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Reg #: _____

Section: _____

National University of Computer and Emerging Sciences, Lahore Campus

Course: Evolutionary Computations
Program: MS (Computer Science)
Duration: 30 Minutes
Paper Date: Nov-2018
Section: N/A
Exam: Quiz-2

Course Code: CS-566
Semester: Fall 2018
Total Marks: 10
Weight
Page(s): 6

Q1 [3 marks] Genetic

Programming:

$$(5.5-(x/15)) - (z+7*\cos(y))$$

Given Expression

- a) Represent the expression (given above) in a prefix notation and draw the tree Representation.

- b) Write down all Terminals and Functions of the expression.

Functions:**Terminals:****Q2 [3 marks] NSGA-III (Many-Objective Optimization)**

Suppose you have to optimize three objectives: (i) Minimize f1, (ii) Minimize f2 and (iii) maximize f3.

Solutio n#	Minimize f1	Minimize f2	Maximize f3
1	6	3	4
2	7	2	5
3	12	4	8
4	4	5	7

- (i) What will be the ideal point?
- (ii) Calculate all the extreme points using the following function:

$$ASF(\mathbf{x}, \mathbf{w}) = \max_{j=1}^M f'_j(\mathbf{x})/w_j, \quad \text{for } \mathbf{x} \in S_t.$$

- (iii) What is the main difference between NSGA-II and NSGA-III as far as diversity preservation scheme is concerned?

Q3 [4 marks]

- (i) If in our search space we have too many local optima and we are interested in finding near global optimal solution. Which one you will prefer and why?
- a) Steepest ascent hill climbing b) stochastic hill climbing
c) Simple hill climbing d) Shotgun hill climbing

Reason:

- (ii) If in our search space we have many local optima and the search space has also many plateaus. Our aim is to find the global optimal solution. Which one you will prefer and why?
- a) Hill climbing b) Tabu search (c) simulated annealing d) any greedy algorithms

Reason:

- (iii) The following are examples of greedy algorithms
- a) Stochastic hill climbing b) Tabu search c) Genetic programming d) Simulated annealing

- (iv) Which of the following are meta-heuristics?
- a) Hill climbing b) Simulated annealing c) Genetic Programming d) problem specific heuristic

Good Luck ☺