B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2015

OPTIMIZATION TECHNIQUES

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the following with suitable examples:
(i) Design vector. (ii) Objective function. (iii) Constraints.
(b) Write brief notes on formulation of optimization problem.

2 (a) What is the significance of Lagrange multiplier?
(b) Using Lagrange multiplier method, solve the following problem.
Minimize $f(x) = 1/2({x_1}^2 + {x_2}^2 + {x_3}^2)$
Subject to constraints
$g_1(x) = x_1 - x_2 = 0$
$g_2(x) = x_1 + x_2 + x_3 - 1 = 0$

3 (a) State four applications of linear programming problem.
(b) Solve the following problem by simplex method.
Maximize $Z = 2x_1 + 6x_2$
Subject to constraints
$-x_1 + x_2 \leq 1$
$2x_1 + x_2 \leq 2$
$x_1, x_2 \geq 0$

4 (a) Solve the following transportation problem for the costs given below.

	D_1	D_2	D_3	D_4	Capacity
O_1	1	2	3	4	6
O_2	4	3	2	0	8
O_3	0	2	2	1	10
Demand	4	6	8	6	

(b) Explain the applications of North – West corner rule with an example.

5 Minimize $f(x) = 0.65 - [0.75/(1 + x^2)] - 0.65x\ tan^{-1}(1/x)$ in the interval [0, 3] by the Fibonacci method using n = 6.

6 Write short notes on:
(a) Univariate method.
(b) Powell's method.

7 Minimize $f(x) = 3{x_1}^2 + 4{x_2}^2$ subject to $x_1 + 2x_2 = 8$. Using an exterior penalty function method with the calculus method of unconstrained minimization.

8 (a) State the principle of optimality in dynamic programming.
(b) Find the value of $\max\ (y_1\ y_2\ y_3)$ subject to $y_1 + y_2 + y_3 = 15$ and $y_1, y_2, y_3 \geq 0$.

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