Karunya University
(Karunya Institute of Technology and Sciences)
(Declared as Deemed to be University under Sec.3 of the UGC Act, 1965)

End Semester Examinations - 2015-16 Even Semester - May 2016

14CE3029 Systems Analysis

Set A

Time : 3 hrs
Total Marks: 100

1. a. Define Systems and types of systems. (10)

   b. What do you mean by design and analysis of a system? Explain with an example. (5)

   c. Discuss the problems in systems analysis in relation to water resources. (5)

OR

2. a. Discuss the conventional and optimization procedures of design and analysis of a system and bring out their merits and demerits. (10)

   b. Discuss Single – Objective versus Multiple – Objective Optimization in water resources problems. (10)

3. a. For all LP problems, the optimum solution will always fall on the boundary of the feasible space. There are three important properties of feasible extreme points in an LP problem. State these three properties. (4)

   b. The solution procedure of an LP model by simplex method follows two basic conditions namely, the optimality condition and the feasibility condition. Explain these two conditions. (4)

   c. Summarize the step by step procedure of simplex method for any general form of LP model. (12)

OR

4. a. Explain the general procedures for formulating a dual problem from a primal problem and also write the dual problem of the primal problem mentioned below: (10)

   Minimize $Z = 3x_1+8x_2$

   Subject to $x_1 +3x_2 \geq 12$

   $3x_1 +5x_2 \geq 30$

   $x_1, x_2 \geq 0$

   b. Solve the following problem using Simplex method: (10

   Maximize $Z = 5x_1+8x_2$

   Subject to $2x_1 + 3x_2 \geq 15$

   $3x_1 + 5x_2 \leq 60$

   $x_1 + x_2 = 18$

   $x_1, x_2 \geq 0$

5. a. Explain the procedure involved in Reservoir capacity expansion by means of simulation. (15)

   b. Discuss Bellman's principle of optimality. (5)

OR

6. a. Consider that funds are allocated to three water resources development project namely, A, B and C in order to maximize the total expected revenue. Each water resources development project consists of different alternative configurations that require different funding levels and yield different revenues. Due to budget limitations, the total available funds for the entire development are fixed. Describe the general philosophy of the dynamic programming technique in deriving the optimal allocation of funds to the three projects with the objective of maximizing the total revenues. (5)

b. With the aid of a sequential representation of serial dynamic programming problem, discuss briefly the elements of Dynamic Programming. (10)

c. Enumerate the Operation Characteristics of Dynamic Programming. (5)

7. a. Explain the objective function and constraints to be involved in the operation of a multi-reservoir for irrigation planning. (15)

. b. Discuss about role of mass diagram for determining reservoir capacity. (5)

OR

8. a. What are the components of river water quality model? Explain them in detail. (5)
b. Briefly explain the parameters and equations governing modeling of Dissolved Oxygen in the river. (5)
c. Discuss about the simulation and optimization of groundwater systems (10)

9. a. Explain simulation and its importance in Water resources systems. (8)

b. Explain the components of a simulation model. (5)

c. Explain the usefulness of simulation runs and the combination of simulation and optimization.(7)

Wishing you All the Best
