

Code: R7 420204

R7

B.Tech IV Year II Semester (R07) Advanced Supplementary Examinations, June 2012

OPTIMIZATION TECHNIQUES
(Electrical and Electronics Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Write brief notes on formulation of optimization problem.
(b) Enumerate various optimization problems.
- 2 (a) Discuss on 'necessary and sufficient conditions for an n-variable function $f(x)$ to have extrema'.
(b) Examine the following function for extreme points. $f(x) = x_1^3 + x_2^3 - 3x_1x_2$.
- 3 Solve the following linear programming problem by Lagrangean method.
Maximize $f(x) = 5x_1 + 3x_2$ subject to $g_1(x) = x_1 + 2x_2 + x_3 - 6 = 0$
 $g_2(x) = 3x_1 + x_2 + x_4 - 9 = 0$
 $x_1, x_2, x_3, x_4 \geq 0$.
- 4 A business executive has the option to invest money in two plans: Plan A guarantees that each dollar invested will earn \$ 70 a year hence, and plan B guarantees that each \$ dollar invested will earn \$ 2 after 2 years. In plan A, investments can be made annually, and in plan B, investments are allowed for periods that are multiples of two years only. How should the executive invest \$ 1, 00,000 to maximize the earnings at the end of 3 years?
- 5 ABC limited has three production shops that supply a product to five warehouses. The cost of production varies from shop to shop and cost of transportation from one shop to warehouse also varies. Each shop has a specific production capacity and each warehouse has certain amount of requirements. The costs of transportation are given below:

	Warehouse					Supply
	I	II	III	IV	V	
Shop A	6	4	4	7	5	100
Shop B	5	6	7	4	8	125
Shop C	3	4	6	3	4	175
Demand	60	80	85	105	70	

The cost of manufacturing the product at different production shops is

Shop	Variable cost	Fixed cost
A	14	7000
B	16	4000
C	15	5000

Find the optimum quantity to be supplied from each shop to different warehouses at the minimum total cost.

- 6 Consider the following unimodal, single variable function $f(x) = x^2 + 54/x$ solve by using quadratic method.
- 7 Consider the four-variable minimization problem:
 $f(x_1, x_2, x_3, x_4) = (x_1 + 2x_2 - 1)^2 + 5(x_3 - x_4)^2 + (x_2 - 3x_3)^4 + 10(x_1 - x_4)^4$.
Perform two iterations of Cauchy's method.
- 8 Write short notes on the following:
 - (a) Penalty function method.
 - (b) Computational procedure in dynamic programming.
