

Name of the Examination: M. E C . S. E FIRST YEAR SECOND SEMESTER – 2019**Subject: PATTERN RECOGNITION****Full Marks: 100****Time: 3 hours;**Answer Any Five Questions

- Q1. (a) Define variance and covariance? For two vectors A, B of the same dimension how do you compute the covariance of (A, B)?
(b) Define Eigenvalue and Eigen Vector.
(c) Discuss the Principal Component Analysis (PCA) technique. [20]
- Q2. (a) What are the different types of Support Vector Machines (SVM)?
(b) Discuss the working principle of linear SVM.
(c) What are support vectors? [20]
- Q3. (a) With suitable example define Kernel function.
(b) Describe the concept of non-linear SVM.
(c) Discuss how SVM classifier can be used for classification for more than two classes. [20]
- Q4. (a) Define Bayes and naïve Bayes rule. Discuss Bayes classifier.
(b) What is KNN classifier? How to choose the values of 'K' in KNN classifier? [20]
- Q5. (a) Define entropy and mutual information.
(b) Discuss the principle of Decision Tree Classifier.
(c) What is the importance of feature selection? Discuss how mutual information can be used for feature selection. [20]
- Q6. (a) Discuss DB Scan clustering algorithm.
(b) What is the Hierarchical Clustering Algorithm? Briefly describe the following three Hierarchical Clustering Algorithms:
(i) Single Linkage (ii) Complete Linkage (iii) Average Linkage [20]
- Q7. (a) Show how the Genetic Algorithm (GA) can be used to design a classifier. How you can design the multi-objective version of GA-based supervised classifier?
(b) Why does FCM perform better than KMEAN?
(c) Discuss two encoding scheme for GA based clustering. [20]
- Q8. (a) With suitable example define cluster validity index. How this index can be used for partitioning the data set for an unknown number of clusters?
(b) Discuss how spanning tree can be used for clustering.
(c) What is multi-objective clustering? Why it perform better than single objective clustering. [20]