Reg. No. : | | | | | | | | | | |

Question Paper Code: 49311

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Elective

Electrical and Electronics Engineering

14UEE911 - FUZZY LOGIC AND NEURAL NETWORK

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following is not true regarding the principles of fuzzy logic?

   (a) Fuzzy logic is a concept of `certain degree
   (b) Fuzzy logic follows the principle of Aristotle and Buddha
   (c) Japan is currently the most active users of fuzzy logic
   (d) Boolean logic is a subset of fuzzy logic

2. Considering a graphical representation of the `tallness' of people using its appropriate member function, which of the following combinations are true?

   (i) TALL is usually the fuzzy subset
   (ii) HEIGHT is usually the fuzzy set
   (iii) PEOPLE is usually the universe of discourse

   (a) i, ii & iii (b) i & ii only
   (c) i, iii only (d) ii & iii

3. Where does the Bayes rule can be used?

   (a) Solving queries (b) Increasing complexity
   (c) Decreasing complexity (d) Answering probabilistic query

4. The height h(A) of a fuzzy set A is defined as h(A) =sup A(x) where x belongs to A. Then the fuzzy set A is called normal when

(a) h(A)=0 (b) h(A)<0 (c) h(A)=1 (d) h(A)<1

5. A four 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 (b) 76 (c) 119 (d) 100

6. 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 (b) 76 (c) 119 (d) 154

7. The network that involves backward links from output to the input and hidden layers is called as

(a) Self organizing maps (b) Perceptrons
(c) Recurrent neural network (d) Multi layered perceptron

8. In artificial Neural Network interconnected processing elements are called

(a) nodes or neurons (b) weights (c) axons (d) Soma

9. The Artificial neural network used in power system, the Neuron can send _____ signal at a time.

(a) multiple (b) one (c) both (a) and (b) (d) none of these

10. Neural Networks are used for application of complex _____ with many parameters.

(a) Linear Functions (b) Nonlinear Functions
(c) Discrete Functions (d) Exponential Functions

PART - B (5 x 2 = 10 Marks)

11. List any 4 properties of fuzzy sets.

12. Differentiate fuzzification and defuzzification based on their definition.

13. Compare artificial neural network and biological network based on their attributes.

14. What are recurrent networks?

15. List few applications of fuzzy logic and artificial neural network.

PART - C (5 x 16 = 80 Marks)

16. (a) Let A={(x1,0.2), (x2,0.7), (x3,0.4)} and B={(y1,0.5), (y2,0.6)} be two two fuzzy sets defined on the universe of discourse X={x1, x2, x3} and Y= {y1, y2, y3} respectively.Find the Cartesian product of the A and B and the fuzzy relation R. (16)

Or

(b) Fuzzy logic provides an alternative solution to non-linear control because it is closer to the real world. Give reasons. (16)

17. (a) Formulate the properties of Adaptive fuzzy control and explain. (16)

Or

(b) Illustrate the properties of fuzzy set theory and explain with suitable schematics. (16)

18. (a) Explain briefly about the perceptron multilayer net with its algorithm. (16)

Or

(b) Draw and explain the architecture of back propagation network. Also derive the updation of hidden layer weights. (16)

19. (a) Give the comparison between the radial basis-function networks and the multilayer perceptron? Train the home made robot using recurrent back propagation algorithm. (16)

Or

(b) Sketch the structure of bidirectional associative memory. Construct an algorithm for testing inputs in bidirectional associative memory. (16)

20. (a) (i) Explain applications of Genetic algorithm in medical science. (8)

(ii) Advantages of fuzzy logic control over the artificial neural networks. (8)

Or

(b) Structure the inverted pendulum problem. Discuss the design of a neuro-controller for the inverted pendulum. (16)