Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
ME – SEMESTER – III (New)– EXAMINATION – WINTER-2019
Subject Code: 3730506   **Date: 16-11-2019**
Subject Name: Pattern Recognition and Machine learning
Time: 02:30 PM TO 05:00 PM   **Total Marks: 70**
Instructions:
> 1. **Attempt all questions.**
> 2. **Make suitable assumptions wherever necessary.**
> 3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain (i) Supervised Learning (ii) Unsupervised Learning and (iii) Reinforcement Learning.	**07**
	(b)	Explain following useful properties and capabilities offered by neural networks. (i) Generalization (ii) Input –output mapping	**07**
Q.2	**(a)**	How the discrimination function useful for the minimum error rate classification? Explain the different cases for same.	**07**
	(b)	Explain Probabilistic Neural Networks (PNN). How to choose the window function?	**07**
		OR	
	(b)	What are the problems of dimensionality? How it can be overcome?	**07**
Q.3	**(a)**	How to compute the Hidden markov model?	**07**
	(b)	Explain k_n Nearest Neighbor Estimation and Parzen window estimation.	**07**
		OR	
Q.3	**(a)**	Explain the Bayesian Parameter Estimation for Gaussian distribution.	**07**
	(b)	When do Maximum Likelihood and Bayes method differ?	**07**
Q.4	**(a)**	Enlist the basic architectures of neural network. Explain in brief any one of them.	**07**
	(b)	Describe in brief following heuristics to improve the performance of Back propagation algorithm • Initialisation • Learning from hints	**07**
		OR	
Q.4	**(a)**	Describe in brief following heuristics to improve the performance of Back propagation algorithm • Normalization • Number of hidden neurons/layers	**07**
Q.4	**(b)**	Explain in brief the necessary steps for back propagation learning algorithm. Clearly mentions all assumptions made.	**07**
Q.5	**(a)**	Explain Linear Discriminant Functions and Decision Surfaces for two/multi category cases.	**07**
	(b)	Explain criterion Functions for Clustering. Explain in brief Iterative Optimization and Hierarchical Clustering.	**07**
		OR	
Q.5	**(a)**	Explain clustering with suitable examples in context of unsupervised learning.	**07**
	(b)	Explain importance of bias and variance for regression in context of lack of Inherent Superiority of any classifier.	**07**

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