GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)

B. Tech (Fourth Semester - Regular) Examinations, April – 2025

23BCDPE24011 – Introduction to Soft Computing

(Computer Science and Engineering)

Time: 3 hrs   Maximum: 60 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A   (2 x 5 = 10 Marks)

Q.1. Answer *ALL* questions

		CO #	Blooms Level
a.	Describe the various fuzzification Methods.	CO1	K1
b.	Describe the 4 types defuzzification Methods.	CO1	K2
c.	State competitive learning rule.	CO2	K2
d.	Explain the Supervised and Unsupervised learning approaches.	CO3	K1
e.	Discuss Artificial Swarm Intelligence.	CO5	K2

PART – B   (10 x 5 = 50 Marks)

Answer *ALL* the questions

		Marks	CO #	Blooms Level
2. a.	A= {.2/x + .3/y+ .5/z + .7/w} and B= {.3/x + .2/y + .4/z + .65/w}, using α-cut with α =.3 Find (i) A∪ B^C (ii) (A ∩ B)^C (iii) A^C ∩ B (iv) B^C (v) A∩ B^c	5	CO1	K3
b.	Briefly Explain about various Activation Functions used in NN?	5	CO2	K2
	(OR)			
c.	Explain Mamdani Fuzzy Inference Systems.	5	CO1	K2
d.	Find R o S using max-min composition. X ={1, 4, 6}, Y ={1, 5, 7}, R ={(x, y) | y = x + 1}, S = {(x, y) | x < y}	5	CO1	K3
3.a.	Explain various types of encoding techniques in Genetic Algorithm.	5	CO3	K2
b.	Explain graphically about Perceptron ?	5	CO2	K2
	(OR)			
c.	Explain Sugeno Fuzzy Inference Systems.	5	CO1	K3
d.	Describe with a diagram the 5 layers of ANFIS model	5	CO5	K2
4.a.	Calculate the Error using Forward Pass with the data as Input= {0.11, 0.5}, Weight= {.13, .25, .33, .45}, Bias= {.3, .5}, Output= {0.22, 0.99}	5	CO2	K3
b.	Update the weight using Backpropagation method.	5	CO2	K3
	(OR)			
c.	Explain the McCulloch-Pitts neuron model with figure.	5	CO2	K1
d.	Discuss various types of selection procedures in GA	5	CO3	K2
5.a.	Discuss the various Hybridization techniques in Soft computing.	5	CO4	K2
b.	Explain the Learning Rules for Neural Network.	5	CO2	K2
	(OR)			
c.	Explain different mutation techniques used in GA.	5	CO3	K2

d.	Construct the Kohonen's Self Organizing Map (KSOM) to cluster the 4-given vectors [0 0 1 1], [1 0 0 0], [0 1 1 0] and [0 0 0 1]. The number of clusters to be formed is two. W= {.17, .42, .52, .82 .9, .61, .5, .35} Assume an initial learning rate 0.2.	5	CO2	K3
6.a.	Explain the performance of the Particle Swarm Optimization algorithm	5	CO5	K2
b.	Explain Competitive learning Neural network with suitable diagram.	5	CO2	K1
	(OR)			
c.	Discuss the advantages of Swarm Intelligence.	5	CO5	K1
d.	State and explain radial basis function neural network with suitable architecture.	5	CO2	K2

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