EPCET LIBRARY BANGALORE-49

CBCS SCHEME

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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.***

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. 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)**

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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