 **RA**

**IV B.Tech I Semester Regular Examinations, November 2005**
**OPTIMIZATION TECHNIQUES**
**(Electrical & Electronic Engineering)**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) What are the different types of optimization problems? Explain each with the help of suitable objective function and constraints. [8]
   (b) If f(x) is optimal at x=x*, show that the first maximum varying even derivative f(x) at x=x* must be positive for f(x*) to be minimum. [8]

2. (a) State and explain Kuhn-Tucker conditions. [8]
   (b) Use Kuhn-Tucker conditions to solve the following problem [8]
   Maximise $Z = 2{x_1}^2 + 12x_1x_2 - 7{x_2}^2$
   Subject to $2x_1 + 5x_2 \leq 98$
   $x_1, x_2 \geq 0$

3. (a) State and explain the standard form of LPP. [8]
   (b) Explain the significance of slack, surplus and artificial variables of LPP. [8]

4. Solve the following LPP using simplex method

   maximize $Z = -x_1 + 2x_2$

   subject to $x_1 + 2x_2 \leq 4$
   $2x_1 + 5x_2 \leq 10$ **[16]**

5. (a) Discuss the techniques used to solve the transportation problem [6]
   (b) Solve the following transportation problem [10]

| D \ O | A | B | C | Availability |
|---|---|---|---|---|
| X | 500 | 300 | 2200 | 1 |
| Y | 900 | 450 | 1700 | 3 |
| Z | 2500 | 2000 | 500 | 4 |
| Requirement | 4 | 2 | 2 | 8 |

6. Show that the function f(x)=$x_2$ , $0 \leq x \leq 1$ , f(x)=2-x, $0 \leq x \leq 1$ , is unimodel in (0,2).Use the Fibonacci method to find its maximal point with in an interval of uncertainty 0.1. [16]

7. Minimize f = $3x_1^2+4x_2^2$ subject to $x_1 + 2x_2 = 8$ using an exterior penalty function method with the calculus method of unconstrained minimization. [16]

8. Explain the concept of dynamic programming and show how to solve a linear programming problem by dynamic programming approach with an example. [16]

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