Reg. No. : | | | | | | | | | | | | |

Question Paper Code:R5E03

B.E./B.Tech. DEGREE EXAMINATION, NOV 2025

Fifth Semester

R21UAD503 – MACHINE LEARNING TECHNIQUES

Artificial Intelligence & Data Science

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Define Machine Learning.	CO1-U
2.	Write the importance of machine learning algorithms.	CO1-U
3.	Illustrate the real-time applications of the central theorem.	CO1-U
4.	Define discrete distribution techniques in machine learning.	CO1-U
5.	Compare a biological neuron and an artificial neuron.	CO1-U
6.	Identify the parameters in a perceptron network and their significance.	CO1-U
7.	Define Unsupervised Learning.	CO1-U
8.	Define dimensionality reduction.	CO1-U
9.	Define HMM.	CO1-U
10.	Illustrate the real-time applications of LSTM.	CO1-U

PART – B (5 x 16= 80 Marks)

11.	(a)	Analyze the role of unsupervised learning in machine learning. Classify its structure and examine a real-world application to illustrate its function.	CO3-Ana	(16)
		Or		
	(b)	Examine the process of data preprocessing in machine learning by categorizing various techniques such as data cleaning, feature scaling, and handling missing values. Compare these techniques and analyze their relationships to model accuracy and robustness.	CO3-Ana	(16)

12.	(a)	Apply the Discrete Distribution techniques with real-time examples.	CO2-App	(16)
		Or		
	(b)	Make use of continuous distribution techniques in solving real-time problems with examples.	CO2-App	(16)
13.	(a)	Summarize and explain various types of artificial neural networks.	CO1-U	(16)
		Or		
	(b)	Determine the activation function and list a few activations function with descriptions.	CO1-U	(16)
14.	(a)	Explain the SVM classifier with a suitable example.	CO1-U	(16)
		Or		
	(b)	Discuss the role of dimensionality reduction techniques in training neural networks. Justify their impact on over fitting, training time, and data visualization.	CO1-U	(16)
15.	(a)	Examine the structure and key components of Markov Models. Classify the steps involved in their algorithmic flow and justify their application in time-series forecasting and natural language processing.	CO3-Ana	(16)
		Or		
	(b)	Examine the use of the LSTM model in real-time applications. Analyze its effectiveness by distinguishing how it handles sequential data and inferring its advantages in various scenarios.	CO3-Ana	(16)