

(4)

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- (b) Discuss the process of encoding solutions into chromosomes and genes, and explain the importance of choosing an appropriate representation for the problem domain.

(CO5)

- (c) Present a step-by-step overview of a basic genetic algorithm, including the initialization of the population, evaluation of fitness, selection, crossover, mutation, and termination conditions. (CO5)

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Roll No.

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B. TECH. (CSE) (EIGHTH SEMESTER)

END SEMESTER

EXAMINATION, May, 2023

SOFT COMPUTING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Explain the concept of artificial neural networks (ANNS) and how they are inspired by biological neural networks.

(CO1)

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(2)

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- (b) Describe the architecture of an artificial neural network, including the input layer, hidden layers (if any), and output layer.
(CO1)
- (c) Explain the McCulloch-Pitts neuron model and its significance in understanding the basic functioning of artificial neural networks.
(CO1)
- 2. (a) Explain the architecture of a single-layer perception and its basic components.
(CO2)
- (b) Compare and contrast the Hopfield network and Bidirectional Associative Memory (BAM) models.
(CO2)
- (c) Explain the architecture and working principle of a backpropagation neural network.
(CO2)
- 3. (a) Explain the concept of fuzzy sets and their significance in handling uncertain or imprecise information.
(CO3)

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- (b) Define fuzzy relations and discuss their role in modeling relationships between fuzzy sets.
(CO3)
- (c) What is fuzzy composition, and why is it important in fuzzy systems?
(CO3)
- 4. (a) Define fuzzy variables and explain their role in representing linguistic terms or concepts in fuzzy logic.
(CO4)
- (b) Explain the different types of membership functions commonly used in fuzzy logic, such as triangular, trapezoidal, Gaussian, and sigmoidal functions.
(CO4)
- (c) Describe the Takagi-Sugeno fuzzy rule system and the Mamdani fuzzy rule system.
(CO4)
- 5. (a) Describe the biological inspiration behind genetic algorithms and how they mimic the process of natural selection and evolution.
(CO5)

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