B.Tech. Civil (Water Resources Engineering)

Term-End Examination

December, 2006

ET-536(A) : HYDRAULIC STRUCTURES-I

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks. Give neat sketches in support of your answers.*

1. (a) What do you understand by "Mass Curve" ? Explain the use of mass curve to determine the possible "yield" from a reservoir of specific capacity. 7

(b) Explain the purpose of foundation treatment of a concrete dam. 7

2. (a) Distinguish clearly between a low gravity dam and high gravity dam.

(b) Derive the expression used for such a distinction.

(c) Determine the limiting height of a low gravity dam of concrete, taking specific gravity of concrete as 2·45 and allowable compressive stress as 345 t/m^2. 2, 6, 6

3. (a) State the conditions which are essential for the formation of a hydraulic jump. 7

(b) Show that for short horizontal channel of rectangular section, the Froude numbers before and after the jump are related by

$$\left(\sqrt{(1+8F_1^2)}-1\right)\left(\sqrt{(1+8F_2^2)}-1\right)=4$$ 7

4. (a) "A spillway is a safety valve in a dam." Justify this statement. 7

(b) Explain the different stream flow measuring devices. 7

5. (a) Explain the various considerations for designing a barrage. 7

(b) Discuss the main causes of failure of weirs founded on pervious foundations. 7

6. (a) How would you select a homogeneous dam depending upon the materials available ? 5

(b) Explain the Swedish slip circle method of analysis for testing the stability of an earth dam. 9

7. Write short notes on the following : $4\times3\frac{1}{2}=14$

(a) Multipurpose Reservoir

(b) Consolidation of Earth dams

(c) Scouring Sluices

(d) Froude Number

8. Differentiate between the following : $4 \times 3\frac{1}{2} = 14$

(a) Overflow and Non-overflow dams

(b) Reservoir capacity and Reservoir yield

(c) Exit gradient and Safe Exit gradient

(d) Retarding basin and Storage reservoir