

R18

Code No: 157HK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, February - 2025

NEURAL NETWORKS AND DEEP LEARNING

(Common to CSE(AIML), AI&ML)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) Define associative memory in the context of ANNs. [2]
- b) Define gradient descent and its role in training neural networks. [3]
- c) Describe the Maxnet. [2]
- d) Compare ART1 and ART2 networks in terms of their capabilities and applications. [3]
- e) Define deep learning. [2]
- f) What are the limitations of back propagation? [3]
- g) Define under-constrained problems. [2]
- h) Explain the concept of dataset augmentation. [3]
- i) Define algorithms with adaptive learning rates. [2]
- j) Discuss future trends in optimization for NLP? [3]

PART – B

(50 Marks)

2. Explain the working principle of an Adaline network. How does Adaline differ from a perceptron? [10]

OR

3. What are the key steps involved in the backpropagation algorithm? How does the learning rate affect the performance of a backpropagation network? [10]

4. Explain the structure and working of fixed weight competitive networks. Discuss their primary features and applications. [10]

OR

5. Discuss the architecture of Hamming networks with an example of how they perform classification task. How does the Hamming network calculate similarity between patterns? Illustrate the process. [10]

6. Explain the architecture and working of deep feed-forward networks with a diagram. [10]

OR

7. Compare different variants of gradient descent algorithms, such as SGD, Adam, and RMSprop. [10]

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8. Explain the concept of parameter norm penalties and their role in regularizing deep learning models. [10]

OR

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9. Explain the concept of semi-supervised learning and its importance in scenarios with limited labeled data. [10]

10. Explain the primary challenges faced in optimizing neural networks and their impact on model performance. [10]

OR

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11. Explain the importance of parameter initialization in neural network optimization. Discuss the relationship between parameter initialization and the convergence of optimization algorithms. [10]

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