D.. Naffisuddin Kha'

Roll No:...................

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 2 EXAMINATION OCTOBER 2019

B.Tech V Semester

COURSE CODE: 18B1WEC533

COURSE NAME: Applied Artificial Intelligence

MAX. MARKS: 25

COURSE CREDITS: 03

MAX. TIME: 1 Hr 30 Min

Note: All questions are compulsory. Assume the data wherever necessary.

Q1. With the help of a suitable example, explain the Genetic Algorithm principle "Survival of the fittest".

CO2 (3 Marks)

Q2. Consider the following function

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

where x is a constrained varying between 0 to 31. Using Genetic Algorithm, show the rise in the average fitness of the population if a constant population size $n = 4$ is maintained.

CO2 (8 Marks)

Q3. Using the travelling salesman problem as an example, describe the following terms in relation to Ant Colony Optimization:

CO3 (3 Marks)

a. Visibility
b. Evaporation
c. Transition Probability

Q4. Assume 4 cities {A, B, C, D}, which are represented by a fully connected graph. The following tables represent the pheromone levels on each edge of the graph and the distances between each city (assume the pheromone levels and distances are symmetric).

CO3 (8 Marks)

Pheromone Levels			
	A	B	C	D
A				
B	0.25			
C	0.11	0.98		
D	0.34	0.54	0.67	

Distances			
	A	B	C	D
A				
B	12			
C	10	6		
D	8	15	3	

Let an ant started its journey at city A and has travelled to city C. The values of alpha and beta are set to 1, Q is 100 and the coefficient of vaporization is set to 0.5.

a. What is the probability that the ant will travel to city A?
b. What is the probability that the ant will travel to city B?
c. What is the probability that the ant will travel to city D?
d. Assume the ant completes its tour using the route A – C – B – D. What will be the pheromone levels on each edge once they have been updated?

Q5. Discuss in detail the steps in solving optimization problem using Particle Swarm Intelligence.

CO3 (3 Marks)