E **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 57S29

Ph.D. COURSE WORK EXAMINATION, MAY 2018

Elective

Communication Systems

15PCM529 - PATTERN RECOGNITION

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1. (a) Explain the concept of Classification and Post processing in pattern recognition. CO1- U (20)

Or

(b) What do you mean by pattern recognition? Explain. Describe design principles of pattern recognition system with an example. CO1- U (20)

2. (a) Explain the uni-variate and multivariate normal density functions with examples. CO2- U (20)

Or

(b) What is discriminant function? Discuss in detail. In a two class problem, the likelihood ratio is given as follows: CO2- U (20)

$$p(X \mid C_1) / p(X \mid C_2)$$

Write the discriminant function in terms of the likelihood ratio.

3. (a) Why parameter estimation is an important issue in pattern recognition? What are the two methods usually considered for this? Illustrate any one of them considering a Gaussian case of unknown μ and $\sum$. CO3- Ana (20)

Or

	(b)	Let us assume that there are *m* samples in *n* dimensional space. Describe the mathematical components required to compute the *n* principal components for each sample. Describe how Principal Component Analysis (PCA) will enable dimensionality reduction. Put the above details in an algorithmic structure.	CO3- Ana	(20)
4.	(a)	Write a short note on Fisher-Linear Discriminant.	CO4- U	(20)
		Or		
	(b)	Explain Parzen window estimation. Illustrate with diagrams.	CO4- U	(20)
5.	(a)	Write algorithm for K-means clustering with the help of diagram. Explain how the K-means clustering produces a form of stochastic hill climbing in the log likelihood function.	CO5- App	(20)
		Or		
	(b)	Illustrate with dendrogram the hierarchical agglomerative clustering and the hierarchical division clustering. Bring out the differences in the computational procedures involved in both of them.	CO5- App	(20)