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MVCT/MVCP-302(A)

M.E./M.Tech., III Semester

Examination, June 2016

Advanced Dam Design and Construction (Elective-II)

Time : Three Hours

Maximum Marks: 70

Note: i) Attempt any five questions.
ii) Each question carry equal marks.
iii) Assume missing data suitably.

1. a) Discuss the various ways by which a concrete gravity dam may fail and how will you ensure its safety against each type of failure?
   b) Derive expressions for determining base width of gravity dam for different criteria.

2. The following data refer to the non-overflow section of a gravity dam.
   R_L of top of the dam = 450m, RL of bottom of the dam = 400m
   Full reservoir level = 447m, Top width of the dam = 12.6m
   Upstream face is vertical; Downstream face is vertical upto R_L 439m; and there after, the dam stream face slopes at 0.7 (H):1(V) upto base. Drainage holes are located 8m away from the upstream face.
   Unit weight of masonry = 22.5 kN/m^3
   Reduction of uplift at drainage hole = 50%
   Coefficient of friction between masonry and foundation material = 0.8
   Determine:
   i) Factor of safety against overturning;
   ii) Factor of safety against sliding
   iii) Maximum pressure on foundation and
   iv) Maximum principal stress in the masonry of the dam, at the base, consider only the forces due to water thrust, uplift, earthquake and The self weight.

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3. a) Derive expression for discharge through a saddle siphon spillway and explain the functions of its various component parts.
   b) What are the causes of failure of earth dam?

4. Design a suitable profile for a chute spillway with the following data:
   Spillway crest level = 400m; Level of bottom of flank at which the low ogee weir is to be constructed = 390m
   Design discharge = 5000 cumecs
   Downstream tail water level corresponding to 5000 cumecs = 402m
   The spillway length consists of 5 spans of 10.0m clear width each. The thickness of each spillway pier may be assumed to be 2.5. Assume any other data required.

5. a) Explain with the help of a sketch, the components and working of a tainter gate.
   b) Explain with a sketch, the component parts and their function of a rockfill dam

6. a) Distinguish between the constant radius and constant angle layouts of an arch dam obtain the value of the best control angle for the latter. http://www.rgpvonline.com
   b) Explain trial load analysis for the arch dam.

7. Explain the following in detail:
   a) Stress computations with embedded electrical instrumentation.
   b) River diversion for construction of dams.

8. Write short notes on any four of the following:
   a) Preliminary investigations and surveys for river valley projects
   b) Foundation treatment for dams
   c) Energy dissipation devices
   d) Dome dams
   e) Diversion for construction of dams

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