Name:..... Reg.No.....

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHT SEMESTER B.TECH (HONS.) EXAMINATION MAY 2019

Course code: 08CS6032
Course name:Evolutionary Computing

Max. Marks : 60 Duration : 3 Hours

Answer ALL six questions. Part (a) of each question is compulsory.

Answer EITHER part (b) *or* part (c) of each question.

Q.No. Marks

Module I

1a. Illustrate on the features of Evolutionary computing. **3**

Answer b *or* c

b.Outline the similarities and differences between Genetic Algorithms and Evolutionary Strategies.**6**

c.With regard to evolutionary strategies what do you understand by the term self-adaptation? **6**

Module II

2a. One aspect of a simulated annealing cooling schedule is the temperature. What is the effect of having the starting temperature too high or too low? **3**

Answer b *or* c

b. Describe the motivation behind the Hill Climbing algorithm **6**

c. The following table shows six evaluations of a simulated annealing algorithm. For each evaluation give the probability of the next state being accepted. Assume the objective function is being maximised. 6

No.	Current State (Evaluation)	Potential New State (Evaluation)	Temperature
1	120	50	20
2	120	50	500
3	120	100	20
4	120	100	500
5	120	150	20
6	120	150	500

Module III

3a. Discuss on the variation of Genetic Algorithms 3

Answer b *or* c

b.Assume the initial population was x={17, 21, 4 and 28}. Using one-point crossover, what is the probability of finding the optimal solution? Explain your reasons. **6**

c. Assume we have the following function

$$f(x) = x^3 - 60 * x^2 + 900 * x + 100$$

Using a binary representation we can represent x using five binary digits.

Given the following four chromosomes give the values for x and f(x).

Chromosome	Binary String
P_1	11100
P_2	01111
P_3	10111
P_4	00100

6

Module IV

4a. Describe how ants are able to find the shortest path to a food source. **3**

Answer b *or* c

b Using the travelling salesman problem as an example, define the following terms with relation to ant algorithms

Visibility

Evaporation

Transition Probability **6**

c.Many of the search methods presented in the lectures had as their basis some aspect of the real world. Propose an idea for a search algorithm based on some natural process or animal behaviour. Discuss how your method could be realised in a computer implementation in solving, say, the TSP. **6**

Module V

5a. Discuss about Bird flocking its rules, characteristics of Schooling and draw the ranges of behaviour patterns. 4

Answer b *or* c

b. Explain briefly how Particle Swarm Optimization (PSO) works **8**

c.Enumerate on Neighbourhood Topologies of PSO **8**

Module VI

6a. Write about variations of Artificial bee colony Optimization **4**

Answer b *or* c

b. Describe about Artificial bee colony algorithm **8**

c. Discuss and relate the behaviour of real bees with computational techniques. **8**