Register No : _____

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

BE/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Fifth Semester

Artificial Intelligence and Data Science

AD3501 – Deep Learning

Regulations - 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Define deep learning and explain how it differs from traditional machine learning techniques.	RE	1	2
2.	Recall the definition of optimization.	RE	1	2
3.	Summarize the key characteristics of Convolutional Neural Networks.	UN	2	2
4.	Name some common types of loss functions used in regression tasks.	RE	2	2
5.	Explain the concept of bidirectional RNNs.	UN	3	2
6.	Recall the concept of gated architectures in neural networks.	RE	3	2
7.	Define Performance Metrics.	RE	4	2
8.	List the steps involved in a systematic debugging process.	RE	4	2
9.	Compare the roles of an encoder and a decoder in a sequence-to-sequence model.	UN	5	2
10.	Label the key components of a Generative Adversarial Networks.	RE	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Demonstrate the role of probability distributions in defining the loss functions used in deep learning model.	UN	1	7
		ii	Compare scalars and vectors in deep learning by defining each and explain their roles in model parameters and data representation.	UN	1	6
			Or			
	b	I	Identify the hyperparameters associated with Stochastic Gradient Descent and explain their roles in the optimization process.	UN	1	7
		ii	Formulate the impact of real-world complexities on model performance and explain how deep learning frameworks are designed to handle these challenges.	UN	1	6
12.	a		Develop a method for addressing sparse interactions in collaborative filtering and detail the steps you would take to improve recommendation accuracy.	AP	2	13
			Or			
	b		Model a neural network architecture that incorporates various nonlinear activation functions.	AP	2	13

13.	a	Build a conceptual model and explain how gradient descent optimizes the loss function in deep learning.	AP	3	13
		Or			
	b	Construct a simple mathematical expression that represents the gradient of a function and explain the significance of each part of the expression in optimization.	AP	3	13
14.	a	Apply different evaluation metrics to assess the performance of a baseline model in regression tasks.	AP	4	13
		Or			
	b	Experiment with different random search strategies for hyperparameter optimization in a machine learning model.	AP	4	13
15.	a	Apply the concept of regularization in autoencoders and explain how it helps prevent overfitting.	AP	5	13
		Or			
	b	Make use of the concept of latent space in deep generative models to describe how it enables the manipulation of generated outputs in images.	AP	5	13

*PART – C (Marks 1*15 = 15)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
16.	a	Identify the types of sequential data for training a deep recurrent network in the e-commerce context. Explain how data influences your model design.	AP	3	15
		Or			
	b	Apply your understanding of LSTM architecture to design a model that predicts equipment failure based on time-series sensor data.	AP	3	15