R22 Regulation *Subject code:4E6FA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Regular Examinations, May 2025

MACHINE LEARNING

(IT)

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 machine learning?	1M	CO1	1
b)	What is linear regression used for?	1M	CO1	1
c)	What is a Multi-layer Perceptron (MLP)?	1M	CO2	1
d)	What is a kernel function in SVM?	1M	CO2	1
e)	What is a decision tree?	1M	CO3	1
f)	In K-means, what does 'K' represent?	1M	CO3	1
g)	What is dimensionality reduction?	1M	CO4	1
h)	What is the full form of PCA?	1M	CO4	1
i)	What is reinforcement learning?	1M	CO5	1
j)	Write about MCMC model?	1M	CO5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Explain the different types of machine learning with suitable examples. b) Describe the components of a learning system with a neat block diagram.	5M 5M	CO1	2
	OR			
3	a) What are the key issues and challenges in machine learning? Discuss any three. b) Describe concept learning as a search problem.	5M 5M	CO1	1
4	a) Explain the architecture of a Multi-layer Perceptron (MLP) with a neat diagram. b) Explain the basic concept of Support Vector Machines.	5M 5M	CO2	2
	OR			
5	a) Explain the backpropagation algorithm used in training an MLP. b) Define the "curse of dimensionality". How does it affect machine learning models.	5M 5M	CO2	2
6	a) What is overfitting in decision trees? How can it be avoided? b) Compare and contrast ID3 and CART algorithms.	5M 5M	CO3	1

	OR			
7	a) Explain ensemble learning. b) Describe the K-Means clustering algorithm with a step-by-step example.	5M 5M	CO3	2
8	a) What is dimensionality reduction and explain its types in machine learning with examples. b) How are genetic algorithms used for optimization in machine learning problems?	5M 5M	CO4	1
	OR			
9	a) Describe genetic operators (selection, crossover, mutation) with examples. b) Explain about evolutionary learning.	5M 5M	CO4	2
10	a) Explain the basic concepts of Reinforcement Learning (RL) with suitable examples. b) Explain the structure and components of a Hidden Markov Model.	5M 5M	CO5	2
	OR			
11	a) Explain Markov Random Fields (MRF). b) Implement Kalaman filter and Particle filter with an example.	5M 5M	CO5	2