U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E.   **Semester: VI**
Branch: Artificial Intelligence and Machine Learning   **Duration: 3 hrs.**
Course Code: 22AM6PCAML   **Max Marks: 100**
Course: Advanced Machine Learning   **Date: 05.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
                   2. Missing data, if any, may be suitably assumed.

				CO	PO	Marks
			UNIT - I			
	1	a)	Derive the equations for posterior and posterior predictive distribution using beta-binomial model.	CO3	PO2	**10**
		b)	How Naïve Bayes Classifier can be used for the prediction of conditionally independent class labels.	CO2	PO2	**10**
			UNIT - II			
	2	a)	How Linear Discriminant Analysis can be applied for a special case in which the covariance matrices are tied or shared across classes. Analyze various strategies for preventing the over fitting of the data.	CO2	PO2	**10**
		b)	Apply linear Gaussian model for Inferring an unknown scalar from noisy measurements.	CO2	PO2	**10**
			UNIT - III			
	3	a)	Define the model selection problem, how marginal likelihood can be computed using parameter inference for a fixed mode?	CO2	PO2	**10**
		b)	What is Bayes' risk? Prove that a Bayes estimator can be obtained by minimizing the posterior expected loss for each x.	CO3	PO3	**10**
			UNIT - IV			
	4	a)	Develop a variational framework to maximize a lower bound on the marginal likelihood.	CO3	PO3	**10**
		b)	Apply an alternative form of deterministic approximate inference based on the reverse KL divergence.	CO2	PO3	**10**
			OR			
	5	a)	Illustrate Gibs sampling algorithm for the suitable data.	CO3	PO3	**10**
		b)	Explain Hybrid Monte Carlo Algorithm with necessary equations.	CO2	PO2	**10**

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - V			
	6	a)	How SVM can be applied in regression task.	*CO2*	*PO2*	**10**
		b)	Discuss the different methods for classification and regression based on kernels.	*CO1*	*PO1*	**10**
			OR			
	7	a)	Explain different kinds of inference in hidden Markov models.	*CO1*	*PO1*	**10**
		b)	Analyze Google's PageRank algorithm for web page ranking using a Markov model.	*CO3*	*PO3*	**10**

******