Roll No.										

B.E. (FULL TIME) DEGREE END SEMESTER EXAMINATIONS, MAY 2014

AGRICULTURAL AND IRRIGATION ENGINEERING
VI - Semester

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. Distinguish between systems approach and systems analysis.
2. Differentiate between analysis and synthesis.
3. What is meant by sensitivity analysis? State its importance.
4. What do you understand by the term "feasible region" and "in-feasible region" in linear programming?
5. State the Bellman's optimality criteria.
6. Under what circumstances can multi objective function be used in dynamic programming.
7. What is meant by Monte-corelo simulation?
8. Distinguish between single and multi reservoir simulation.
9. What is meant by Integer and parametric linear programming?
10. List any four advanced optimization techniques used in irrigation engineering.

PART – B (5 x 16 = 80 Marks)

11. (i) With neat sketch discuss the various types of goal programming used in reservoir optimization. (10)

    (ii) Explain the steps involved in optimization of irrigation system using Genetic Algorithm. (6)

12. (a) What is the need for systems approach to irrigation system? (4)

    (ii) Draw the components of irrigation systems and also explain briefly the basic characteristics of each component? (12)

    (OR)

    (b) Explain the various types of systems with suitable example and sketch for each. (16)

13. (a) St. Valentain's Florist Company in Hosur is engaged in cultivation of roses and orchids in green houses for export purposes. The company has trained man power to do the following operations on every day basis.

(i) Intercultural operations such as weeding and pest management -140 man / hour

(ii) Pruning, Cutting and Packaging - 150 man /hour

It is estimated that each batch of roses require 2 man hour of intercultural operations and 3 man hours of pruning, cutting and packing. Orchids require 2 and 1 man hour operation respectively each day.

The yield of roses from each batch fetches Rs. 10,000/- as profit and Orchid fetches Rs. 8,000/- as profit. Formulate the Linear programming problem. (16)

(OR)

(b) (i) What is simplex method in optimization? (4)

(ii) Determine the optimum crop area of sugarcane (S) and banana (B) from the following Objective function:

Maximize $Z = 5S + 8B$

Subjected to

$2S + 3B \geq 15$

$3S + 5B \leq 60$

$S + B = 18$

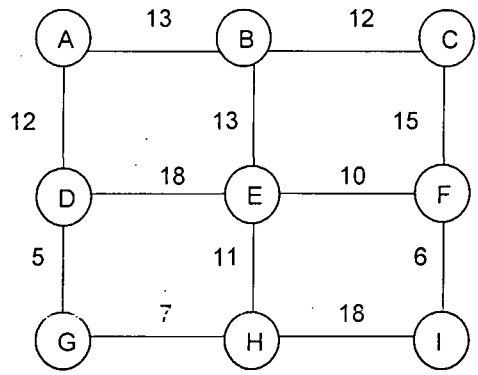
$S, B \geq 0$ (12)

14. (a) During the dynamic analysis of allocation, there are three crop zones namely Banana, Groundnut and Radish under the control of irrigation engineer. The allocation is made in discrete steps of one unit ranging from 1 to 5. The benefit obtained by allotting each unit is tabulated below. Using DP estimate the optimal allocation of water to each crop zone. (16)

Water Allotted	**Return from (Benefit)**		
Max 6	**Banana**	**Groundnut**	**Radish**
1	5	5	7
2	8	6	12
3	9	3	16
4	8	-4	15
5	5	-15	12

(OR)

(b) A pipe line is to be laid between node G and C shown in the figure below. The pipe line can pass only along the routes shown by solid lines between intermediate nodes in the figure. The distance between two nodes is shown on the line joining the two nodes. Obtain the shortest distance for the pipeline using DP. (16)



15. (a) (i) Differentiate between Random variate and random process. (4)

(ii) The following table denotes the monthly inflow and demand for a reservoir. The capacity of the reservoir is 60 M m^3. Assume initial storage. Evaporation and seepage losses are considered as negligible. Determine the release pattern using the simulation method. (12)

Monthly Demand (M $m^{3)}$	2	9	16	35	12	9	10	14	27	36	16	5
Inflow (M $m^{3)}$	5	15	19	27	40	12	15	3	2	0	0	0

(OR)

(b) Explain the procedure involved in developing standard operating rule curve for irrigation release (16)

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