

III B.Tech I Semester Supplementary Examinations, November 2005

OPTIMIZATION TECHNIQUES
(Electrical & Electronic Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain with the help of examples, how optimization problems are classified based on: [8]
 - i. Single value objective function
 - ii. Multi value objective function.
- (b) Explain the formulation of any engineering problem. Include objective functions and constraints. [8]
2. (a) State and explain the necessary and sufficient conditions for existence of relative optima in case of multivariable optimization with constraints. [8]
- (b) Find the dimensions of a rectangular parallelepiped with largest volume whose sides are parallel to the coordinate planes, to be inscribed in the ellipsoid. [8]
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. (a) Explain the canonical form with respect to LPP. [6]
- (b) Solve the following system of equations by using PIVOT operations

$$4x_1 + 3x_2 + x_3 = 13$$

$$3x_1 + 0x_2 + 7x_3 = 24$$

$$x_1 + 2x_2 + 3x_3 = 14$$

[10]

5. (a) With the help of an example discuss unbalanced transportation problem [6]
- (b) Solve the following transportation problem

			Availability
30	20	10	800
5	15	25	500

Requirement 300 300 400

[10]

6. Starting from (0,0) , carry out at the most five iterations for the following problem using the method of steepest descent : [16]

$$\text{Minimize } f(x) = (x_1 - x_2^2)^2 + (1 - x_2^2).$$

7. Classify the constrained optimization techniques and briefly explain each technique. [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]
