



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.																			
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Mid - Term Examinations - March 2026

Date: 12-03-2026

Time: 09:30am - 11.00am

School: SOIS	Program: 6BCAAIML01/6BCAAIML02/6BCADS01/ 6BCADS02		
Course Code: CSA3052	Course Name: PATTERN RECOGNITION		
Semester: VI	Max Marks: 50	Weightage: 25%	

CO - Levels	C01	C02	C03	C04	C05
Marks	46	22	22		

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

1	What is semi-supervised learning?	2 Marks	L1	C01
2	Define a feature vector.	2 Marks	L1	C01
3	Distinguish between features and feature vectors.	2 Marks	L2	C01
4	Name any two commonly used kernel functions.	2 Marks	L1	C02
5	What is Kernel PCA?	2 Marks	L1	C03

Part B

Answer the Questions.

Total Marks 40M

6.	a.	Explain Bayes Decision Theory and discuss how it helps in minimizing classification error in pattern recognition systems.	10 Marks	L2	CO1
Or					
7.	a.	Compare supervised, unsupervised, and semi-supervised learning approaches, clearly explaining their characteristics with suitable real-world examples.	10 Marks	L2	CO1

8.	a.	Explain the Gaussian Probability Density Function (PDF) and write its mathematical expression, explaining the meaning of each parameter.	10 Marks	L2	CO1
Or					
9.	a.	Discuss discriminant functions with its types and explain how they are used to separate classes in a classification problem.	10 Marks	L2	CO1

10.	a.	Explain the Karhunen–Loève (KL) transformation and describe how it performs dimensionality reduction in high-dimensional data.	10 Marks	L2	CO2
Or					
11.	a.	Discuss Singular Value Decomposition (SVD) and discuss its role and importance in data compression and noise reduction.	10 Marks	L2	CO2

12.	a.	Explain nonlinear dimensionality reduction and list different techniques.	10 Marks	L2	CO3
Or					
13.	a.	Elucidate the working of Kernel Principal Component Analysis (Kernel PCA) with the help of a neat and labeled block diagram.	10 Marks	L2	CO3