

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – III • EXAMINATION – WINTER • 2013****Subject code: 733001****Date: 26-11-2013****Subject Name: Advance Process 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) Explain the interpretations with examples for **07**
- Zero coefficient in column.
 - No positive ratio.
 - Identical values of smallest positive ratio.

While solving any linear programming problem using simplex method.

- (b) A length of wire 100 cm is to cut in two parts. One portion is to be bent into the form of a circle, and the other into the form of a square. From where it must be cut, if the sum of the areas enclosed by the circle and square is to be the least possible? **07**

- Q.2** (a) Find the area of the largest rectangle with its lower base on the x-axis and whose corners are bounded at the top by the curve $y = 16 - x^2$. **07**

- (b) A poster is to contain 600 cm^2 of printed matter with margins of 6 cm at the top and bottom and 4 cm at each side. Find the overall dimensions that minimize the total area of the poster. **07**

OR

- (b) Discuss: Artificial Neural Network. **07**

- Q.3** (a) Compare Two-point Equal Interval search, Dichotomous search, Golden Section search and Fibonacci search technique of Region Elimination with working equations of each. **07**

- (b) Find the values of x_1 and x_2 which minimize the function, **07**
 $y = x_1^2 + 4x_2^2 - 4x_1$
 subject to the restriction that,
 $2x_2 - x_1 = 12$.
 Use Lagrangian Multiplier method.

OR

- Q.3** Using the Powell method, conduct three stages of search seeking the minimum of the objective function **14**

$$y = x_1^2 + 3x_1x_2 - 2x_1x_2x_3 + 5x_3^2$$

Q.4 (a) Explain the concept and algorithm of Simulated Annealing technique with example. **07**

(b) Find the minimum of, **07**

$$y = x_1^2 + 2x_2^2$$

Subject to,

$$3x_1 + x_2 \geq 2$$

$$x_1 + 2x_2 \geq 3$$

Using a penalty function method.

OR

Q.4 (a) Explain TABU search optimization technique with algorithm and example. **07**

(b) Discuss Ant Colony Optimization in detail. **07**

Q.5 Maximize P with respect to x_i when it is subject to restrictions that **14**

$$11x_1 + 3x_2 - 2x_3 \geq P$$

$$4x_1 + 5x_2 + x_3 \geq P$$

$$6x_1 + 10x_2 + 5x_3 \geq P$$

$$x_1 + 8x_2 + 12x_3 \geq P$$

$$x_1 + x_2 + x_3 = 1, x_i \geq 0$$

OR

Q.5 (a) Giving the examples of Integer and mixed integer programming, list out methods to solve them discussing strength and weakness. **07**

(b) Discuss optimization of Liquid-Liquid Extraction process. **07**
