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ET-536(A)

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

June, 2016

00710

ET-536(A) : HYDRAULIC STRUCTURES – I

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Support your answers with examples and neat diagrams, wherever necessary. Use of scientific calculator is permitted. Assume appropriate data, if not given.*

1. (a) "Dams are the sources of sorrow and grief." Debate the statement giving points in favour as well as against it. 7

(b) What is a mass curve ? How will you determine storage capacity for the reservoir from the mass curve ? 7

2. (a) What are the different ways by which a concrete gravity dam may fail, and how will you ensure its safety against each type of failure ? 5+2=7

(b) Write a note on temperature control in mass concreting in a dam. 7

3. (a) Illustrate with neat sketches the following parts of an earth dam and state their functions briefly : *4×2=8*

(i) Rock Toe

(ii) Horizontal drainage blanket

(iii) Cut-off wall

(iv) Rip rap

(b) What factors will you keep in mind while selecting a suitable site for a dam reservoir ? Explain the factors. *6*

4. (a) "A spillway is a safety valve in a dam." Discuss the statement. *5*

(b) Enumerate the important types of spillway gates and discuss the merits and demerits of installing such gates. *5+4=9*

5. (a) What is a hydraulic jump ? How does it help in dissipating the energy of the water falling over a weir or a dam ? What would happen if this energy is not properly dissipated ? *7*

(b) How can you determine the length of a hydraulic jump, if you know the Froude number and the conjugate depths ? *7*

6. (a) Show the component parts of a diversion head-works on a neat sketch. Mention the functions and important design considerations pertinent to the divide wall. *6+2=8*

(b) What is meant by afflux, and how does it affect the design of weirs and barrages ? Why is a barrage preferred to a weir nowadays ? *6*

7. (a) Explain the Swedish slip circle method of analyzing the stability of an earthen dam slope. *7*

(b) Explain briefly Khosla's exit gradient concept. When a weir is constructed across a river, it disturbs the existing regime. Explain the changes that occur till the river attains regime condition again. *7*

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Drainage Gallery

(b) Stability Analysis of Earthen Dam

(c) Rule Curves

(d) Function of Scouring Sluices

(e) Effect of Earthquakes in Spillways

(f) Stream Flow Measurement

(g) Reservoir Sedimentation and its control
