BACHELOR OF ENGINEERING INFORMATION TECHNOLOGY EXAMINATION, 2018

4th Year, 1st Semester

Fuzzy Logic & Neural Computing

Marks-100 Time- 3 Hours

Group-A

Answer any 1 Question

1. a) Discuss the importance of Jordan and Elman Network as recurrent network. 8
   b) Define: signum function. 2

2. a) Describe the architecture of following networks- 4+4=8
      i) Boltzmann Machine
      ii) Hopfield Model
   b) Find out the relation between Gaussian and Cauchy Machine. 2

3. a) Describe the classification of different learning algorithms in ANN. 8
   b) Determine the relationship of IS to ANNs. 2

Group-B

Answer any 1 Question

4. a) Describe the architecture of a fuzzy logic system. 8
   b) Define: dilation. 2
   c) Give a list for general observations of fuzzy logic. 4
   d) Discuss the application of fuzzy logic as example of computational intelligence data mining system. 6

5. a) Explain the architecture of a machine learning system. 8
   b) List out the objectives and issues in machine learning. 4
   c) What are the myths about computational intelligence? 4
   d) How does the management play role in machine and deep learning? 2
   e) Discuss any 2 issues in machine intelligence. 2

Group-C

6. a) Evaluate the following expression and determine its nature. 8

$(((P \wedge Q) \rightarrow (\sim P)) \wedge (Q \vee P)) \rightarrow ((Q \wedge P \wedge P) \leftrightarrow (P \vee Q))$

b) You are given the following data.

P: Mr. X is efficient, T(P) = 0.80

Q: Mr. Y is efficient, T(Q) = 0.75

Find out the following - 4

i) Mr. X is inefficient.

ii) Mr. X is efficient and so is Mr. Y.

iii) Either Mr. X or Mr. Y is efficient.

iv) If Mr. X is efficient then so is Mr. Y.

c) Consider the following ex. to train a MADALINE to solve the X-OR problem. 8
Only the computations for the 1st weight updates are shown below, with the training patterns as:

x1	x2	t
1	1	-1
1	-1	1
-1	1	-1
-1	-1	-1

d) Implement the McCulloch-Pitts Network for AND Logic Function. 5

OR

d) Write down the equivalent predicate statements for the following. 1+2+2=5

i) Alive means not dead.

ii) No mortal lives longer than 150 years.

iii) If someone dies then he is dead at all later times.

e) Consider the fuzzy sets $\bar{A}_1$ and $\bar{A}_2$ are defined on the interval X= (0, 5) of the real numbers, by the membership grade functions.

$\mu\bar{A}_1(x) = x/(x+1)$, $\mu\bar{A}_2(x) = (x-1)/(x+1)$.

Determine the mathematical formula and graphs of the membership grade functions of each of the following sets. 10

i) A_1^c, A_2^c

ii) $A_1 \cup A_2$

iii) $A_1 \cap A_2$

iv) Show that, $(\bar{A}_1 \cup \bar{A}_2)^c = \bar{A}_1^c \cap \bar{A}_2^c$.

Group-D

7. Differentiate between: (any 5) - 3*5=15

a) supervised and unsupervised learning

b) software agent and regular software

c) ES and ANN

d) ANN and SVM

e) fuzzy systems and neural networks

f) Hebbian and Delta rule

g) Mamdani and Sugeno Model of FIS

h) liquid state machines and echo state networks

Group-E

8. Write short note on: (any 4) - 5*4=20

a) fuzzy automata

b) cellular neural networks

c) swarm intelligence

d) kernel machine(SVM)

e) A-S model of cognitive memory

f) hybrid neuro-fuzzy system