

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013****Subject code: 710903N****Date: 13-06-2013****Subject Name: Engineering Optimization****Time: 10.30 am – 01.00 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) Find the dimensions of a box of largest volume that can be inscribed in a sphere of unit radius. **07**
- (b) Write the different application of optimizations. **07**
- Q.2** (a) What do you mean by saddle point? Explain it with a suitable example. **07**
- (b) Which are the different methods for the optimization of multivariable unconstrained problems and explain any one method? **07**
- OR**
- (b) Write necessary and sufficient conditions for Lagrange multiplier method. Explain with a significant example. **07**
- Q.3** (a) Explain step wise procedure for the Fibonacci method. **07**
- (b) Determine the following function is concave or convex $f(X) = 2x_1^3 - 6x_2^2$ **07**
- OR**
- Q.3** (a) Using quadric interpolation method find minimum $f(X) = 5x^2 + 2x - 1$ **07**
- (b) Minimize $f(X) = 2x^2 + (16/x)$ using Newton-Rapson method. **07**
- Q.4** (a) Write the procedure for steepest and descent method for case of negative gradient vector as a direction for minimize of function and also write convergence criteria. **07**
- (b) Find the minima of function $f(X) = x_1^2 - 3x_1x_2 + 4x_2^2 + x_1 - x_2$ with starting point $(1,1)^T$ using conjugate gradient method. **07**
- OR**
- Q.4** (a) What do you understand by penalty method? Which are the different penalty Function methods? Explain any one in detail. **07**
- (b) State the difference between following entities **07**
1. Continuous variable and discrete variables
 2. Single objective optimization and multi objective optimization
 3. Quadratic programming and geometric programming
- Q.5** (a) How genetic algorithm is useful for the optimization of a function? Also explain step wise procedure of GA used to optimize a function. **07**
- (b) Explain multilayer feedback network used in ANN. **07**
- OR**
- Q.5** (a) Draw a flowchart stating the working of Simulated Annealing. **07**
- (b) Explain the following terms associated with GA: Reproduction, crossover and mutation. **07**
