Code: 9A01708

R09

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2017

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) What is a system and what do you mean by systems approach to water resources planning and management?

(b) Examine the following functions for convexity/concavity.

$f(x) = x_1^2 + x_2^2 - 4x_1 - 2x_2 + 5$

2 Solve the following linear programming problem using the simplex method.

Maximize $t = x_1 + x_2 + x_3$

Subject to: $4x_1 + 5x_2 + 3x_3 \leq 15$

$10x_1 + 7x_2 + x_3 \leq 12$

$x_1, x_2 and\ x_3 \geq 0$

3 (a) Bring out salient differences between simplex and revised simplex methods.

(b) Explain briefly about sensitivity and post optimality analysis.

4 (a) What is the essence of Bellman's principle in dynamic programming?

(b) Describe about backward recursion and forward recursion with neat diagrams.

5 (a) What are the nonlinear programming techniques applied in water resources planning?

(b) Discuss Kuhn-Tucker conditions in detail.

6 What is simulation? Explain the advantages in solving programming of complex water resources systems. Explain the steps in simulation.

7 (a) Discuss the following factors in water resources economics:

(i) Present worth factor. (ii) Sinking fund factor. (iii) Capital recovery factor.

(b) 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?

8 (a) How do you optimally operate a single resource system?

(b) Discuss the following:

(i) Planning of resource system.

(ii) Optimal clipping pattern.

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