

The crop water requirement is assessed as 250 ha-m.

(b) If the dependable yield of the catchment is estimated to be 0.29 m, what will be the gross capacity of the reservoir? 14

8. Discuss in detail about the integrated water resources management. 14

9. Write briefly about the environmental impacts of water resources projects. 14

Code : 011843

B.Tech. 8th Semester Exam., 2017

Water Resources Planning and Management

Time : 3 hours

Full Marks : 70

Instructions :

- (i) The marks are indicated in the right-hand margin.
- (ii) There are **Nine** questions in this paper.
- (iii) Attempt **Five** questions in all.
- (iv) Questions No. 1 is compulsory.

1. Write short answers (Answer any seven): $2 \times 7 = 14$

- (a) Conjunctive use
- (b) Simulation
- (c) Consumptive use
- (d) Optimization
- (e) Mass Curve
- (f) Single and Multipurpose reservoirs
- (g) System
- (h) Different techniques of water resources systems analysis
- (i) Local Maximum and Global Maximum
- (j) Backward Recursion

2. Solve by Simplex method

$$\text{Maximize } Z = 2x_1 + x_2$$

$$\text{Subject to } 3x_1 + x_2 \leq 300$$

$$x_1 + x_2 \leq 200$$

$$x_1, x_2 \geq 0$$

3. Solve the 4-user water allocation problem to maximize the total returns, using forward recursion of dynamic programming. Water available for allocation is 60 units, to be allocated in discrete units of 0, 10, 20,60. Returns from four users for a given allocation are given below. 14

Allocation	Returns from			
	User 1	User 2	User 3	User 4
0	0	0	-3	1
10	3	4	3	1
20	5	4	5	1
30	6	4	5	7
40	3	4	4	8
50	3	6	2	10
60	3	7	0	10

4. Explain Capacity expansion problem with example. 14

5. A person borrows a sum of Rs. 50,000/- @ 6 per cent interest for 10 years. Determine the equal sum to be paid at the end of each year to repay the loan, and the amounts credited towards interest and repayment in the 5th year. 14

6. (a) Discuss in detail about the reservoir classification.
(b) Draw Area-Elevation curve and Capacity-Elevation Curve. 7+7

7. The lowest portion of capacity elevation curve of a proposed irrigation reservoir, draining 20 km² of catchment, is represented by the following data.

Elevation (m)	Capacity (ha-m)
RL 600	24.2
602	26.2
604	30.3
606	36.8

The rate of silting for the catchment is 300 m³/km²/ year. Assuming the life of the reservoir to be 50 years (a) Compute the dead storage, and the lowest sill, if the main canal is 6 km long with a bed slope of 1 in 1000, and the canal bed level at the tail end is at RL 594.5 m. The full supply depth of the canal at the head is 80 cm.