2023
M. E. (Information Technology)
Second Semester
MEIT-2103: Advanced Soft Computing

Time allowed: 3 Hours   Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I.   Attempt the following:-

a) Differentiate between classification and clustering.

b) Define fuzzification.

c) Determine (alfa) α-level cut set for the following fuzzy set

A= {(1,0.2),(2,0.5),(3,0.8),(4,1),(5,0.7),(6,0.3)}

Where $\alpha = 0.5$

d) What is two point cross-over?

e) What is the difference between auto associative and hetero associative memory networks?   (5x2)

UNIT - I

II.   a) Certain medications and trauma can both cause blood clots. A blood clot can lead to a stroke, heart attack, or it could simply dissolve on its own and have no health implications. The following probability information is given where M= Medication, T=trauma, BC=Blood clot, HA= heart attack, N= nothing, and S=stroke. T stands for true or this event did occur. F stands for false, or this event did not occur.

P(M = T)	0.2
P(M = F)	0.8
P(T = T)	0.05
P(T = F)	0.95

M	T	P (BC = T)	P (BC= F)
T	T	0.95	0.05
T	F	0.3	0.7
F	T	0.6	0.4
F	F	0.9	0.1

BC	P(HA = T)	P(HA = F)	P(S = T)	P(S = F)	P(N = T)	P(N = F)
T	0.4	0.6	0.35	0.65	0.25	0.75
F	0.15	0.85	0.1	0.9	0.75	0.25

(i)   Create a DAG that represents this situation

(ii)   What is the probability that a person develop a blood clot as a result of both medication and trauma and then have no medical implication?

b) Describe the applications of soft computing techniques.   (2x5)

III.   Explain the back-propagation learning algorithm used in multilayer feed-forward neural networks. Also, describe different learning factors of back-propagation neural network.   (10)

IV.   Is the pattern [-1 1 1 1] stored in the Hopfield network with weight matrix given below? If yes, show this, if no give one pattern that is stored in the network. The threshold is 0 as usual. Show your calculations.

0	-1	-1	-1
-1	0	1	1
-1	1	0	1
-1	1	1	0

(10)

UNIT - II

V.   What is the role of membership function in fuzzy logic? Consider two fuzzy sets defined by "approximately 2" = {0.5/1+1/2+0.5/3} and "approximately 4" = {0.8/1+0.9/3+1/4}. Find the value of "approximately 8".   (10)

VI.   a) Explain Mamdani and Sugeno fuzzy inference system.

b) What is defuzzification? Describe any two techniques used for defuzzification.   (2x5)

VII.   Describe the working principle of particle swarm optimization. How it solves the problem of exploration and exploitation?   (10)

x-x-x