Code: 9A01708 **R09**

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2015

WATER RESOURCES SYSTEM PLANNING & MANAGEMENT

(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Define system and discuss various types of systems.

(b) Briefly discuss systems approach to water resources planning and management.

2 Formulate a linear programming problem to maximize the total income and determine the areas x_1 and x_2 under crop 1 and crop 2, respectively, in hectares give the following data:

	Water	Fertilizer			Income /he Rs
Crop	Units/he required	Cost/Unit (Rs)	Unit/he Required	Cost/unit (Rs)	Rs
1	W_1	p_1	f_1	q_1	h_1
2	W_2	p_2	f_2	q_2	h_2

The following are resource limitations water availability is limited to W units, fertilizer availability is limited to F units, load availability is limited to A hectares, money available for investment is limited Rs. B.

3 (a) Explain the dual problem in linear programming.

(b) What is sensitivity analysis and why do we perform it in linear programming?

4 (a) Explain the application of dynamic programming in capacity expansion problem.

(b) Explain the application of dynamic programming in shortest route problem.

5 Write short note on the following:

(a) Unconstrained optimization.

(b) Kuhn – Tucker conditions.

(c) Gradient based method.

6 (a) Explain the components, steps of simulation models in water resources.

(b) Explain why a simulation experiment must usually be executed over a long period of simulated time in water resources projects.

7 (a) A bank gave 10 percent interest, compounded every two months for the first six months of a year. Subsequently, the bank decided to give only 8 percent interest, compounded monthly, for the rest of the year. What was the effective rate of interest for that year?

(b) Explain benefit cost analysis.

8 (a) Explain linear programming techniques for optimal cropping pattern.

(b) Explain the conjunctive use of surface and subsurface water resources.

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