

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2024****Subject Code: 3154201****Date:16-05-2024****Subject Name: Optimization Techniques****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Explain any six applications of optimization in engineering. **03**
 (b) Explain different types of constraints in Engineering Optimization with suitable examples. **04**
 (c) Explain the concept of maxima and minima in single variable optimization. **07**
- Q.2** (a) Give difference of Single variable and Multi variable optimization. **03**
 (b) What is convex programming and problem of it? Explain with example. **04**
 (c) What is difference between Multivariable Optimization with Equality Constraints and Multivariable Optimization with Inequality? Give example **07**
- OR**
- (c) Explain and differentiate Global and Local optima. **07**
- Q.3** (a) Differentiate Linear and Non Linear programming **03**
 (b) Explain Interval halving method and Fibonacci method with suitable example **04**
 (c) What is Non-Linear Programming? Explain Direct Root methods in detail. **07**
- OR**
- Q.3** (a) Define below terms: **03**
 1. Unrestricted search
 2. Exhaustive search
 3. Dichotomous search
 (b) What is Golden Section method? Brief with suitable example. **04**
 (c) Describe Multivariable Optimization in detail. **07**
- Q.4** (a) Explain direct root method. **03**
 (b) Discuss Constraint Surface and Objective Function. **04**
 (c) Discuss Univariate method, Hookes and Jeeves' method. **07**
- OR**
- Q.4** (a) Differentiate Direct and Indirect Search methods. **03**
 (b) Describe the Random Search Method for constrained optimization problem. **04**
 (c) Explain the Algorithm and Flowchart for Powell's Method of optimization. **07**
- Q.5** (a) What are Fuzzy optimization techniques? **03**
 (b) Explain Newton's method of Unconstrained Optimization Techniques with Example **04**
 (c) Explain Genetic Algorithms and Simulated Annealing as Modern methods of Optimization with example **07**
- OR**
- Q.5** (a) What are the grid search method used for and list out the advantages of it. **03**
 (b) Give details about Transformation techniques of Constrained Optimization Techniques **04**
 (c) Explain in detail Ant colony optimization as Modern methods of Optimization **07**
