R22 Regulation *Subject code:4E6HC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Regular Examinations, May 2025

DEEP LEARNING AND NEURAL NETWORK

(CSE(DS))

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)	What is overfitting ?	1M	CO1	BTL2
b)	What is supervised Learning Algorithm	1M	CO1	BTL2
c)	What is the XOR problem in the context of neural networks?	1M	CO2	BTL1
d)	How does dropout prevent overfitting in neural networks?	1M	CO2	BTL2
e)	Define data types in CNN.	1M	CO3	BTL2
f)	Write about convolution operation in CNN.	1M	CO3	BTL1
g)	Define a recurrent neural network.	1M	CO4	BTL1
h)	Name the three primary gates in an LSTM cell.	1M	CO4	BTL2
i)	What is the primary characteristic of an under complete auto encoder?	1M	CO5	BTL1
j)	How do auto encoders facilitate manifold learning?	1M	CO5	BTL3

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Give Differences between supervised and unsupervised Learning Algorithms	5M	CO1	BTL2
	b.) What is a learning algorithm in machine learning? Give examples of different types of learning algorithms.	5M		
	OR			
3	a) Explain the concepts of model capacity, overfitting, and under fitting. How do they impact model performance?	5M	CO1	BTL1
	b) Define unsupervised learning. Provide examples and explain one unsupervised learning algorithm in detail.	5M		BTL2
4	Explain how the architecture of a deep feedforward network is designed. What role do hidden units play, and how does their number affect model performance.	10M	CO2	BTL2
	OR			
5	a) What is multi-task learning? Discuss its advantages and provide an example scenario where it is beneficial.	5M	CO2	BTL2
	b) Explain the challenges of under-constrained problems in deep learning and how regularization techniques address these challenges.	5M		

6.	a) Analyze the types of data that are best suited for CNN architectures. Provide example	5M	CO3	BTL4
	b) Discuss different variants of the basic convolution function and their applications.	5M		
	OR			
7	a) Explore the neuroscientific inspirations behind CNNs.	5M	CO3	BTL3
	b) Highlight some algorithms that improve the efficiency of convolution operations in CNNs.	5M		
8	a) Explain the process of unfolding a recurrent neural network's computational graph and its significance in training.	5M	CO4	BTL2
	b) Describe the architecture of echo state networks and explain how they differ from traditional RNNs in terms of training and stability.	5M		
	OR			
9	a) Discuss the role of explicit memory mechanisms in sequence modeling and compare them with traditional RNN memory representations..	5M	CO4	BTL4
	b) Illustrate the encoder-decoder architecture used in sequence-to-sequence models and explain how it handles variable-length input and output sequences.	5M		
10	a) Compare and contrast undercomplete autoencoders with regularized autoencoders.	5M	CO5	BTL1
	b) Explain the concept of stochastic encoders and decoders in autoencoders. How do they differ from one another.	5M		
	OR			
11	a) Explore various applications of autoencoders in real-world scenarios.	5M	CO5	BTL1
	b) Discuss the use of autoencoders in dimensionality reduction.	5M		