B.CHEMICAL ENGINEERING 3 RD YEAR 2 ND SEMESTER EXAMINATION, 2017
OPTIMIZATION METHODS IN CHEMICAL ENGINEERING
ANSWER ANY FOUR QUESTIONS
ASSUME MISSING DATA, IF ANY
FULL MARKS: 100
TIME: 3 HOURS
REFERENCE: EX/CHE/T/325/2017

1. Use the Lagrangian method to solve the following problem

Minimize $Z = 4x_1 + 6x_2 - 2x_1^2 - 2x_1x_2 - 2x_2^2$

subject To $x_1 + x_2 = 2$

and $x_1, x_2 \geq 0$

2. Use the Kuhn Tucker conditions to solve the following non-linear programming problem

Maximize $Z = 2x_1 + x_1^2 + x_2$

subject To $2x_1 + 3x_2 \leq 6$

$2x_1 + x_2 \leq 4$

and $x_1, x_2 \geq 0$

3. Use Wolfe's Modified Simplex algorithm for solving the following quadratic programming problem

Minimize $Z = 6 - 6x_1 + x_1^2 - 2x_1x_2 + 2x_2^2$

subject To $x_1 + x_2 \leq 2$

and $x_1, x_2 \geq 0$

4. Minimize $f(x) = x(x - 1.5)$ in the interval (0.0, 1.0) by Fibonacci method. Use n = 6. Solve for two iterations only.

5. Minimize $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$

Starting from $X_1^T = [0\ 0]$ using Steepest Descent method. Solve for two iterations only.

6. Using Simplex algorithm solve the following linear programming problem

Minimize $Z = x_1 + 4x_2 + 5x_3$

subject To $3x_1 + \quad + 3x_3 \leq 22$

$x_1 + 2x_2 \quad + 3x_3 \leq 14$

$3x_1 + 2x_2 \leq 14$

and $x_1, x_2, x_3 \geq 0$