CE - 701

B.E. VII Semester

Examination, December 2013

Design of Hydraulic Structure

Time : Three Hours

Maximum Marks : 70

Note : Attempt all questions.

1. a) Describe various elementary forces acting over a Dam. What is their effect on the stability of the dam. 7
   b) Derive expression for stresses at heel and toe end of a Dam, with necessary criterias. 7

OR

2. a) Determine the base width of the elementary profile of gravity dam such that resultant passes through the outer third point considering earthquake forces due to uniform horizontal and vertical acceleration $\alpha_h = \alpha_v = \alpha$ along with hydrostatic and uplift pressure. 7
   b) Design a practical profile of a gravity dam for following data:
   RL of Base of dam = 1500m
   RL of F.R.L. = 1530.5m
   Specific gravity of the Material = 2.4
   Safe compressive stress = 1250kN/m^2
   Height of wave = 1.5m 7

3. a) For a proposed Earth dam of site only pervious material is available, draw a suitable section of the Earth for given foundation condition:
      i) Hard Strata
      ii) Foundation pervious to moderate depth. 7
   b) Describe down stream drainage systems. 7

OR

4. a) What is phreatic line how it is obtained graphically. 7
   b) Describe failures in an Earth dam. 7

5. Design an ogee spill way for concrete gravity dam for following data: 14
   i) River Bed level = 300.00m
   ii) R.L. of spill way crest = 405.00m
   iii) Slope of d/s face = 0.75:1.0
   iv) Design discharge = 6400 cu mecs
   v) Length of spill way = 5 span, clear length 10.0m
   vi) Thickness of pier = 2.5m

OR

6. a) Describe various spillway crest gates. 7
   b) At an energy dissipater structure below a spillway, the discharge is 19m^3/s and the energy loss is 1.5m at. Hydraulic jump forming therein. Determine the depth of flow at both ends of the jumps. 7

7. Explain the working and design details of a syphon spillway. 14

OR

8. Describe various methods used for energy dissipation below spillways. 14

9. a) Classify the hydel plants and describe any one in detail. 7
   b) The load on a hydel plant varies from minimum of 10,000kW to a maximum of 40,000kW. Two turbo generators of capacities 20,000kW each have been installed, calculate:
      i) Total installed capacity of the plant.
      ii) Plant factor
      iii) Maximum demand
      iv) Load factor
      v) Utilization factor 7

OR

10. a) Classify the Turbines, describe any one in detail. 7
    b) Compare thermal and Hydropower. 7

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