CBCS SCHEME

USN

21CS743

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Deep Learning

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is Deep Learning? Discuss the historical trends in Deep Learning. (10 Marks)

b. Explain the principal components analysis and derive the equation when we project the data X and Z using linear transformation W. (10 Marks)

OR

2 a. Define Machine Learning and explain the most common tasks used in machine learning. (10 Marks)

b. Illustrate how support vector machine is considered most influential approach to supervised learning. (10 Marks)

Module-2

3 a. Demonstrate the sigmoid units for Bernoulli Output Distributions. (10 Marks)

b. Discus Rectified Linear Units (ReLUs) and their generalizations. (06 Marks)

c. Define Symbol to Symbol Derivatives. (04 Marks)

OR

4 a. Explain the chain rule of calculus with examples. (10 Marks)

b. Explain the general back propagation algorithm. (10 Marks)

Module-3

5 a. Explain the stochastic gradient descent and its variants in Deep Learning. (10 Marks)

b. Explain the RMSProp algorithm and how it modifies AdaGrad algorithm to perform better in nonconvex settings. (10 Marks)

OR

6 a. What are the challenges in Neural Network Optimization? (10 Marks)

b. Explain the parameter initialization strategies in Deep Learning. (10 Marks)

Module-4

7 a. Define convolutional network and explain its operation. (08 Marks)

b. Explain the concept of pooling. (06 Marks)

c. Discuss sparse interactions, parameter sharing and equivariant representations (06 Marks)

OR

8 a. Explain the variants of the basic convolution function with example. **(10 Marks)**

b. In CNN how you are framed the structured outputs and what different formats of data can be used, explain in detail. **(10 Marks)**

Module-5

9 a. Explain briefly how does Recurrent Neural Networks (RNNs) unfolding computational graphs. **(10 Marks)**

b. Compare and contrast Long Short Term Memory (LSTM) and Gated Recurrent Units. **(10 Marks)**

OR

10 a. Discuss about Bidirectional Recurrent Neural Networks. **(10 Marks)**

b. What is Natural Language Processing? Explain an N-Gram Model. **(10 Marks)**

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