Exam.Code:1006
Sub. Code: 35103

2055
M.E. (Information Technology)
Second Semester
MEIT-2202: 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 hard computing and soft computing.
b) Using linear separability concept, obtain the response for NOR function. (take bipolar inputs and targets)
c) State the concept of delta rule used in adaptive linear neuron.
d) Law of excluded middle law cannot be applied to fuzzy sets. Give proper justification to the statement.
e) "Termination criteria for genetic algorithm brings the search to halt". Explain various termination techniques. (5x2)

UNIT - I

II. a) Differentiate between classification and clustering with suitable examples.
b) 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? (2x5)

III. Use Adaline network to train ANDNOT function with bipolar inputs and targets. Calculate total mean square error after 1 epoch of training. Initially, the weights and bias have assumed random value of 0.2. The learning rate also set to 0.2. **(10)**

IV. Explain how adaptive resonance theory achieves the properties of stability and plasticity. Also, describe the difference between ART1 and ART2. **(10)**

P.T.O.

UNIT - II

V. a) With the help of figure explain, the features of fuzzy membership functions.

b) Explain the characteristics and different classifications of a neuro-fuzzy hybrid systems. **(2x5)**

VI. Determine the α-cut sets for the given fuzzy sets: **(10)**

$\underline{S1} = \left\{\frac{0}{0} + \frac{0.5}{20} + \frac{0.65}{40} + \frac{0.85}{60} + \frac{1.0}{80} + \frac{1.0}{100}\right\}$

$\underline{S2} = \left\{\frac{0}{0} + \frac{0.45}{20} + \frac{0.6}{40} + \frac{0.8}{60} + \frac{0.95}{80} + \frac{1.0}{100}\right\}$

Express the following for α =0.5

(i) $\underline{S1}\ U\ \underline{S2}$ (ii) $\underline{S1} \cap \underline{S2}$ (iii) $\overline{\underline{S1}}$ (iv) $\overline{\underline{S2}}$ (v) $\underline{S1} - \underline{S2}$

VII. Explain the working principle of particle swarm optimization. How it is used to solve the problem of exploration and exploitation? **(10)**

x-x-x