R22 Regulation *Subject code: 4E6GB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Regular Examinations, May 2025

DEEP LEARNING

(CSE(AI&ML))

Maximum Marks: 60 Date: 20.06.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Differentiate between bias and variance in model training.	1M	1	2
b)	What is the role of hyperparameters in a learning algorithm?	1M	1	1
c)	Define the dataset augmentation in regularization?	1M	2	2
d)	Why is early stopping considered a form of regularization?	1M	2	2
e)	How does max-pooling help in feature extraction?	1M	3	2
f)	What is the benefit of Random or Unsupervised Features?	1M	3	1
g)	Define the concept of Bidirectional RNNs.	1M	4	1
h)	List out the usage of Explicit Memory.	1M	4	2
i)	Illustrate Performance Metrics with simple example.	1M	5	3
j)	Explain Debugging Strategies in deep learning.	1M	5	2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Explain the challenges of underfitting and overfitting in machine learning. How can validation set help mitigate these issues? b) Derive the Maximum Likelihood Estimation (MLE) for a simple linear regression model.	5M 5M	1	2
	OR			
3	a) Explain gradient-based learning in neural networks. Why is the choice of activation function critical? b) Explain the Back-Propagation algorithm step-by-step.	5M 5M	1	2
4	a) Describe multi-task learning and how it acts as an implicit regularizer. b) Explain the concept involved in Norm Penalties as Constrained Optimization.	5M 5M	2	3
	OR			
5	a) Illustrate sparse representations? How do they contribute to regularization? b) Discuss the challenges of neural network optimization.	5M 5M	2	3

6	a) Explain how convolution and pooling can be viewed as an "infinitely strong prior" in Bayesian terms. b) Compare and contrast valid convolution, same convolution, and full convolution operations.	5M 5M	3	2
	OR			
7	a) Explain the concept of "random or unsupervised features" in CNNs and their significance. b) Describe three different variants of the basic convolution function and their applications.	5M 5M	3	2
8	a) Describe the encoder-decoder architecture for sequence-to-sequence tasks. b) Elaborate the concept of Recurrent Neural Networks.	5M 5M	4	3
	OR			
9	a) Demonstrate Large-Scale Deep Learning application with clear structure. b) Explain LSTM and other gated RNN's.	5M 5M	4	3
10	a) Identify Default Baseline Models in Deep learning model. b) How you will process the Selecting Hyper parameters for any use cases.	5M 5M	5	3
	OR			
11	a) Summarize the basic idea involved in Computer Vision and Speech Recognition. b) Explain the applications of Natural Language Processing in deep learning techniques.	5M 5M	5	3