Code No.: R22CS58311OE	R22	H.T.No.			8	R					

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–M.TECH–I–Semester End Examinations (Regular) - January- 2026
MACHINE LEARNING(OE)
(CSE)

[Time: 3 Hours] **[Max. Marks: 60]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(10 Marks)**

1.	a)	What are the advantages and disadvantages of using a small k value in k-nearest neighbors?	[1M]
	b)	What is the concept of ranking in machine learning?	[1M]
	c)	List out the applications of matrix completion.	[1M]
	d)	What are mixture models in unsupervised learning? Discuss.	[1M]
	e)	What is an F1-score? How to use it?	[1M]
	f)	Define overfitting and underfitting?	[1M]
	g)	What is feature representation learning?	[1M]
	h)	Provide an example where sparse models can be applied.	[1M]
	i)	What are the challenges in handling IOT Data?	[1M]
	j)	What made SciKit Learn very popular in the Machine Learning Community?	[1M]

PART-B **(50 Marks)**

2.		What is the Naive-Bayes algorithm, and how does it work in classification tasks? What assumptions does it make about the data?	[10M]
		OR	
3.		Explain the basic principles of Support Vector Machines and how they work in binary classification.	[10M]
4.		Describe the K-means clustering algorithm and its steps. How does the choice of the initial centroids impact the convergence of the K-means algorithm?	[10M]
		OR	
5.		How does PCA help in reducing the dimensionality of a dataset while retaining information?	[10M]
6.		Describe the concept of cross-validation. Provide examples of situations where k-fold cross-validation would be preferable over a simple train-test split.	[10M]
		OR	
7.		Compare and contrast Random Forest with bagging and boosting in terms of their underlying mechanisms.	[10M]
8.		Explain the concept of sparse modeling and its significance in feature selection.	[10M]
		OR	
9.	a)	Explain the key characteristics of time series data.	[5M]
	b)	What are the challenges associated with modeling time series data compared to static data?	[5M]

10. Identify and analyze two challenges specific to implementing classification methods for IoT applications. [10M]

OR

11. Choose one recent trend in machine learning and discuss its applications in a specific industry or domain. [10M]

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