Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II(New course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 2720821 **Date: 11/12/2015**

Subject Name: Engineering Optimization

Time:2:30 pm to 5:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q-1 a.) Define following terms. (06)

1.) Trajectory optimization problems.

2.) Quadratic optimization problems.

3.) Geometric optimization problems.

b.) Use Two- phase simplex method to (08)

Maximize $Z = 3x_1+2x_2+2x_3$

S/t $5x_1+7x_2+4x_3$ Ò7

$-4x_1+7x_2+5x_3$ Ó-2

$3x_1+4x_2-6x_3$ Ó29/7

x_1,x_2,x_3Ó0

Q-2 a.) Explain Lagrange multiplier method for two variables with one constraint. (07)

b.) Differentiate Random jumping, Random walk and Random walk with direction exploitation for unconstrained optimization. (07)

(OR)

b.) Explain Random search method for constrained optimization problem. (07)

Q-3 a.) State the necessary and sufficient condition for the minimization of function F(X). (07)

b.) Explain the Exterior penalty function method for constrained optimization problem. (07)

(OR)

a.) What is a direct root method? Differentiate Newton method and Quasi ï Newton method. (07)

b.) Explain the interior penalty function method for constrained optimization problem. (07)

Q-4 a.) Minimization $f(x1, x2) = x_1-x_2+2x_1^2+2x_1x_2+x_2^2$ Starting from the point (07)

$X_1 = \binom{0}{0}$ by Fletcher ï Reeves method.

b.) Explain Fibonacci method. (07)

(OR)

a.) Explain cutting plane method. Why itôs known as cutting plane method? (07)

b.) Explain Gold section method. Give meaning of ñGOLDENò. (07)

Q-5 a.) What is topology optimization? Explain procedure for topology optimization. (07)

b.) Explain procedure for GA. Define fitness function in GA. (07)

(OR)

a.) Write objective function and constraint for structural topology optimization problem. (07)

b.) Can you consider SA as a zeroth ï order search method? Explain detail with example.