B.E. Civil Engineering - Third Year - Second Semester

B.E. Information Technology - Third Year - Second Semester

B.E. Metallurgical and Material Engineering - Third Year - Second Semester

B.E. Construction Engineering - Fourth Year - Second Semester

B.E. Electrical Engineering - Fourth Year - Second Semester

B.E. Electronics and Tele-Communication Engineering - Fourth Year - Second Semester

B.E. Instrumentation and Electronics Engineering - Fourth Year - Second Semester

B.E. Mechanical Engineering - Fourth Year - Second Semester

B.E. Power Engineering - Fourth Year - Second Semester

B.E. Production Engineering - Fourth Year - Second Semester

B.E. Computer Science & Engineering - Fourth Year-Second Semester

Sub : Optimisation Techniques for Engineering Design (Open Elective)

Full Marks : 100   time : 3 hrs

Answer any five questions (20 X5 = 100)

1. a) Classify optimization techniques. Explain the role of optimization in design.

   b) Develop the N.L.P of an engineering problem for optimum design.

                                                                                              10 + 10

2. a) find out the value of x at which the following function is minimum, maximum or point of inflection.

   $F(x) = x^4 - 2x^3 + 6x^2\ 5x + 4$

   b) Apply Interval halving method or Golden Section method to find out minimum value of the following objective function (2 iterations)

   $f(x) = X^2 + 25/X$.

   c) How is secant method used to find an optimum solution?

                                                                                              5+10+5

3. a) Explain Simplex method for multivariable optimisation.

   b) Apply Cauchy's Steepest Descent method for multivariable optimization for the following function

   $f(x) = (x_1 - 2x_2 - x_1 x_2)^2$ (two iterations)

                                                                                              5+10+5
   c) Why Marquard method is more efficient ?

                                                                                    [Turn over

4. a) Explain the interior and exterior penalty function method for constrained optimization.

   b) Describe optimality criteria for equality constraints.

   c) Explain Particle swarm optimization technique.

8+6+6

5. a) Explain genetic algorithm used for optimisation.

   b) Explain the algorithm for Simulated annealing.

14 +6

6. a) Describe the working principle of Artificial Neural Network

   b) Explain Ant colony optimization algorithm.

10 +10

7. a) Explain "Pareto optimal solution".

   b) Explain weighted metrices method for multivariable optimization.

   c) explain any technique for finding "non dominated solution".

   d) Discuss the ε – constraint method for multi-objective optimization.

5+5+5+5