Roll No ....

CE - 701

B.E. VII Semester
Examination, December 2015
Design of Hydraulic Structure

Time : Three Hours

Maximum Marks : 70

Note: i)   Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

    ii)   All parts of each question are to be attempted at one place.

   iii)   All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

   iv)   Except numericals, Derivation, Design and Drawing etc.

1. a)   Define gravity dam.

   b)   Explain purpose of galleries in gravity dam.

   c)   Explain elementary profile of gravity dam.

   d)   Discuss step by step the analytical procedure that you will adopt for analysis the stability of gravity dams.

<div align="center">OR</div>

Design the practical profile of gravity dam between RL 200.0 m to RL 111.8 m for the following data. Maximum allowable compressive stress in concrete = 3000kN/m². Maximum reservoir level=200.0 m; RL of bottom of dam = 100.0 m specific gravity of concrete = 2.4, unit weight of water = 9.81kN/m³.

2. a) Explain rock fill dam.

b) Discuss soils suitable for earth dam.

c) Write foundation requirements for earth dams.

d) Explain causes of failure of earth dams.

OR

An earth dam made of homogeneous material has the following level of top of dam=300.0 m level of deepest river bed =278.0 m H.F.L. of reservoir = 297.5m, width of the top of dam= 4.5m v/s slope = 3:1, D/S slope = 2:1, K=5×10⁻⁴ cm/sec. Determine the discharge passing through the body of the dam.

3. a) Explain breaching section of the dam.

b) Discuss low spillways.

c) Explain effective length of ogee spillway and its determination.

d) Describe ogee spillway with its design procedure.

OR

Describe briefly the component parts and their design for a chute spillway.

4. a) Explain principles of energy dissipation.

b) Discuss the functions of a head regulator.

c) Define flexibility and drive expression for the same.

d) Discuss briefly the various types of energy dissipators that are used for energy dissipation below overflow spillways, under different relative position of T.W.C and J.H.C.

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OR

What is meant by a "cross-drainage works"? Explain the different types of cross drainage works.

5. a) Draw the plan of run off river plant.

b) Explain capacity factor and reserve capacity.

c) What is a surge tank and what are its types and uses?

d) Name various hydropower plants and describe any one in detail.

OR

A load on a hybrid plant varies from a minimum of 10 MW to a maximum of 40 MW. Two turbo-generators of capacities 22 MW each have been installed. Calculate.

i) Total installed capacity of the plant

ii) Plant factor

iii) Maximum demand

iv) Load factor

v) Utilization factor

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