Dr. Nafis U Khan

Roll No:.....

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 3 EXAMINATION DECEMBER 2021

B.Tech VII Semester

COURSE CODE: 19B1WEC732 MAX. MARKS: 35

COURSE NAME: Pattern Analysis in Machine Intelligence COURSE CREDITS: 03

MAX. TIME: 2 Hours

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

Q1. Explain the following measurements related to statistical pattern recognition: CO1 [3 Marks]

1. Variance
2. Co-variance
3. Euclidean distance

Q2. Write a comparison note between Baye's Classifier and Support Vector Machines. CO2 [4 Marks]

Q3. Using the travelling salesman problem as an example, describe the following terms in relation to Ant Colony Optimization: CO2 [3 Marks]

1. Visibility
2. Evaporation
3. 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 [10 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.

1. What is the probability that the ant will travel to city A?
2. What is the probability that the ant will travel to city B?
3. What is the probability that the ant will travel to city D?
4. 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?

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Q5. 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.

CO3 [7 Marks]

Q6. With the help of a suitable example, explain fuzzy inference system in decision making. CO4 [4 Marks]

Q7. Perform intersection and union fuzzy operation for the given fuzzy set: CO4 [4 Marks]

$A = \{(0.95, 1,), (0.8, 2), (0.6, 3), (0.55, 4), (0.3, 5)\};$

$B = \{(0.25, 2), (0.5, 3), (0.75, 4), (0.9, 5), (1, 6)\}$