

**B.TECH. CIVIL ENGINEERING
(BTCLEVI)**

Term-End Examination

June, 2013

**BICEE-015 : WATER RESOURCES SYSTEM
PLANNING AND DESIGN**

Time : 3 hours

Maximum Marks : 70

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- Note :* (i) *All answers are to be written in English only.*
(ii) *Answer any seven questions.*
(iii) *Programmable calculators are not allowed.*
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1. Identify and discuss briefly some of the major issues and challenges face during water management. 10
2. Discuss the following methods for estimating the reservoir capacity. 5+5
 - (a) Mass diagram method.
 - (b) Sequent peak method.
3. Compare the following preferred combinations of purposes for effective utilization of water. 5+5
 - (a) Irrigation and power.
 - (b) Flood control and water supply.
4. Enumerate the procedural steps for planning ground water system. 10

5. What are the various types of multistage decision problems? With example, explain how multistage decision problem is represented. 10
6. (a) What are the economic and financial aspects of water resource planning and management? 5
- (b) What are the institutional aspects of water resource planning and management? 5
7. Write two different linear programming models for estimating the : 10
- (a) maximum constant reservoir release or yield 'Y' for a given fixed reservoir capacity 'K' and
- (b) for estimating the minimum reservoir capacity 'K' required for a field yield 'Y'. Assume that there are 'T' time periods of historical flows available. How could these models be used to define a storage capacity-yield function, indicating the yield Y available from a given capacity K?
8. Why optimization is important in water resource systems? Classify different optimization techniques. 10

9. Find all the basic solutions of the following systems of equations identifying in each case the basic and non-basic variables : $2x_1 + x_2 + 4x_3 = 11$, $3x_1 + x_2 + 5x_3 = 14$ investigate whether the basic solutions are degenerate basic solutions or not. Find the basic-feasible solution of the system. 10

10. Using simplex method. 10

Maximize $Z = 5x_1 + 3x_2$

Subject to $x_1 + x_2 \leq 2$

$$5x_1 + 2x_2 \leq 10$$

$$3x_1 + 8x_2 \leq 12$$

$$x_1, x_2 \geq 0.$$
