B.TECH. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

December, 2013

BICEE-015 : WATER RESOURCES SYSTEM PLANNING AND DESIGN

Time : 3 hours   *Maximum Marks : 70*

Note : (i) *All answers are to be written in English only.*

(ii) *Answer **any seven** questions.*

(iii) *Programmable calculators are **not** allowed.*

1. (a) What are the importance of water resource   5+5
        planning and management ?
    (b) Explain the different approaches for
        planning and management of water
        resources.

2. (a) Discuss three interdependent subsystems of   5+5
        water resource management.
    (b) Discuss the constraints in the planning of
        water resource management

3. What are the characteristics of standard form of   10
    linear programming ? Give an example of general
    form of linear programming problem.

4. (a) Discuss the use of recursive equations to   5+5
        structure a multistage decision problem as
        a sequential process.
    (b) Compare between backward and forward
        recursion approaches.

5. Enumerate procedural steps for water quality management planning. **10**

6. Discuss the factors to be considered when planning storm sewer networks and detension basins for managing quantity and quality of storm water runoff. Explain how simulation and / or optimizations methods are used for management of storm water. **10**

7. Discuss ground water system planning of a new township plan. How will you allocate ground water to the various agencies ? Also, Discuss the role of policy makers involved. **10**

8. Compare the following preferred combinations of purposes for effective utilization of water. **5+5**
   (a) Recreation , fisheries and wild life.
   (b) Flood control, irrigation , power and water supply.

9. Find an optimal solution to the following L.P.P by computing all basic solutions by finding one that maximizes the objective function : **10**
   $2x_1 + 3x_2 - x_3 + 4x_4 = 8,\ x_1 - 2x_2 + 6x_3 - 7x_4 = -3$
   $x_1,\ x_2,\ x_3,\ x_4 \geq 0$
   Max. $Z = 2x_1 + 3x_2 + 4x_3 + 7x_4$.

10. Solve the following L.P.P by simplex method : **10**
    Minimize $Z = x_1 - 3x_2 + 3x_3$
    Subject to $\quad 3x_1 - x_2 + 2x_3 \leq 7$
    $\qquad\qquad 2x_1 + 4x_2 \geq -12$
    $\qquad\qquad -4x_1 + 3x_2 + 8x_3 \leq 10$
    $\qquad\qquad x_1,\ x_2,\ x_3 \geq 0$