

Roll No. ....

Total Pages : 03

**MTE/D-23**

**24081**

OPTIMIZATION TECHNIQUES

MT-CSE-18-31(iii)

(Non-CBCS)

Time : Three Hours]

[Maximum Marks : 100

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) What are the applications of ant colony optimization ?
- (b) What is the difference between uni-variate and multi-variate optimization problems ? Discuss.
- (c) What is a mathematical programming problem ?
- (d) What is a feasible region in linear programming ?

**Unit I**

2. (a) What do you understand by an objective function, decision variables, and constraints ? Illustrate.
- (b) Why is problem formulation important ? What are the characteristics of a good problem formulation ? Discuss.

(5-29/3) L-24081

P.T.O.

3. (a) What is the difference between exact optimization and heuristic optimization methods ? Discuss.
- (b) Write a detailed note on applications of optimization in engineering.

### Unit II

4. (a) Solve the following LPP graphically :  
 Maximize :  $Z = 2x + 3y$ ,  
 Subject to :  

$$x + y \leq 4,$$

$$x \geq 0,$$

$$y \geq 0.$$
- (b) Discuss the use of interior point method in semi definite programming.
5. (a) What is Optimization Problem ? Discuss the steps to find maximum and minimum values given constraints using calculus.
- (b) What is Quadratic Programming ? Discuss the Active Set Method to solve the QP problem.

### Unit III

6. (a) What are the different selection techniques in Genetic Algorithm ? Discuss using suitable examples.
- (b) What is bio-inspired optimization algorithms ? What is the background of ACO ? Discuss.

7. (a) What is the use of mutation operation in Genetic Algorithm ? How is it performed in permutation encoding ? Illustrate.
- (b) How does particle swarm optimization work ? What is fitness value in PSO ? Illustrate.

### Unit IV

8. What is route optimization in networking ? Discuss the use of any optimization technique in network routing.
9. Discuss the use of any bio-inspired optimization algorithm  $n$  solving a real life problem.