

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – III • EXAMINATION – WINTER 2012****Subject code: 733001****Date: 30/12/2012****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** Maximize P with respect to x_i when it is subject to restrictions that **(14)**
 $11x_1 + 3x_2 - 2x_3 \geq P$
 $4x_1 + 5x_2 + x_3 \geq P$
 $6x_1 + 10x_2 + 5x_3 \geq P$
 $x_1 + 8x_2 + 12x_3 \geq P$
 $x_1 + x_2 + x_3 = 1, x_i \geq 0$
- Q.2** (a) Discuss: Artificial Neural Network. **07**
 (b) 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 $y = 10 - x^2$. **07**
- OR**
- (b) A box with a square base and open top is to hold 1000 cm³. Find the dimensions that require the least material (assume uniform thickness of material) to construct the box. **07**
- Q.3** Find the minimum of the function, **14**
 $y = (x_1 - 0.5)^2 + (x_2 - 1.0)^2$
 Subject to the restriction that
 $g = x_1^2 + 2x_2^2 - 4 \leq 0$
- OR**
- Q.3** (a) Discuss Ant Colony Optimization in detail. **07**
 (b) Discuss about TABU Search for optimization in detail. **07**
- Q.4** Using the Powell method, conduct three stages of search seeking the minimum of the objective function **14**
 $y = x_1^2 + 3x_1^2x_2^2 - 2x_1x_2x_3 + 5x_3^2$
- OR**
- Q.4** Use the Fibonacci method to seek the position of the maximum value of the function **14**
 $y = 9x - 0.1x^2$
 In the range $0 \leq x \leq 100$ to within an accuracy of 0.1 percent of the original range. Give the results of the calculations for the first five stages only.
- Q.5** (a) Discuss optimization of liquid-liquid extraction process. **07**
 (b) Discuss optimizing the economic operation of a fixed-bed filter. **07**
- OR**
- Q.5** (a) Explain Dynamic Programming with the help of an 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.
