HALDIA INSTITUTE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION UNDER MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL)

Paper Code: PEC-CS 702B

Paper Name: Soft Computing

Time Allotted: 1 Hour 30 Minutes *Full Marks*: 70

The figures in the margin indicate full marks
Candidates are required to give their answers in their own words as far as practicable

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives from the followings: 30 x 1 = 30

(i) LCS stands for? [CO1]

a) learning classes system

b) learning classifier systems

c) learned class system

d) None of the above

(ii) EV is considered as? [CO5]

a) adaptive

b) complex

c) both a and b

d) none of these

(iii) Genetic algorithms are example of [CO5]

a) heuristic

b) Evolutionary algorithm

c) ACO

d) PSO

(iv) Applying recombination and mutation leads to a set of new candidates, called as ?. [CO3]

a) grand child

b) child

c) offspring

d) All of the Above

(v) There are also other operators, more linguistic in nature, called _____ that can be applied to fuzzy set theory. [CO2]

a) Hedges

b) Lingual Variable

c) Fuzz Variable

d) None

(vi) Which of the following neural networks uses supervised learning ? [CO4]

a) Multilayer perceptron.
b) Self organizing feature map
c) The item Hopfield network
d) None

(vii) What is the feature of ANNs due to which they can deal with noisy, fuzzy, inconsistent data? [CO4]
a) associative nature of networks
b) distributive nature of networks
c) both associative & distributive
d) none

(viii) Any soft-computing methodology is characterized by [CO2]

a) Precise solution

b) control actions are unambiguous and accurate

c) control actions are formally defined

d) algorithm which can easily adapt with the change of dynamic environment

(ix) For what purpose Feedback neural networks are primarily used? [CO4]

a) classification

b) feature mapping

c) pattern mapping

d) none of the mentioned

(x) Operations in the neural networks can perform what kind of operations? [CO4]

a) serial

b) parallel

c) serial or parallel

d) none

(xi) What is ART in neural networks? [CO4]

a) automatic resonance theory

b) artificial resonance theory

c) adaptive resonance theory

d) none

(xii) The values of the set membership is represented by _____ [CO2]
a) Discrete Set
b) Degree of truth
c) Probabilities
d) Both Degree of truth & Probabilities

(xiii))----------function is a continuous function that varies gradually between the asymptotic values 0 and 1 or -1 and +1 [CO4]

a)Activation function

b)Thresholding function

c)Signum function

d)Sigmoidal function

(xiv) What are the following sequence of steps taken in designing a fuzzy logic machine? [CO2]

a) Fuzzification → Rule evaluation → Defuzzification
b) Fuzzification → Defuzzification → Rule evaluation
c) Rule evaluation → Fuzzification → Defuzzification
d Rule evaluation → Defuzzification → Fuzzification
(xv) If A and B are two fuzzy sets with membership functions μA(x) = {0.6, 0.5, 0.1, 0.7, 0.8} μB(x) = {0.9, 0.2, 0.6, 0.8, 0.5} Then the value of μ(A∪B)'(x) will be [CO2]

a) {0.9, 0.5, 0.6, 0.8, 0.8}

b) {0.6, 0.2, 0.1, 0.7, 0.5}

c) {0.1, 0.5, 0.4, 0.2, 0.2}

d) {0.1, 0.5, 0.4, 0.2, 0.3}

(xv) What is the name of the operator that is functioned on the population? [CO5]

a) Recombination
b) Reproduction
c) Mutation
d) None of the above

(xvi) The fuzzy proposition "IF X is E then Y is F" is a [CO2]

a) conditional unqualified proposition
b) unconditional unqualified proposition
c) conditional qualified proposition
d) unconditional qualified proposition

(xvii) . —– defines logic funtion of two prepositions [CO2]
a) prepositions
b) Lingustic hedges
c) truth tables
d) inference rules

(xviii) In fuzzy propositions, —gives an approximate idea of the number of elements of a subset fulfilling certain conditions [CO2]
a) Fuzzy predicate and predicate modifiers
b) Fuzzy quantifiers
c) Fuzzy qualifiers
d) All of the above

(xix) What are the two types of Fuzzy Inference Systems? [CO4]

a) Model-Type and SystemType
b) Momfred-type and Semigitype
c) Mamdani-type and Sugeno-type
d) Mihni-type and Sujganitype

(xx) What Is Another Name For Fuzzy Inference Systems? [CO4]
a) Fuzzy Expert system
b) Fuzzy Modelling
c) Fuzzy Logic Controller
d) All of the above

(xxi) In Evolutionary programming, survival selection is [CO5]

a) Probabilistic selection (μ+μ) selection
b) (μ, λ)- selection based on the children only (μ+λ)- selection based on both the set of parent and children
c) Children replace the parent
d) All of the above

(xxii) A perceptron can be defined as _____ [CO4]

a) A double layer auto-associative neural network

b) A neural network with feedback

c) An auto-associative neural network

d) A single layer feed-forward neural network with pre-processing

(xxiii) Backpropagation can be defined as _____ [CO4]

a) It is another name given to the curvy function in the perceptron.

b) It is the transmission of errors back through the network to adjust the inputs.

c) It is the transmission of error back through the network to allow weights to be adjusted so that the network can learn.

d) None of the above

(xxiv) Having multiple perceptrons can solve the XOR problem satisfactorily because each perceptron can partition off a linear part of the space itself, and they can then combine their results. [CO4]

a) True - This works always, and these multiple perceptrons learn to classify even complex problems.

b) False - Perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do

c) True - Perceptron can do this but are unable to learn to do it - they have to be explicitly hand-coded

d) False - Just having a single perceptron is enough

(xxv) Who initiated the idea of Soft Computing? [CO2]

a) Charles Darwin

b) Lofti A Zadeh

c) Rechenberg

d) Mc_Culloch

(xxvi) What is the name of the operator that is functioned on the population? [CO5]

a) Recombination

b) Reproduction

c) Mutation

d) None of the above

(xxvii Name the selection method that is found to be less noisy. [CO6]

a) Boltzmann solution

b) Remainder solution

c) Stochastic remainder solution

d) None of the above

(xxviii) Which of the following best relate to reinforcement learning? [CO4]

a) Error based learning

b) Backpropagation learning

c) Output-based learning

d) None of the above

(xxix) _____ deals with uncertainty problems with its own merits and demerits [CO2]

a) Neuro-fuzzy

b) Neuro-genetic

c) Fuzzy-genetic

d) None

(xxx) What does FAM stand for? [CO2]

a) Fuzzy Association Memory

b) Fuzzy Associative Memory

c) Fuzzy Assist Memory

d) None of the above

Group – B
(Multiple Choice Type Questions)

2. Choose the correct alternatives from the followings: 20 x 2 = 40

(i) The truth values of traditional set theory can be defined as _____ and that of fuzzy logic is termed as _____. [CO2]

a) Either 0 or 1, either 0 or 1.
b) Between 0 & 1, either 0 or 1.
c) Either 0 or 1, between 0 & 1.
d) Between 0 & 1, between 0 & 1.

(ii) Which of the following is correct for the neural network? [CO4]

i. The training time is dependent on the size of the network

ii. Neural networks can be simulated on the conventional computers

iii. Artificial neurons are identical in operation to a biological one

a) All of the above
b) (ii) is true
c) (i) and (ii) are true
d) None of the above

(iii) A 3-input neuron is trained to output a 0 when the input is 110 and a 1 when the input is 111. After generalization, the output will be 0, when and only when the input is: [CO4]

a) 000 or 110 or 011 or 101
b) 000 or 010 or 110 or 100
c) 100 or 111 or 101 or 001
d) 010 or 100 or 110 or 101

(iv) A 4-input neuron has weights 1, 2, 3, and 4. The transfer function is linear, with the constant of proportionality being equal to 2. The inputs are 4, 10, 5, and 20, respectively. The output will be: [CO4]

a) 76
b) 238
c) 123

d) 119

(v) Which of the following is correct? [CO6]

i. In contrast to conventional computers, neural networks have much higher computational rates.

ii. Neural networks learn by example.

iii. Neural networks mimic the same way as that of the human brain

a) All of the above
b) (ii) and (iii) are true
c) (i), (ii) and (iii) are true
d) None of the above

(vi) What are the advantages of neural networks over conventional computers? [CO6]
(i) They have the ability to learn by example
(ii) They are more fault tolerant
(iii)They are more suited for real time operation due to their high 'computational' rates

a) (i) and (ii) are true
b) (i) and (iii) are true
c) Only (i)
d) All of the mentioned

(vii) Having multiple perceptrons can solve the XOR problem satisfactorily because each perceptron can partition off a linear part of the space itself, and they can then combine their results. [CO4]

a) True - This works always, and these multiple perceptrons learn to classify even complex problems.
b) False - Perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do
c) True - Perceptron can do this but are unable to learn to do it - they have to be explicitly hand-coded
d) False - Just having a single perceptron is enough

(viii) Which of the following is incorrect? [CO6]

a) The union and intersection of two context-free languages are context-free.
b) The reverse of context-free language is context-free, but its complement does not need to be.
c) Every regular language is context-free as it can be easily explained by regular grammar.
d) The intersection of a context-free language and a regular language is always context-free.

(ix) How does blind search differ from optimization? [CO3]

a) blind search represent a guided approach while optimization is unguided

b) blind search usually does not conclude in one step like some optimization methods.
c) blind search cannot result in optimal solution whereas optimization method do
d) none of these

(x) Which of the following statement is correct? [CO6]

a) Not all formal languages are context-free
b) All formal languages are context-free
c) All formal languages are like natural language
d) Natural languages are context-oriented free

(xi) Signum function is defined as ---------- [CO2]

a) φ(I) =+1, I>0, -1, I<=0

b) φ(I)=0

c) φ(I)=+1,I>0

d) φ(I)=-1,I<=0

(xii) To generate the final output, the sum is passed on to a non-linear filter φ called [CO4]

a)Smash function

b)sum function

c)Activation function

d)Output function

(xiii) Given U = {1,2,3,4,5,6,7} A = {(3, 0.7), (5, 1), (6, 0.8)} then A will be: (where ~ →complement) [CO3]

a) {(4, 0.7), (2,1), (1,0.8)}

b) {(4, 0.3.): (5, 0), (6. 0.2) }

c) {(l, 1), (2, 1), (3, 0.3), (4,1), (6,0.2), (7, 1)}

d) {(3, 0.3), (6.0.2)}

(xiv)----------produce negative output values [CO4]

a)Hyperbolic tangent function

b)Parabolic tangent function

c)Tangent function

d)None of the above

(xv)---------- carrying the weights connect every input neuron to the output neuron but not vice-versa. [CO4]

a)Feed forward network
b)Fast forward network
c)Fast network
d)Forward network

(xvi)---------- has not feedback loop [CO4]

a)Neural network

b)Recurrent Network

c)Multilayer Network

d)Feed forward network

(xvii) In the learning method, the target output is not presented to the network ---------- [CO3]

a) Supervised learning

b)Unsupervised learning

c)Reinforced learning

d)Hebbian learning

(xviii) Combining a number of ADALINE is ---------- [CO4]

a) MULTILINE

b)MULTIPLE LINE

C)MADALINE

d)MANYLINE

(xix) Neural network applications ---------- [CO4]

a) Pattern Recognition

b)Optimization Problem

c)Forecasting

d)All the above

(xx)---------- is a Systematic method for training multilayer artificial neural network [CO4]

a)Back propagation

b)Forward propagation

c)Speed propagation

d)Multilayer propagation

SUNANDA JANA

Signature of the Paper Setter/Moderator

Answer Key:

Group – A

1. (i)b	(ii)c	(iii)b	(iv)c	(v)a	(vi)a
(vii)c	(viii)d	(ix)d	(x)c	(xi)c	(xii)b
(xiii)d	(xiv)a	(xv)b	(xvi)a	(xvii)c	(xviii)b
(xix)c	(xx)d	(xxi)a	(xxii)d	(xxiii)c	(xxiv)c
(xxv)b	(xxvi)b	(xxvii)c	(xxviii)c	(xxix)a	(xxx)b

Group – B

2. (i) c	(ii) c	(iii) b	(iv) b	(v) a	(vi) d
(vii) c	(viii) a	(ix) b	(x) a	(xi) a	(xii) c
(xiii) c	(xiv) a	(xv) a	(xvi) b	(xvii) b	(xviii) c
(xix) d	(xx) a				