Roll No.									

B.E. (FULL TIME) DEGREE END SEMESTER EXAMINATIONS, NOV./DEC. 2013

VI Semester
AGRICULTURAL AND IRRIGATION ENGINEERING

17

AI 9354 SYSTEMS ANALYSIS IN IRRIGATION ENGINEERING
(Regulations 2008)

Time: 3 Hours Maximum: 100 marks

Answer All Questions

PART – A (10 x 2 = 20 Marks)

1. What is System analysis?
2. Differentiate between lumped system and distributed system.
3. List the types of sensitivity analysis?
4. Distinguish between Linear programming and non-linear programming.
5. What is meant by stage variable and state variable?
6. When multi objective function can be used in optimization model?
7. Write the Monte-corelo equation in simulation?
8. List the various types of operating rules in reservoir simulation?
9. What is the need for Linear Decision Rule(LDR)?
10. Why advanced optimization like Genetic Algorithm used in irrigation engineering?

PART – B (5 x 16 = 80 Marks)

11. (i) Explain briefly with sketch about fuzzy goal programming algorithm used in reservoir release optimization. (6)
(ii)Determine the Maximum storage of an irrigation tank from the following table data given in M m^3. The target storage in the tank is 25 M m^3 for all months. Use integer linear programming. Assume initial storage as 10 M m^3 (10)

Month	October	November	December	January
Inflow (M m^3)	25	30	10	2
Demand (M m^3)	18	11	35	45
Storage(M m^3)	10	--	--	--

12.a)(i) Explain the methods used in developing Block Box model in Agricultural engineering. (5)
(ii) Sketch the various components of irrigation systems and also explain briefly the characteristics of each component? (11)

(OR)

12.b)(i) Explain briefly various steps to be followed in system analysis. (8)
(ii) Explain with diagram of a distributed system in agricultural engineering. (8)

13.a) What are the digital models available for solving linear programming and highlight salient features of any one model? (16)

(OR)

13.b) Determine the optimum crop area of banana (B) and sugarcane(S) from the following

Objective function

Maximize $Z = 4S + 3B$

Subjected to

$3B + 2S <= 2400$

$S + B <= 1000$

$S >= 100$ and $B >= 50$ (16)

14.a) During the analysis of allocation, there are three crop zones namely Maize, Cotton and Pulses under the control of irrigation engineer. The allocation is made in discrete steps of one unit ranging from 1 to 6. The benefit obtained by allotting each unit is tabulated below. Using dynamic programming determine the optimal allocation of water to each crop zones. (16)

Water Allotted	**Return from (Benefit)**		
Max 6	**Maize**	**Cotton**	**Pulses**
1	5	6	7
2	7	6	12
3	9	5	16
4	8	-4	15
5	5	-10	12
6	0	-25	0

(OR)

14.b) Explain with suitable network diagram, to find optimal route for the measurement of discharge in an irrigation canal system by the field engineer. Assume the field engineer will observe from measuring stations P,Q,R and S. The optimal route solution may be obtained by dynamic programming. (16)

15.a)(i) Explain the procedure adopted in developing Standard operating policy for an irrigation storage structure through simulation. (11)

(ii) Differentiate between conditional probability and exceedence probability. (5)

(OR)

15 b) The following table denotes the monthly inflow and demand for a reservoir. The capacity of the reservoir is 70 M m^3 and initial storage is 10 M m^3. Assume evaporation and seepage losses as negligible. Determine the release pattern using the simulation method. (16)

Monthly Demand (M $m^{3)}$	12	9	10	35	32	19	10	14	27	36	16	5
Inflow (M $m^{3)}$	20	15	19	20	30	10	20	13	12	0	0	0

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