

Pratik.

GD

Indian Institute of Technology, Kharagpur

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Date: : Time: 2 hours; Full Marks: 30; No. of students: 96

Autumn Sem. 2016-2017 (Mid. Sem.); Subject No. MF41601

B. Tech. and DD students; Subject Name: Soft Computing

Instructions: Answer all the questions. Assume suitable data, if necessary.

Marks: = 20 + 8 + 2 = 30

Q. 1

A binary-coded genetic algorithm (GA) is to be used to maximize a function involving one real and another integer variables as follows: $f(x_1, x_2) = x_1 + x_2 + x_1^2 + x_2^2 + x_1x_2$. The integer (x_1) and real (x_2) variables are allowed to vary in the ranges of (0,31) and (0.4,5.51), respectively. Design suitable GA-string to ensure a precision level of 0.01 for the real variable. Use a random population of size $N = 6$, proportionate selection, two-point crossover with probability $p_c = 1.0$, bit-wise mutation with probability $p_m = 0.015$. Show only one iteration by hand calculations.

Q. 2

Write short notes on the following:

- (a) Visualized Interactive Genetic Algorithm (VIGA)
- (b) Non-dominated Sorting Genetic Algorithm (NSGA) used for multi-objective optimization

Q. 3

Genetic algorithm is a randomized but controlled search algorithm – justify the statement in five sentences.
