Seat No.: _____ Enrolment No._____

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 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**

$y = x_1^2 + 3x_1^2 x_2 - 2x_1 x_2 x_3 + 5x_3^2$

Q.4	**(a)**	Explain the concept and algorithm of Simulated Annealing technique with example.	**07**
	(b)	Find the minimum of, $y = x_1^2 + 2x_2^2$ Subject to, $3x_1 + x_2 \geq 2$ $x_1 + 2x_2 \geq 3$ Using a penalty function method.	**07**

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 $11x_1 + 3x_2 - 2x_3 \geq P$ $4x_1 + 5x_2 + x_3 \geq P$ $6x_1 + 10x_2 + 5x_3 \geq P$ $x_1 + 8x_2 + 12x_3 \geq P$ $x_1 + x_2 + x_3 = 1$, $x_i \geq 0$	**14**

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**

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