Paper Code: PCS-02	**Roll No.**										

PCS-02/PrePhD
ODD SEMESTER EXAMINATION, 2016-17
PATTERN RECOGNITION AND ANALYSIS

[Time: 3 Hours] [Max. Marks: 70]

Note: - Attempt ALL questions.

1. Attempt any four parts of the following:- **[3.5x4=14]**

(a) Sketch the system diagram of a generic pattern recognition system.
(b) What are the different paradigms of pattern recognition system? Explain briefly.
(c) Formulate statistical pattern recognition problem with example.
(d) How do the decision boundaries are computed in statistical pattern recognition system?
(e) What is the curse of dimensionality problem?
(f) Describe the frontiers of pattern recognition system.

2. Attempt any two parts of the following:- **[7x2=14]**

(a) Describe principle component analysis (PCA) technique. List the issues of the PCA technique.
(b) Describe linear discriminant analysis (LDA) technique. Why LDA is generally preferred over LDA for discriminant analysis.
(c) Explain the principle of Naïve-Bayes classifier with the risk analysis of misclassification.

3. Attempt any two parts of the following:- **[7x2=14]**

(a) Why the feature selection is an important step before classification? Describe any one feature selection technique with example.
(b) Describe the principle used in support vector machine (SVM). How kernel functions are computed in SVM?
(c) Explain following classification methods:
    (i) k-Nearest Neighbors
    (ii) Decision Trees

4. Attempt any two parts of the following:- **[7x2=14]**

(a) What are the different approaches to designing a classifier? Explain any two approaches briefly.
(b) Why there is a need for combining multiple classifiers to solve a given classification problem? Briefly, describe various schemes for combining classifiers.
(c) How does the performance of a classifier be evaluated? Describe any two methods that are commonly used to estimate the error rates of a classifier.

5. Attempt any two parts of the following:- **[7x2=14]**

(a) Describe a functional definition of a cluster. Illustrate agglomerative hierarchical clustering technique with example.
(b) Write short notes on the following:
    (i) EM algorithm
    (ii)Gaussian distribution
(c) What is the role of pattern recognition in biometrics? Describe a generic biometric system with example.