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Roll No.

CE-802

B. E. (Eighth Semester) EXAMINATION, June, 2009

(Civil Engg. Branch)

HYDRAULIC STRUCTURES

(CE – 802)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *five* questions. All questions carry equal marks. Suitable data, if necessary, can be assumed.

1. (a) Derive an expression for the elementary profile of a gravity dam. 10
(b) Derive expression for principal stresses at toe considering elementary and earthquake forces. 10
2. (a) Discuss in brief the causes of failure of earthen dam. 10
(b) Explain the design criteria for an earthen dam. 10
3. (a) By thin cylinder theory show that most economic angle for an arch dam is $133^{\circ} 34'$. 10
(b) Describe the following : 10
 - (i) Multiple arch dam
 - (ii) Massive head Buttress dam

4. (a) Describe various types of spillways with their location choice and relative merits and demerits. 10
- (b) What are different types of spillway crest gates ? Explain with neat sketches. 10
5. (a) Describe hydraulic jump type stilling basin with horizontal apron as per Indian Standard recommendations. 10
- (b) Give the classification of various Hydel power plants. 10
6. (a) Name various sea-shore structures and describe with layout plan of a Dock along with its various components. 10
- (b) Explain the wave action on sea-shore structures. 10
7. (a) Describe the following with neat sketch : 10
- (i) Bulb turbine
- (ii) Surge tank
- (iii) Underground power houses
- (b) Explain the following terms : 10
- (i) Load factor
- (ii) Peak and base load station
8. Write short notes on any *four* of the following : 5 each
- (i) Rock fill dams
- (ii) Construction joints in dams
- (iii) Timber dams
- (iv) Seepage in earth dam
- (v) Economic spacing in Buttress dam
- (vi) Run off river power plants
- (vii) Earthquake forces in dams
- (viii) Phreatic line