Reg. No. | | | | | | | | | (27)

BE (Full Time) DEGREE END SEMESTER EXAMINATION, APRIL/MAY 2011

VI SEMESTER

AGRICULTURE AND IRRIGATION ENGINEERING

AI 9354 SYSTEM ANALYSIS IN IRRIGATION ENGINEERING

(Regulation 2008)

Time: 3 Hours Maximum: 100 Marks

Note: Answer All Questions

PART – A (10 x 2 = 20)

1. Define System and system concept.
2. Draw the schematic diagram for the irrigation system.
3. What is meant by objective function in linear programming?
4. Write the needs for sensitivity analysis in optimization model.
5. Differentiate between dynamic programming and non-linear programming
6. Define state variable and stage variable in dynamic programming.
7. What are the important factors to be considered reservoir simulation?
8. List the types of reservoirs related to purpose of simulation
9. What do you mean by integer linear programming?
10. List the methods of advanced optimization used in irrigation management

PART – B (5 x 16 = 80)

11. (i) Explain with sketch methods of determining the optimum release from the reservoir when target release (Demand) is fixed. The optimization model uses the Goal programming technique. (8)

(ii) Determine the optimum storage in an irrigation tank from the following data Target storage is 15 M m^3. Assume evaporation and seepage loss as negligible. All data are in M m^3. (8)

Month	June	July	August	September
Storage	10	25	30	15
Demand	22	15	20	35
Inflow	35	22	15	60

12. (a) Explain with neat sketch the characteristics of a irrigation system components in view of system approach. (16)

(OR)

(b) (i) What is the scope of system analysis in agriculture (4)

(ii) Explain briefly the steps to be adopted in system analysis pertaining to the water resources projects. (12)

13. (a) (i) What is simplex method? Draw the initial table for solving linear program. (4)

(ii) Explain briefly about optimization procedure adopted in cropping pattern with two variety of crop. (12)

(OR)

b) Determine the optimum crop area of Paddy (Pa) and Ground nut (Ga) from the following. (16)

Objective function

Max Z= 8*Pa + 5*Ga (Benefit)

Subjected to

2 * Pa + 1 * Ga <= 1000 (Cost Available)

3 * Pa + 4 * Ga <= 2400 (Period of cultivation in months)

Pa + Ga <= 700 (Total Ayacut available)

Ga> = 0 and Pa >=0 (Non negative)

14. (a) (i) Differentiate between single and multipurpose reservoir. (4)

(ii) Explain briefly the procedure adopted in determine the optimum route for the observation of water level of irrigation wells by the field staff, who is moving from well number A to D through Wells B and C. (12)

(OR)

(b) An irrigation manager has to allocate six units of water to three farmers; the allocation is made in discrete steps of one unit ranging from 1 to 6. The benefit accrued by allotting each unit is tabulated below. Using dynamic programming develop the optimal allocation to the farmers. (16)

Water allotted	Return from		
	Farmer 1	Farmer 2	Farmer 3
1	5	5	7
2	8	6	12
3	9	3	16
4	8	-4	15
5	5	-15	12
6	0	-30	0

15. (a) (i) Differentiate between Auto Regression and Correlation coefficient (4)

(ii) The following table indicates the monthly inflow data and demand for a reservoir. If the storage capacity of the reservoir is 52 Mm^3, seepage and evaporation losses as 2 Mm^3/month, determine the release pattern through simulation technique. (12)

Inflow (Mm^3)	5	10	19	27	36	42	35	27	16	9	2	0
Demand (Mm^3)	2	7	17	35	40	45	33	15	20	10	1	0

(OR)

(b) Explain the procedure involved in developing standard operating policy for an irrigation reservoir through simulation technique. (16)