRAULIC STRUCTURES – I

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any five questions. Each question carries equal marks. Use of scientific calculator is permissible.*

1. (a) What do you mean by reservoirs ? How is the capacity curve of reservoirs prepared ?   7

    (b) Describe the storage zones of a reservoir with the help of a neat sketch.   7

2. (a) What is arbitrary profile of a gravity dam ? Explain in brief. Considering the effect of hydrostatic pressure and uplift pressure, show that the base width (b) of the arbitrary profile of the gravity dam for no sliding to occur can be written as

    $$b = \frac{h}{\mu(s - c)},$$

    where all the terms have their usual meaning.   7

    (b) Describe the causes of failure of a gravity dam.   7

3. (a) Explain the Bligh creep theory. How can you provide safety against uplift pressure ?   7

   (b) What is a barrage ? Draw a cross-section through barrage.   7

4. (a) What do you mean by "Hydraulic Jump" ? Write down the equation of flow depths before (d_1) and after (d_2) the jump formation in terms of Froude number (F_1).   7

   (b) Describe the necessity of an energy dissipator arrangement downstream of a spillway.   7

5. (a) Discuss the various factors required to be considered in the selection of the type of dam.   7

   (b) How do waves affect the stability of a dam ? Explain the procedure of computing the wave pressure.   7

6. (a) What are the various types of fish ladders ? Explain their general requirements.   7

   (b) Discuss the various remedial measures required to be taken to prevent failure of weirs on permeable foundations.   7

7. Write short notes on the following : $4 \times 3\frac{1}{2}$

(a) Mass Curve

(b) Stability Analysis of Gravity Dam

(c) Scouring Sluices

(d) Exit Gradient

8. Differentiate between the following : $4 \times 3\frac{1}{2}$

(a) Overflow and Non-overflow dam

(b) Diversion and Storage works

(c) Retarding basin and Storage reservoir

(d) Entrance channel and Exit channel