



End Semester/Reappear (Semester V) Examination December, 2024

Programme: BCA

Course: Soft Computing

Course Code: 3C.324

Enrolment no. _____

Full Marks: 70

Time: 3 Hrs.

Q. No.	Questions	CO	Bloom Taxonomy Category	Marks
Section I				
1	Short Answer type questions			4 x 5 = 20
a	Define Fuzzy Cartesian product	CO1	Remember	
	or			
b	Differentiate between hard computing and soft computing.	CO1	Understand	
	or			
	Explain Multilayer Perceptron's in detail.	CO4	Understand	
c	or			
	Define Artificial Neural Network and its components.	CO4	Understand	
	Illustrate the importance of fitness function in GA.	CO3	Understand	
d	or			
	Define Encoding in Genetic algorithm (GA).	CO3	Understand	
	What do you mean by Biological Neural Network? How is it different from ANN?	CO4	Understand	
	or			
	i. A neuron with 3 inputs has the weight vector $w = [0.10, 1-0.2]$. The activation function are binary sigmoidal and bipolar sigmoidal activation function. If input vector is $[0.80, 6, 0.9]$, find the output of a neuron. (7 marks)	CO4	Apply	
	ii. Discuss the applications of an artificial neural network. (3 marks)			
Section II				
Long Answer type questions				
2	Explain Defuzzification. Classify the different methods of defuzzification process.	CO2	Analyze	3 x 10 = 30
	or			
	Describe Fuzzy Inference System (FIS)? Explain FIS with a schematic diagram.	CO2	Understand	
3	a) Explain the operations of fuzzy union, intersection, and complement. (4 marks)	CO1	Evaluate	
	b) Consider a set $P = \{ P1, P2, P3, P4 \}$ of four varieties of paddy plants, set $D = \{ D1, D2, D3, D4 \}$ of various diseases affecting the plants and $S = \{ S1, S2, S3, S4 \}$ be the common symptoms of the diseases. Let $\sim R$ be the relation on $P \times D$ and $\sim S$ be a relation on $D \times S$. Evaluate the association of the plants with the different symptoms of the diseases using max-min composition. (6 marks)			
	$\sim R = \begin{bmatrix} 0.6 & 0.6 & 0.9 & 0.8 \\ 0.1 & 0.2 & 0.9 & 0.8 \\ 0.9 & 0.3 & 0.4 & 0.8 \\ 0.9 & 0.8 & 0.1 & 0.2 \end{bmatrix} \quad \sim S = \begin{bmatrix} 0.1 & 0.2 & 0.7 & 0.9 \\ 1 & 1 & 0.4 & 0.6 \\ 0 & 0 & 0.5 & 0.9 \\ 0.9 & 1 & 0.8 & 0.2 \end{bmatrix}$			
	or			
	Three fuzzy sets are defined as follows: $\sim A = \{0.1/30 + 0.2/60 + 0.3/90 + 0.4/120\}$ $\sim B = \{1/1 + 0.2/2 + 0.5/3 + 0.7/4 + 0.3/5 + 0/6\}$ $\sim C = \{0.3/20 + 1/30 + 0.9/40 + 0.7/50\}$ Evaluate (a) $\sim R = \sim A \times \sim B$ (b) $\sim S = \sim B \times \sim C$ (c) $\sim T =$ using max-min composition	CO1	Evaluate	
4	Define self-organizing map. Draw and explain the architecture of Kohonen Self organizing feature map.	CO5	Analyze	
	or			

	Illustrate Radial basis function neural network with a neat diagram.	CO5	Apply	
Section III				
	Application based questions			
5	a. Elaborate Adaline network. Also discuss the applications of the Adaline network. b. Explain Hebbian learning with its flowchart.	CO5	Analyze	1 x 20 = 20
	or			
	Discuss Madaline network. How Madaline network is used to solve the XOR problem?	CO5	Analyze	

COURSE OUTCOME

At the end the course the candidate will able to

CO1: Solve numerical on Fuzzy sets and Fuzzy Reasoning.

CO2: Develop Fuzzy Inference System (FIS).

CO3: Solve problems on Genetic Algorithms.

CO4: Explain concepts of neural networks.

CO5: Develop neural networks models for various applications.