

II B.Tech I Semester Supplementary Examinations, May 2005
OPTIMIZATION TECHNIQUES
(Electrical & Electronic Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE Questions
All Questions carry equal marks

- Explain the theory of multivariable optimization without constraints.
 - What is objective function? Explain the objective function surfaces.
- Explain single variable optimization with illustrative example.
 - Find the extreme points of the function.
 $f(x_1, x_2) = x_1^3 + x_2^3 + 2x_1^2 + 2x_2^2 + 6$.
- Solve the following system of equations by using pivot operations.
 $4x_1 + 3x_2 + x_3 = 13$
 $3x_1 + 7x_3 = 24$
 $x_1 + 2x_2 + 3x_3 = 14$
- Give a generalized mathematical model of Linear Programming Problem.
 - Explain about the Basic Feasible Solution.
 - Explain the significance of 'key row', 'key column' and 'key number' and 'replacement ratio' with respect to a Simplex Method.
- Maximize the following problem using Simplex Method.
 $Z = 10x + y + 2z$
 Subject to $x + y - 2z \leq 10$; $4x + y + z \leq 20$ and x, y and $z \geq 0$
- An oil company has three refinery stations and five filling stations. Transportation cost (rupees for barrel) for shipping oil from refinery station to filling station is shown in the following table.

		Filling Station	Capacities
		$F_1 F_2 F_3 F_4 F_5$	(barrels)
Refinery	R_1	360 180 270 180 540	24
Station	R_2	450 360 450 180 90	36
	R_3	540 450 360 630 270	42
Requirements		12 12 18 24 24	

- Solve the following problem using dynamic programming technique:
 Maximized $z = 28x + 7y$
 Subject to: $4x + 3y \leq 12$; $2x_1 + 5x_2 \leq 10$; $x_1, x_2 \geq 0$.
- Write short notes on the following:
 - Kuhn-Rucker conditions

- (b) Limitations of Dynamic Programming Technique
- (c) Simplex algorithm.

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