R22 Regulation *Subject code:4E5GD & 4E5HB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, May 2025

MACHINE LEARNING

(Common to CSE(AI&ML) & CSE(DS))

Maximum Marks: 60 Date:23.06.2025 AN 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)	Define Machine learning.	1M	1	2
b)	Define Linear regression.	1M	1	1
c)	What is Multi-Layer perceptron?	1M	2	2
d)	Write the Support vector Machines?	1M	2	2
e)	What is Decision trees?	1M	3	1
f)	Write about Unsupervised Learning?	1M	3	6
g)	Make use of Factor Analysis	1M	4	3
h)	Define Isomap.	1M	4	2
i)	What is Reinforcement Learning?	1M	5	1
j)	Write about Bayesian Networks?	1M	5	2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	How can principles from the structure and functioning of the brain and neurons be applied to design an effective learning system?	10M	1	4
	OR			
3	Explain the types of Machine learning.	10M	1	2
4	What are the main characteristics and advantages of multilayer perceptron's in neural network architecture, and how do they facilitate the learning of complex patterns in data?	10M	2	2
	OR			
5	How can the back propagation algorithm be derived mathematically to efficiently compute gradients for optimizing neural networks?	10M	2	4
6	How do Gaussian mixture models work in the context of clustering and density estimation, and what are the key advantages of using them over simpler clustering techniques?	10M	3	5
	OR			
7	What are the primary steps involved in the k-means clustering algorithm, and how do you determine the optimal number of clusters for a given dataset?	10M	3	2

8	What is linear discriminant analysis (LDA), and how does it differ from other classification techniques in terms of its approach to maximizing class separability?	10M	4	2
	OR			
9	What role does least squares optimization play in evolutionary learning algorithms, and how can it be utilized to improve the accuracy of model predictions in complex datasets?	10M	4	3
10	What are Markov Chain Monte Carlo (MCMC) methods, and how do they facilitate sampling from complex probability distributions in Bayesian inference?	10M	5	2
	OR			
11	What are hidden Markov models (HMMs), and how are they utilized in applications such as speech recognition and bioinformatics to model sequential data?	10M	5	1