

24. Select the correct order of operations used in the working cycle of a genetic algorithm (GA) after. The population initialization of the random solutions  
 (A) Reproduction, assigning fitness, mutation, cross over (B) Assigning fitness, reproduction, cross over, mutation  
 (C) Assigning fitness, reproduction, mutation, cross over (D) Cross over, assigning fitness, reproduction, mutation
25. Which of the following is not a part of fuzzy logic system architecture?  
 (A) Fuzzification module (B) Knowledge base  
 (C) Defuzzification module (D) Interference base

**PART – B (5 × 10 = 50 Marks)**

Answer ALL Questions

- |  | Marks | BL  | CO  | PO |
|--|-------|-----|-----|----|
| 26. a. Discuss about different types of learning with an example.  | 10    | 4   | 1   | 3  |
| (OR)   |       |     |     |    |
| b. Explain about Hebbian and perceptron learning rule.   | 10    | 4   | 1   | 3  |
| 27. a. Discuss about leaky integrator and express its mathematical response.   | 10    | 4   | 2   | 2  |
| (OR)   |       |     |     |    |
| b. Illustrate the basic architecture of adaptive resonant theory with its advantages and disadvantages.                                | 10    | 4   | 2   | 2  |
| 28. a.i. Distinguish between neural networks and fuzzy logic system.   | 5     | 4   | 3   | 2  |
| ii. Classify the types of fuzzy sets.  | 5     | 3,4 | 3   | 2  |
| (OR)   |       |     |     |    |
| b. Discuss about any three crisp set operations with its mathematical equation.  | 10    | 4   | 3   | 2  |
| 29. a. Explain about neuro fuzzy system with practical application.  | 10    | 4   | 4   | 3  |
| (OR)   |       |     |     |    |
| b. Discuss about following fuzzy relations:<br>(i) Anti reflexive relation<br>(ii) Anti symmetric relation<br>(iii) Symmetric relation | 10    | 4   | 4   | 3  |
| 30. a. Discuss about application of fuzzy logic system in flexible manufacturing system.   | 10    | 4   | 5,6 | 3  |
| (OR)   |       |     |     |    |
| b. Illustrate the flow chart of fuzzy logic system to measure gear tooth profiles using coordinate measuring machine.                  | 10    | 4   | 5,6 | 3  |

\*\*\*\*\*

Reg. No.

**B.Tech. DEGREE EXAMINATION, MAY 2022**

Sixth Semester

18MEE434T – NEURAL NETWORK AND FUZZY SYSTEMS

(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 40<sup>th</sup> 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

- |  | Marks | BL | CO | PO |
|--|-------|----|----|----|
| 1. Synapse of a biological neuron is copied in the artificial neuron in the form of<br>(A) Connecting weights (B) Summing junction<br>(C) Bias value (D) Activation function   | 1     | 1  | 1  | 1  |
| 2. When the learning rate is kept high, the neural network may become<br>(A) Stable (B) Unstable<br>(C) Dormant (D) Active   | 1     | 1  | 1  | 1  |
| 3. _____ training of the neural network results in loss of its generalization capability.<br>(A) Over (B) Under<br>(C) Supervised (D) Unsupervised   | 1     | 1  | 1  | 1  |
| 4. In a back propagation algorithm, the error in predictions is _____ using a gradient based method.<br>(A) Maximized (B) Minimized<br>(C) Normalized (D) Initially predicted  | 1     | 1  | 1  | 1  |
| 5. A multilayered feed forward neural network can be used as<br>(A) A regression tool (B) A clustering tool<br>(C) Both clustering and regression tools (D) Neither clustering nor regression tools  | 1     | 1  | 1  | 1  |
| 6. Which one of the following neural networks is used as a data visualization technique?<br>(A) Jordan network (B) Elman network<br>(C) Elman-Jordan network (D) Kohonen network   | 1     | 1  | 2  | 1  |
| 7. To map the higher dimensional data to the lower dimensions (S), kohonen network uses their<br>(A) Distance information only (B) Topology information only<br>(C) Both distance and topology information (D) Neither distance nor topology information | 1     | 1  | 2  | 1  |
| 8. Counter propagation neural network uses<br>(A) Unsupervised learning only (B) Supervised learning only<br>(C) Both supervised and unsupervised learning (D) Neither supervised nor unsupervised learning  | 1     | 1  | 2  | 1  |

9. Counter propagation neural network consists of  
 (A) Input layer and teachable output layer (B) Input layer and unsupervised Kohonen layer  
 (C) Unsupervised Kohonen layer and teachable output layer (D) Input layer, unsupervised Kohonen layer and teachable output layer
10. In recurrent neural network the information is processed in  
 (A) Forward direction only (B) Backward direction only  
 (C) Cycle (D) Neither forward nor backward direction
11. Supervised learning can be implemented in neural networks in  
 (A) Incremental mode only (B) Batch mode only  
 (C) Both incremental and batch modes (D) Neither incremental mode nor batch modes
12. Fuzzy logic is  
 (A) Used to respond to questions in a human like way (B) A new programming language used to program animation  
 (C) The result of fuzzy thinking (D) A term that indicates logical values greater than one
13. In mamdani approach of fuzzy reasoning tool, the strength of a fixed rule is determined using  
 (A) OR operator (B) AND operator  
 (C) Union operator (D) Multiplication operator
14. Stress analysis of a mechanical member mathematically can be an example of  
 (A) Hard computing (B) Soft computing  
 (C) Both hard computing and soft computing (D) Neither hard computing and soft computing
15. If we want to model fuzziness and uncertainties of a problem, which one of the following tools will be recommended?  
 (A) Back propagation neural network (B) Statistical regression analysis  
 (C) Fuzzy reasoning tool with mandani approach (D) Counter propagation neural network
16. Let us consider two fuzzy sets  
 $A(X) = \{(X_1, 0.1), (X_2, 0.2), (X_3, 0.3), (X_4, 0.4)\}$   
 $B(X) = \{(X_1, 0.2), (X_2, 0.3), (X_3, 0.4), (X_4, 0.5)\}$   
 Their union  $(A \cup B)(X)$  is determined as  
 (A)  $\{(X_1, 0.2), (X_2, 0.3), (X_3, 0.4), (X_5, 0.5)\}$   
 (B)  $\{(X_1, 0.1), (X_2, 0.2), (X_3, 0.3), (X_5, 0.4)\}$   
 (C)  $\{(X_1, 0.4), (X_2, 0.3), (X_3, 0.2), (X_5, 0.1)\}$   
 (D)  $\{(X_1, 0.5), (X_2, 0.4), (X_3, 0.3), (X_5, 0.2)\}$

17. Let us consider two fuzzy sets as follows  
 $A(X) = \{(X_1, 0.1), (X_2, 0.2), (X_3, 0.3)\}$   
 $B(X) = \{(X_1, 0.3), (X_2, 0.4), (X_3, 0.5)\}$   
 Their algebraic sum,  $A(X) + B(X)$  is represented as follows  
 (A)  $\{(X_1, 0.4), (X_2, 0.6), (X_3, 0.8)\}$  (B)  $\{(X_1, 0.3), (X_2, 0.4), (X_3, 0.5)\}$   
 (C)  $\{(X_1, 0.1), (X_2, 0.2), (X_3, 0.3)\}$  (D)  $\{(X_1, 0.37), (X_2, 0.52), (X_3, 0.65)\}$
18. Let us consider two fuzzy sets as follows:  
 $A(X) = \{(X_1, 0.3), (X_2, 0.4), (X_3, 0.5)\}$   
 $B(X) = \{(X_1, 0.5), (X_2, 0.6), (X_3, 0.7)\}$   
 Their algebraic difference,  $A(X) - B(X)$  is determined as follows  
 (A)  $\{(X_1, 0.5), (X_2, 0.6), (X_3, 0.7)\}$  (B)  $\{(X_1, 0.3), (X_2, 0.4), (X_3, 0.5)\}$   
 (C)  $\{(X_1, 0.7), (X_2, 0.6), (X_3, 0.5)\}$  (D)  $\{(X_1, 0.3), (X_2, 0.4), (X_3, 0.3)\}$
19. In a string of binary coded algorithm, 10 bits are used to represent areal variable varying. In the range of (1, 30). The real value corresponding to the binary string: 1010101010 is calculated as follows  
 (A) 25.64 (B) 27.84  
 (C) 13.66 (D) 20.33
20. Compactness and distinctness of the clusters are determined using  
 (A) Inter-cluster distances only (B) Intra-cluster distances only  
 (C) Inter and intra cluster distances respectively (D) Intra and inter cluster distances respectively
21. Which one of the following statements is false regarding clustering?  
 (A) Clustering is a powerful tool for data mining (B) Clustering is done based on the concept of similarity  
 (C) Clustering yields the clusters with either crisp or fuzzy boundaries (D) Clustering yields the set(s) of dissimilar items
22. To design a hierarchical fuzzy logic controllable for establishing input output relationships of a process involving  $n$  input variables and each variable is defined using  $m$  linguistic terms, the number of rules become equal to  
 (A)  $(n-1)m^2$  (B)  $(m-1)n^2$   
 (C)  $m \times n$  (D)  $(m-1)^2(n-1)^2$
23. Choose the false statement with respect to Fuzzy Logic Controller (FLC)  
 (A) FLC is a potential tool for dealing with imprecision and uncertainty (B) FLC does not require an extensive mathematical formulation of the problem  
 (C) The designer of FLC need not have any knowledge of the process to be controlled (D) Computational complexity of an FLC increases for controlling a process involving more no of variables