A Reg. No. : [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Question Paper Code: 59315

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Elective

Electrical and Electronics Engineering

15UEE915 – NEURAL NETWORK AND FUZZY SYSTEM

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A classical set is defined by_____   CO1- R
   boundaries.

   (a) ambiguous   (b) vague   (c) crisp   (d) None of the above

2. A _____ point of a fuzzy set is a point x∈X at which   CO1- R
   μA(x)=0.5

   (a) Core   (b) Support   (c) Cross-over   (d) α - cut

3. Membership functions are used in _____   CO2- R

   (a) Fuzzification only   (b) Defuzzification only

   (c) Fuzzification & defuzzification   (d) None of the above

4. Perceptron, Delta, LMS are the learning methods falls under the category of   CO2- R

   (a) Error correction learning - learning with a teacher

   (b) Reinforcement learning - learning with a critic

   (c) Hebbian learning

   (d) Competitive learning - learning without a teacher

5. A perceptron is: CO3- R

(a) A single layer feed-forward neural network with preprocessing

(b) A double layer autoassociative neural network

(c) An autoassociative neural network

(d) None of the above

6. A typical biological cell has these _____ regions CO3- R

(a) Soma and Axon   (b) Axon   (c) Dendrite and axon   (d) Soma, axon and dendrite

7. _____is a hetero associative, content-addressable CO4- R
memory consisting of two layers, which uses the forward and backward
information flow to produce an associative search for stored stimulus-
response association.

(a) Random associative memory   (b) Bidirectional associative memory

(c) Correlative associative memory   (d) Unidirectional associative memory

8. Which of the following is the component of learning system? CO4- R

(a) Goal   (b) Model   (c) Learning rules   (d) All of the mentioned

9. Automatic generation control with fuzzy logic controller in the power CO5- R
system includes

(a) Single area   (b) Two area   (c) Three area   (d) All of these

10. The basic processing elements of neural networks are called CO5- R
_____

(a) natural neuron   (b) artificial neuron   (c) fundamental neuron   (d) basic neuron

PART – B (5 x 2= 10 Marks)

11. Define fuzzy sets with discrete universe and continuous universe. CO1- R

12. What do you meant by fuzzification and defuzzification in fuzzy systems? CO2- R

13. List the various learning rules used in neural network? CO3- R

14. What are the applications of neural networks? CO4- R

15. Mention some of the applications of the fuzzy logic controllers in real time CO5- R
world.

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16. (a) Brief the properties of   CO1- U   (16)
    (i) Classical sets
    (ii) Fuzzy relations

                                         Or

   (b) (i) Write the mathematical expression of the membership function   CO1- U   (8)
    and sketch of the membership function
    (ii) With a neat sketch of Venn diagrams, discuss about the   CO1- U   (8)
    operation of crisp sets

17. (a) With a neat block diagram explains the various blocks in Fuzzy   CO2- Ana   (16)
    logic controller

                                         Or

   (b) Describe various methods of assigning membership values to   CO2- Ana   (16)
    fuzzy variables

18. (a) Briefly explain about various learning rules used in neural   CO3- Ana   (16)
    network.

                                         Or

   (b) Explain with a neat block diagram, flowchart and algorithm for   CO3- Ana   (16)
    error back propagation training algorithm employed in neural
    networks.

19. (a) Use the hebb rule to store the vector (1 1 −1 −1) in an auto   CO4- U   (16)
    associative neural net.
    (i) Find the weight matrix
    (ii) Test the input vector x= (1 1 −1 −1)
    (iii) Test the net with one mistake in the input vector.
    (iv) Test the net with two mistakes components in the input
    vector.

                                         Or

   (b) Elaborate the performance of bidirectional associative memory   CO4- U   (16)
    with stability considerations in artificial neural networks with
    neat diagram.

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20. (a) Illustrate how fuzzy logic control is implemented in power CO5- U (16) systems automatic generation control.

Or

(b) Illustrate how neural network concept can be implemented in CO5- U (16) inverted pendulum applications.