CBCS SCHEME

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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.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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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