Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

**UNIVERSITY**



(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14CE3029** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Systems Analysis** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | What is simulation and what are the main components of reservoir simulation model | CO 1 | 4 |
| b. | What is the significance of Monte-Carlo simulation in water resources systems? | CO 1 | 2 |
| c. | Explain with an example how the inflow data for the reservoir simulation can be generated using probability distribution. | CO 1 | 6 |
| d. | Detail the procedure for simulation of a reservoir for Hydropower Generation | CO 1 | 8 |
| **(OR)** | | | | |
| 2. | a. | Consider a canal supplying water for three different crops. Maximum capacity of the canal is 4 units of water. Optimization Problem: Determine the optimal allocations *xi* to each crop that maximizes the total net benefits from all the three crops. Net benefits from producing the crops can be expressed as a function of the water allotted    Field 1  Field 2  Field 3  *x1*  *x3*  *x2* | CO 1 | 20 |
| 3. | a. | Write the concept of the system and explain in detail about the different types of systems in the context of water resources management | CO 1 | 10 |
|  | b. | Describe some water resource systems consisting of various interdependent components. What are the inputs to the systems and what are their outputs? How did you decide what to include in the system and what not to include? How did you decide on the level of spatial and temporal detail to be included? | CO 1 | 10 |
| **(OR)** | | | | |
| 4. | a. | Formulate the dual problem for the following Maximize z = 6x1 + 14x2 + 13x3,  subject to: 1/2 x1 + 2x2 + x3 ≤ 24,  x1 + 2x2 + 4x3 ≤ 60,  x1 ≥ 0, x2 ≥ 0, x3 ≥ 0. | CO 1 | 8 |
|  | b. | What do you mean by slack and surplus variables and when it will be used? | CO 1 | 6 |
|  | c. | What do you mean by constrained and unconstrained optimization and explain with an example. | CO 1 | 6 |
| 5. | a. | What is dynamic programming and list down its limitation? | CO 1 & 2 | 5 |
|  | b. | Explain in detail about the procedure for resource allocation using dynamic programming | CO 1 & 2 | 12 |
|  | c. | Define the principle of optimality | CO 1 & 2 | 3 |
| **(OR)** | | | | |
| 6. | a. | Define Systems and types of systems. | CO 2 | 10 |
|  | b | What do you mean by design and analysis of a system? Explain with an example. | CO 2 | 5 |
|  | c | Discuss the problems in systems analysis in relation to water resources. | CO 2 | 5 |
| 7. | a. | Explain Conjunctive use of Surface and Groundwater resources. List out the benefits and the conditions under which Conjunctive use of Surface and Groundwater resources is to be carried out. | CO 2 | 20 |
| **(OR)** | | | | |
| 8. | a. | Briefly explain the parameters and equations governing modeling of Dissolved  Oxygen in the river | CO 2 | 10 |
|  | b. | What are the components of river water quality model? Explain them in detail | CO 2 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Write short notes on  1. Local minimum and global minimum  2. Stationary point and saddle point  3. Convexity and concavity of functions | CO 1 | 10 |
|  | b. | Write short notes on   1. Bounded and unbounded solution 2. Feasible and infeasible solution with example | CO 1 | 10 |

ALL THE BEST