Q.5 Attempt any two:

i. Difference between Traditional Algorithms and Genetic Algorithm. **5**

ii. Explain the following types of binary crossover operators with reference to genetic algorithm. **5**
(a) Single point crossover
(b) Double point crossover
(c) Multi point crossover
(d) Uniform crossover
(e) Matrix crossover

iii. What is 'Roulette Wheel Selection'? **5**

Q.6 Attempt any two:

i. What is a Genetic Algorithm based Backpropagation Network? Explain and Draw its architecture. **5**

ii. What is hybrid intelligent control system? What are the advantages and disadvantages of Fuzzy control system. **5**

iii. What are the different types of Neuro-Fuzzy system? Explain any one architecture in detail with the help of diagram. **5**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2019

CS3EA03 Soft Computing

Programme: B.Tech. Branch/Specialisation: CSE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. A perceptron is: **1**
(a) A single layer feed-forward neural network with pre-processing
(b) An auto-associative neural network
(c) A double layer auto-associative neural network
(d) A neural network that contains feedback

ii. An auto-associative network is: **1**
(a) A neural network that contains no loops
(b) A neural network that contains feedback
(c) A neural network that has only one loop
(d) A single layer feed-forward neural network with pre-processing

iii. 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: **1**
(a) 238 (b) 76 (c) 119 (d) 123

iv. Which of the following is true? **1**
I. On average, neural networks have higher computational rates than conventional computers.
II. Neural networks learn by example.
III. Neural networks mimic the way the human brain works.
(a) All of these are true (b) II and III are true
(c) I and III are true (d) None of these

v. Which of the following is true for neural networks? **1**

I. The training time depends on the size of the network.

II. Neural networks can be simulated on a conventional computer.

III. Artificial neurons are identical in operation to biological ones.

(a) All of these (b) II is true

(c) I and II are true (d) None of these

vi. What is back propagation? **1**

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

(b) It is the transmission of error 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 these

vii. Fuzzy logic is a form of **1**

(a) Two-valued logic (b) Crisp set logic

(c) Many-valued logic (d) Binary set logic

viii. Fuzzy logic is extension of Crisp set with an extension of handling the concept of Partial Truth. **1**

(a) True (b) False

ix. The room temperature is hot. Here the hot (use of linguistic variable is used) can be represented by _____ **1**

(a) Fuzzy Set (b) Crisp Set

(c) Both (a) and (b) (d) None of these

x. The values of the set membership are represented by **1**

(a) Discrete Set (b) Degree of truth

(c) Probabilities (d) Both (b) and (c)

Q.2 Attempt any two:

i. Define soft computing? Distinguish between soft computing and hard computing. **5**

ii. 'Conventional computing fails to give solution in applications.' Justify with some examples. **5**

iii. Explain any five characteristics of soft computing. **5**

Q.3 Attempt any two:

i. Compare the strength and weakness of human brain with respect to a computer. **5**

ii. What is forward pass and backward pass in the training of back propagation neural network. **5**

iii. Explain the weight updation process in a back propagation neural network in both hidden and output layers using sigmoidal function. **5**

Q.4 Attempt any two:

i. Explain the following fuzzy set operation with example: **5**

(a) Intersection of fuzzy sets

(b) Union of fuzzy sets

(c) Complement of fuzzy sets

ii. Let R and S be two fuzzy relations defined here: **5**

R =

	y1	y2	y3
x1	0.0	0.2	0.8
x2	0.3	0.6	1.0

S =

	z1	z2	z3
y1	0.3	0.7	1.0
y2	0.5	1.0	0.6
y3	1.0	0.2	0.0

Compute the result of R o S using

(a) max -min composition

(b) max- product composition

iii. What do you mean by De-fuzzification? Explain any TWO De-fuzzification techniques. **5**

P.T.O.

Marking Scheme
CS3EA03 Soft Computing

Q.1	i.	A perceptron is: (a) A single layer feed-forward neural network with pre-processing	**1**
	ii.	An auto-associative network is: (b) A neural network that contains feedback	**1**
	iii.	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: (a) 238	**1**
	iv.	Which of the following is true? (a) All of these are true	**1**
	v.	Which of the following is true for neural networks? (c) I and II are true	**1**
	vi.	What is back propagation? (c) It is the transmission of error back through the network to allow weights to be adjusted so that the network can learn	**1**
	vii.	Fuzzy logic is a form of (c) Many-valued logic	**1**
	viii.	Fuzzy logic is extension of Crisp set with an extension of handling the concept of Partial Truth. (a) True	**1**
	ix.	The room temperature is hot. Here the hot (use of linguistic variable is used) can be represented by _____ (a) Fuzzy Set	**1**
	x.	The values of the set membership are represented by (b) Degree of truth	**1**

Q.2		Attempt any two:		
	i.	Soft computing Difference soft computing and hard computing.	2 marks 3 marks	**5**
	ii.	'Conventional computing fails to give solution in applications.' Proportionate marking		**5**
	iii.	Any five characteristics of soft computing. 1 mark for each	(1 mark * 5)	**5**

Q.3		Attempt any two:		
	i.	Compare the strength and weakness of human brain At least five point 1 mark for each	(1 mark * 5)	**5**
	ii.	Forward pass and backward pass		**5**
	iii.	eight updation process in a back propagation neural network in both hidden and output layers using sigmoidal function.		**5**

Q.4		Attempt any two:		
	i.	(a) Intersection of fuzzy sets (b) Union of fuzzy sets (c) Complement of fuzzy sets Example	1.5 marks 1.5 marks 1.5 marks 0.5 mark	**5**
	ii.	Compute the result of R o S using (a) max -min composition (b) max- product composition	 2.5 marks 2.5 marks	**5**
	iii.	De-fuzzification Any TWO De-fuzzification techniques 2 marks for each (2 marks * 2)	1 mark 4 marks	**5**

Q.5		Attempt any two:		
	i.	Difference b/w Traditional Algorithms and Genetic Algorithm.		**5**
	ii.	(a) Single point crossover (b) Double point crossover (c) Multi point crossover (d) Uniform crossover (e) Matrix crossover	1 mark 1 mark 1 mark 1 mark 1 mark	**5**
	iii.	Roulette Wheel Selection		**5**

Q.6		Attempt any two:		
	i.	Genetic Algorithm based Backpropagation Network Its architecture.	2 marks 3 marks	**5**
	ii.	Hybrid intelligent control system Advantages and disadvantages of Fuzzy control system.	2 marks 3 marks	**5**
	iii.	Types of Neuro-Fuzzy system Any one architecture with diagram.	2 marks 3 marks	**5**

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