CSC 302

B.Sc. Vth SEMESTER EXAMINATION, 2024-25

COMPUTER SCIENCE

(Soft Computing)

AFFIX PRESCRIBED RUBBER STAMP

Date (तिथि) : _____

Paper ID
(To be filled in the OMR Sheet)

1446

अनुक्रमांक (अंकों में) :
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अनुक्रमांक (शब्दों में) : _____

Roll No. (In Words) : _____

Time : 1:30 Hrs.
समय : 1:30 घण्टे

Max. Marks : 75
अधिकतम अंक : 75

नोट : पुस्तिका में 50 प्रश्न दिये गये हैं, सभी प्रश्न करने होंगे। प्रत्येक प्रश्न 1.5 अंक का होगा।

Important Instructions :

1. The candidate will write his/her Roll Number only at the places provided for, i.e. on the cover page and on the OMR answer sheet at the end and nowhere else.
2. Immediately on receipt of the question booklet, the candidate should check up the booklet and ensure that it contains all the pages and that no question is missing. If the candidate finds any discrepancy in the question booklet, he/she should report the invigilator within 10 minutes of the issue of this booklet and a fresh question booklet without any discrepancy be obtained.

महत्वपूर्ण निर्देश :

1. अभ्यर्थी अपने अनुक्रमांक केवल उन्हीं स्थानों पर लिखेंगे जो इसके लिए दिये गये हैं, अर्थात् प्रश्न पुस्तिका के मुख्य पृष्ठ तथा साथ दिये गये ओ०एम०आर० उत्तर पत्र पर, तथा अन्यत्र कहीं नहीं लिखेंगे।
2. प्रश्न पुस्तिका मिलते ही अभ्यर्थी को जाँच करके सुनिश्चित कर लेना चाहिए कि इस पुस्तिका में पूरे पृष्ठ हैं और कोई प्रश्न छूटा तो नहीं है। यदि कोई विसंगति है तो प्रश्न पुस्तिका मिलने के 10 मिनट के भीतर ही कक्ष परिप्रेक्षक को सूचित करना चाहिए और बिना त्रुटि की दूसरी प्रश्न पुस्तिका प्राप्त कर लेना चाहिए।

1. Neural networks or fuzzy logic are part of:

   (A) Soft computing

   (B) Hard computing

   (C) Both (A) and (B)

   (D) None of the above

2. Soft computing is used to solve :

   (A) Linear issues

   (B) Non-linear issues

   (C) Both (A) and (B)

   (D) None of the above

3. Why do we need biological neural networks?

   (A) to solve tasks like machine vision & natural language processing

   (B) to apply heuristic search methods to find solutions of problem

   (C) to make smart human interactive & user friendly system

   (D) all of the mentioned

4. The fundamental unit of network is

   (A) brain

   (B) nucleus

   (C) neuron

   (D) axon

5. When the cell is said to be fired?

(A) if potential of body reaches a steady threshold values

(B) if there is impulse reaction

(C) during upbeat of heart

(D) none of the mentioned

6. What is purpose of Axon?

(A) receptors

(B) transmitter

(C) transmission

(D) none of the mentioned

7. The process of adjusting the weight is known as?

(A) activation

(B) synchronisation

(C) learning

(D) none of the mentioned

8. The procedure to incrementally update each of weights in neural is referred to as?

(A) synchronisation

(B) learning law

(C) learning algorithm

(D) both learning algorithm & law

9. Feedforward networks are used for?

(A) pattern mapping

(B) pattern association

(C) pattern classification

(D) all of the mentioned

10. What is the objective of backpropagation algorithm?

(A) to develop learning algorithm for multilayer feedforward neural network

(B) to develop learning algorithm for single layer feedforward neural network

(C) to develop learning algorithm for multilayer feedforward neural network, so that network can be trained to capture the mapping implicitly

(D) none of the mentioned

11. What is true regarding backpropagation rule?

(A) it is also called generalized delta rule

(B) error in output is propagated backwards only to determine weight updates

(C) there is no feedback of signal at any stage

(D) all of the mentioned

12. What are general limitations of back propagation rule?

(A) local minima problem

(B) slow convergence

(C) scaling

(D) all of the mentioned

13. What is the basic building block of an Artificial Neural Network?

(A) Neuron

(B) Activation function

(C) Gradient descent

(D) Loss function

14. Which of the following activation functions is commonly used in ANNs?

(A) ReLU (Rectified Linear Unit)

(B) Sigmoid

(C) Tanh (Hyperbolic Tangent)

(D) All of the above

15. What is the purpose of the activation function in an ANN?

(A) It determines the output of a neuron

(B) It introduces non-linearity to the network

(C) It enables the network to learn complex patterns

(D) All of the above

16. What is the function of the input layer in an ANN?

(A) It receives input data and passes it to the hidden layers

(B) It performs mathematical computations on the input data

(C) It stores the trained weights and biases of the network

(D) None of the above

17. Which type of ANN architecture is used for processing sequential data?

(A) Recurrent Neural Network (RNN)

(B) Convolutional Neural Network (CNN)

(C) Multilayer Perceptron (MLP)

(D) Radial Basis Function Network (RBFN)

18. Which type of ANN architecture is commonly used for image classification tasks?

(A) Convolutional Neural Network (CNN)

(B) Recurrent Neural Network (RNN)

(C) Radial Basis Function Network (RBFN)

(D) Multilayer Perceptron (MLP)

19. Which activation function is commonly used in the output layer for binary classification in ANNs?

(A) Sigmoid

(B) ReLU (Rectified Linear Unit)

(C) Tanh (Hyperbolic Tangent)

(D) Softmax

20. Which type of ANN architecture is commonly used for natural language processing tasks?

(A) Recurrent Neural Network (RNN)

(B) Convolutional Neural Network (CNN)

(C) Multilayer Perceptron (MLP)

(D) Radial Basis Function Network (RBFN)

21. What is a Genetic Algorithm?

(A) A method of sorting data

(B) A search heuristic inspired by natural selection

(C) A type of neural network

(D) A database management system

22. Which of the following is NOT a component of a Genetic Algorithm?

(A) Selection

(B) Crossover

(C) Mutation

(D) Compilation

23. What does the term "population" refer to in Genetic Algorithms?

(A) The number of genes in a chromosome

(B) A set of potential solutions

(C) The total number of iterations

(D) The best solution found

24. What is the purpose of the selection process in a Genetic Algorithm?

(A) To create new individuals

(B) To evaluate fitness

(C) To choose individuals for reproduction

(D) To terminate the algorithm

25. In Genetic Algorithms, crossover is primarily used to:

(A) Introduce random mutations

(B) Combine genetic information from parents

(C) Eliminate less fit individuals

(D) Evaluate the fitness of solutions

26. What role does mutation play in Genetic Algorithms?

(A) It helps in evaluating the fitness of solutions

(B) It maintains genetic diversity within the population

(C) It selects parents for crossover

(D) It determines the termination condition

27. Which term describes the measure of how well a solution solves the problem in a Genetic Algorithm?

(A) Fitness

(B) Adaptability

(C) Selection pressure

(D) Viability

28. What is a common stopping criterion for a Genetic Algorithm?

(A) Maximum number of generations

(B) Random termination

(C) Infinite loop

(D) Minimum population size

29. Which of the following best describes "elitism" in the context of Genetic Algorithms?

(A) A method to discard the worst solutions

(B) Keeping a portion of the best solutions for the next generation

(C) Random selection of individuals

(D) A type of crossover technique

30. Genetic Algorithms are particularly useful for solving which type of problems?

(A) Simple arithmetic calculations

(B) Optimization problems

(C) Sorting algorithms

(D) Database queries

31. What is Supervised Learning?

(A) Learning from labeled data

(B) Learning without any labels

(C) Learning from rewards

(D) Learning in a simulated environment

32. What type of data does Unsupervised Learning work with?

(A) Labeled data

(B) Unlabeled data

(C) Semi-labeled data

(D) Structured data only

33. What is a common application of Unsupervised Learning?

(A) Predicting stock prices

(B) Spam detection

(C) Customer segmentation

(D) Credit scoring

34. What is the form of Fuzzy logic?

(A) Two-valued logic

(B) Crisp set logic

(C) Many-valued logic

(D) Binary set logic

35. The room temperature is hot. Here the hot (use of linguistic variable is used) can be represented by :

(A) Fuzzy Set

(B) Crisp Set

(C) Fuzzy & Crisp Set

(D) None of the mentioned

36. Fuzzy Set theory defines fuzzy operators. Choose the fuzzy operators from the following:

(A) AND

(B) OR

(C) NOT

(D) All of the mentioned

37. Fuzzy logic is usually represented as :

(A) IF-THEN-ELSE rules

(B) IF-THEN rules

(C) Both IF-THEN-ELSE rules & IF-THEN rules

(D) None of the mentioned

38. _____ is/are the way/s to represent uncertainty.

(A) Fuzzy Logic

(B) Probability

(C) Entropy

(D) All of the mentioned

39. _____ are algorithms that learn from their more complex environments (hence eco) to generalize, approximate and simplify solution logic.

(A) Fuzzy Relational DB

(B) Ecorithms

(C) Fuzzy Set

(D) None of the mentioned

40. The truth values of traditional set theory is _____ and that of fuzzy set is _____.

(A) Either 0 or 1, between 0 & 1

(B) Between 0 & 1, either 0 or 1

(C) Between 0 & I, between 0 & 1

(D) Either 0 or I, either 0 or 1

41. What is fuzzification in the context of fuzzy logic?

(A) Converting fuzzy values into crisp values

(B) Converting crisp values into fuzzy sets

(C) Analyzing the uncertainty in data

(D) Creating rules for fuzzy inference systems

42. Which of the following best describes defuzzification?

(A) The process of determining membership functions

(B) The conversion of fuzzy output into a single crisp value

(C) The evaluation of fuzzy rules

(D) The generation of fuzzy sets

43. What is the most common method of defuzzification?

(A) Fuzzy mean

(B) Centroid method

(C) Maximum membership principle

(D) Weighted average

44. Why is defuzzification important in fuzzy logic systems?

(A) It simplifies the fuzzy rules

(B) It provides a clear output for decision-making

(C) It enhances the fuzzification process

(D) It determines the input variables

45. What is a single-layer feedforward network primarily composed of?

(A) Multiple layers of neurons

(B) An input layer and an output layer

(C) Only hidden layers

(D) An input layer and multiple hidden layers

46. Which of the following is a characteristic of multi-layer feedforward networks?

(A) They have only one layer of neurons.

(B) They can learn complex functions through multiple layers.

(C) They cannot be trained using backpropagation.

(D) They use only linear activation functions.

47. What is a membership function in fuzzy logic?

(A) A function that defines the relationship between input and output

(B) A function that determines the degree of truth of a fuzzy set

(C) A function that converts crisp values into fuzzy values

(D) A function that represents the rules of inference

48. . In fuzzy logic, what does the term "fuzzy rule" refer to?

(A) A strict condition that must be met

(B) A statement that describes a relationship between fuzzy sets

(C) A mathematical function used for calculations

(D) A method for generating membership functions

49. What is the purpose of fuzzy inference in fuzzy logic systems?

(A) To define membership functions

(B) To determine the output based on fuzzy inputs and rules

(C) To convert fuzzy outputs into crisp values

(D) To evaluate the performance of the system

50. Learning is a :

(A) slow process

(B) fast process

(C) can be slow or fast in general

(D) can't say

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