



CBCS SCHEME

21CS743

Seventh Semester B.E./B.Tech. Degree Examination, June/July 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. Using relevant diagrams, analyze and describe the components and functions of a deep learning model in detail. (08 Marks)
- b. Explain the reasons for increasing the size of the model and data set in deep learning detailing the impact on performance and accuracy. (06 Marks)
- c. Compare the difference between Supervised and Unsupervised learning algorithm. (06 Marks)

OR

- 2 a. Explain and analyze the principles and process of principle component analysis (PCA) in detail, highlighting its applications and significance. (07 Marks)
- b. Compare the contrast the k-means and k-nearest neighbors algorithms in detail. (05 Marks)
- c. Identify and describe the key components of learning algorithms explaining the role and importance of each component in the learning process. (08 Marks)

Module-2

- 3 a. Describe why the general back propagation algorithm is essential for training deep neural networks with necessary steps. (12 Marks)
- b. Demonstrate how back-propagation is applied to train a Multilayer Preceptron (MLP) with an example. (08 Marks)

OR

- 4 a. Describe parameter norm penalties and explain the concepts of L1 and L2 regularization. (10 Marks)
- b. Explain the early stopping meta algorithm and how it helps to determine the optimal training duration. What are the main steps involved? (10 Marks)

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-3

- 5 a. Illustrate a scenario where specific challenges arise in neural network optimization. How would you address these issues? (12 Marks)
- b. What is Stochastic Gradient Descent and how does it differ from standard gradient descent? (08 Marks)

OR

- 6 a. Demonstrate how an algorithm such as AdaGrad and RMSprop with an adaptive learning rate adjusts the learning rate during training. (09 Marks)
- b. What factors should be considered when choosing an right optimization for a deep learning model. (06 Marks)
- c. Describe Empirical Risk Minimization (ERM) and explain its role in minimizing average training error. (05 Marks)

Module-4

- 7 a. Demonstrate how the convolution operation is applied in a Convolution Neural Network (CNN). Provide an example with 2-D convolution without kernel-flipping. (10 Marks)
- b. Explain the purpose of pooling functions in convolutional neural networks. How do they modify the output of the layer they are applied to? (10 Marks)

OR

- 8 a. Explain the different variants of the basic convolution function. How do these variants enhance the capabilities of convolutional layers? (10 Marks)
- b. What types of data are commonly used with convolutional networks? (10 Marks)

Module-5

- 9 a. Analyze the role of different hardware and software components in supporting large scale deep learning initiatives. (10 Marks)
- b. Analyze the need for and the significance of speech recognition technology in the field of Natural Language Processing. (10 Marks)

OR

- 10 a. Describe the basic structure and components of recurrent neural networks and their role in sequence modeling. (10 Marks)
- b. Explain the structure and functionality of recursive neural networks with necessary diagram. (10 Marks)

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