

29. a. Explain PID controller with a block diagram.

10 1 4 1

(OR)

b.i. Differentiate fuzzification and defuzzification.

5 1 4 1

ii. Describe fuzzy based ABS.

5 1 4 1

30. a. Explain neuro-fuzzy systems along with its application using functional block diagrams.

10 2 5 1,2

(OR)

b. Explain microcontroller based fuzzy controller for any automobile application.

10 2 5 1,2

* * * * *

Reg. No.

B.Tech. DEGREE EXAMINATION, NOVEMBER 2022

Sixth and Seventh Semester

18AUE313T – ARTIFICIAL NEURAL NETWORKS AND FUZZY LOGIC

(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:

- (i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours

Max. Marks: 75

PART – A (25 × 1 = 25 Marks)

Answer ALL Questions

- What is activation value?
(A) Weighted sum of input (B) Input to neuron
(C) Weighted difference of input (D) Bias function
- Neural networks are complex _____ functions with many parameters.
(A) Linear (B) Non-linear
(C) Discrete (D) Both B and C
- _____ is the process of learning from trained data
(A) Supervised learning (B) Unsupervised learning
(C) Reinforced learning (D) Both A and C
- Artificial Neural Network learn to _____ a function.
(A) Integrate (B) Approximate
(C) Differentiate (D) Discrete
- Adaline works by learning rule that
(A) Minimizes mean squared error (B) Maximizes mean squared error
(C) Minimizes squared error (D) Both B and C
- The role of sigmoid function in neural network is _____
(A) Activation function (B) Membership function
(C) Both A and B (D) Bias function
- XOR problems are
(A) Linearly separable (B) Linearly inseparable
(C) Discrete (D) Both A and C
- What is objective of associative memories?
(A) To store patterns (B) To recall patterns
(C) To store association between patterns (D) Both A and B

Marks BL CO PO

1 1 1 1

1 1 1 1

1 1 1 1

1 1 1 1

1 1 1 1

1 1 2 1

1 1 2 1

1 2 2 1

9. What are advantages of neural network over computers? 1 3 2 2
 (A) They mimic brains and learn by experience (B) They are fault intolerant
 (C) They are suited for controlling engineering problem (D) Both A and B
10. A 3 input neuron is trained to output zero when input is 110 and one when input is 111 after generalization. The output will be zero only when input is 1 3 2 2
 (A) 000 or 110 or 011 or 101 (B) 010 or 100 or 110 101
 (C) 000 or 010 or 110 or 100 (D) 100 or 111 or 101 or 001
11. Fuzzy logic is based on 1 2 3 2
 (A) Boolean truth (B) Set theory
 (C) Degree of truth (D) Both B and C
12. Fuzzy logic is _____ logic, binary logic is _____ logic. 1 2 3 1,2
 (A) Multi ; three (B) Two ; multi
 (C) Both A and B (D) Multi ; two
13. Defuzzification is a process that maps 1 1 3 1
 (A) Fuzzy set to crisp set (B) Crisp set to fuzzy set
 (C) Fuzzy set to fuzzy set (D) Crisp set to crisp set
14. The relation $A \cup (B \cap C) = (A \cup B) \cap C$ is 1 1 3 1
 (A) Associative (B) Commutative
 (C) Distributive (D) Absorption
15. Fuzzy control design is a methodical approach to 1 1 3 1
 (A) Trial and error (B) Empirical
 (C) Linear (D) Newton's theory
16. Which component is not a part of fuzzy architecture? 1 1 4 1
 (A) Fuzzification module (B) Fuzzy inference module
 (C) Activation module (D) Defuzzification module
17. Which statements "TRUE"? 1 2 4 1,2
 (A) Boolean logic is subset of fuzzy logic (B) Fuzzy logic is subset of Boolean logic
 (C) Both A and B (D) Boolean and fuzzy logic are independent
18. The equation $U(t) = k_p e(t) + k_i \int e(t) dr + k_d \frac{de}{dt}$ governs 1 2 4 1,2
 (A) Fuzzy controller (B) ANN controller
 (C) PID controller (D) PD controller
19. Truth value of set theory is _____ and that of fuzzy theory is 1 2 4 1,2
 (A) Either 0 or 1; between 0 & 1 (B) Between 0 & 1; either 0 or 1
 (C) Either 0 or 1; either 0 or 1 (D) Both A and C

20. When is minimum criterion used? 1 1 4 1
 (A) AND operation (B) OR operation
 (C) NOT operation (D) X-OR operation
21. In which ANN, loops are allowed? 1 1 5 1
 (A) Feed – forward (B) Feed – backward
 (C) Semi-feed forward (D) Semi-feedback
22. ART is a self-organizing _____ model. 1 1 5 1
 (A) Neural network (B) Fuzzy
 (C) PID (D) All the above
23. In 'Adaline' weights are updated based on 1 1 5 1
 (A) Linear activation function (B) Non-linear activation function
 (C) Sigmoid activation function (D) Both B and C
24. "Transmission of error back through network to allow weights to be adjusted so that network can learn" is termed as 1 1 5 1,2
 (A) Back-propagation (B) Activation
 (C) Feed forward (D) Both A and B
25. _____ deals with uncertainties of its own merits and demerits 1 1 5 1
 (A) Neuro-fuzzy (B) Neuro-genetic
 (C) Fuzzy-PID (D) Both A and B

PART – B (5 × 10 = 50 Marks)
 Answer ALL Questions

- | | Marks | BL | CO | PO |
|--|-------|----|----|-----|
| 26. a. Explain the architecture of neural network with a functional block diagram. | 10 | 1 | 1 | 1 |
| (OR) | | | | |
| b.i. Describe recurrent neural network. | 5 | 1 | 1 | 1 |
| ii. Explain the concepts of Adaline and Madaline. | 5 | 1 | 1 | 1 |
| 27. a. Explain any three types of activation function with a block diagram. | 10 | 1 | 2 | 1 |
| (OR) | | | | |
| b.i. Describe the concept of gradient descent. | 5 | 1 | 2 | 1 |
| ii. Describe function approximation. | 5 | 1 | 2 | 1 |
| 28. a. Explain fuzzy-logic architecture with appropriate diagrams. | 10 | 1 | 3 | 1 |
| (OR) | | | | |
| b.i. Describe fuzzy relations. | 5 | 1 | 3 | 1 |
| ii. Describe fuzzy, IF-THEN rules with an engineering application. | 5 | 1 | 3 | 1,2 |