

- | | | | |
|--|---|---|---|
| 11. Let $U = \{a, b, c\}$, and $P = 0.5/a + 0.75/c$ be a fuzzy set on U . Then what is the height of P ? | 1 | 1 | 3 |
| (A) 0.5 | | | |
| (B) 0.75 | | | |
| (C) 1.25 | | | |
| (D) 1.0 | | | |
| 12. Let F_α, F_β be the α -cuts of a fuzzy set F such that $0 \leq \alpha \leq \beta \leq 1$. Then which of the following is true? | 1 | 2 | 3 |
| (A) $F_\alpha \subseteq F_\beta$ | | | |
| (B) $F_\alpha \supseteq F_\beta$ | | | |
| (C) $F_\alpha = F_\beta$ | | | |
| (D) $F_\alpha \neq F_\beta$ | | | |
| 13. Let us consider the basic tipping problem which takes service and food quality as inputs and computes a tip percentage. Which of the following linguistic values is not a valid one to represent the fuzzy set tip percentage? | 1 | 2 | 4 |
| (A) cheap | | | |
| (B) average | | | |
| (C) delicious | | | |
| (D) generous | | | |
| 14. In which variant of Fuzzy Neuron, the input x_i and weight w_i are combined using fuzzy OR to produce the intermediate result and the intermediate results are then transformed to the output using fuzzy AND? | 1 | 1 | 4 |
| (A) Implication-OR Fuzzy Neuron | | | |
| (B) OR Fuzzy Neuron | | | |
| (C) XOR Fuzzy Neuron | | | |
| (D) AND Fuzzy Neuron | | | |
| 15. _____ property is not satisfied by a T-Norm operator. | 1 | 2 | 4 |
| (A) Commutative | | | |
| (B) Monotonic | | | |
| (C) Distributive | | | |
| (D) Associative | | | |
| 16. _____ in the ANFIS Architecture is responsible of fuzzification. | 1 | 2 | 4 |
| (A) First Layer | | | |
| (B) Second Layer | | | |
| (C) Third Layer | | | |
| (D) Fourth Layer | | | |
| 17. The average fitness of the mating pool is usually _____ than the current population. | 1 | 2 | 5 |
| (A) lesser | | | |
| (B) higher | | | |
| (C) equal | | | |
| (D) not related | | | |
| 18. _____ technique never selects the worst-fit chromosome of a population. | 1 | 2 | 5 |
| (A) Roulette wheel selection | | | |
| (B) Tournament selection | | | |
| (C) Steady State selection | | | |
| (D) Boltzmann Selection | | | |
| 19. If p_c and p_μ be the crossover probability and the mutation probability of a GA then which of the following relations is true? | 1 | 2 | 5 |
| (A) $p_c < p_\mu$ | | | |
| (B) $p_c > p_\mu$ | | | |
| (C) $p_c = p_\mu$ | | | |
| (D) $p_c \neq p_\mu$ | | | |
| 20. In genetic algorithm, the objective function used to evaluate a particular solution is called _____. | 1 | 1 | 5 |
| (A) Polynomial function | | | |
| (B) Linear function | | | |
| (C) Fitness function | | | |
| (D) Quadratic function | | | |

PART - B ($5 \times 4 = 20$ Marks)

Answer **any 5** Questions

Marks BL CO

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|---|---|---|---|
| 21. Design a Hebb net to realize the logical OR function. | 4 | 3 | 1 |
| 22. How is Local Minima problem overcome in applications involving Delta Rule? | 4 | 3 | 2 |
| 23. Explain the Kohonen's Self Organizing Map (SOM) network. | 4 | 2 | 2 |
| 24. Discuss the operations of fuzzy sets briefly. | 4 | 2 | 3 |
| 25. Describe the various fuzzy membership functions in detail with neat diagrams. | 4 | 2 | 3 |
| 26. Discuss about Adaptive Neuro-Fuzzy Inference Systems (ANFIS) with neat diagram. | 4 | 2 | 4 |
| 27. Write short notes on Applications of Genetic Algorithm. | 4 | 3 | 5 |

PART - C (5 × 12 = 60 Marks)**Marks BL CO****Answer all Questions**

28. (a) How should a neural network learn the clusters with the help of winner-takes all strategy? Explain with example 12 2 1
(OR)
(b) Construct an ADALINE networks to realize the logical AND- NOT function.
29. (a) Summarize the Radial Basis Function Neural Network Architecture in detail. 12 2 2
(OR)
(b) Construct an auto-associative net to store the input patterns given below:
[1, -1, 1, -1]
[1, 1, -1, -1]
[1, -1, -1, 1]
1. Find the number of nodes needed in each layer to store these associations and draw the auto-associative net.
2. Compute the weight matrix of the desired net for storing these patterns.
3. Show that for every input, the net is able to recognize the stored pattern.
4. Check whether the net is able to recognize the input vector with noise [1, -1, 0, -1] where the third element is missing (Actual input is [1, -1, 1, -1])
30. (a) Illustrate the Fuzzy Extension Principles with example. 12 3 3
(OR)
(b) Discuss the Fuzzy Reasoning in detail.
31. (a) Explain the Fuzzy Rule based system in detail. 12 2 4
(OR)
(b) Illustrate the various Defuzzification methods in detail.
32. (a) Explain the Genetic Algorithm operators with example 12 2 5
(OR)
(b) Describe in detail about the Classifications of Genetic Algorithm.

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