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Paper Id:

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Sub Code: NCS-080

Roll No.

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B TECH
(SEM. VIII) THEORY EXAMINATION 2017-18
PATTERN RECOGNITION

Time: 3 Hours**Total Marks: 100**

Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. Define the law of total probability.
 - b. What do you mean by dimension reduction in pattern recognition?
 - c. Write the difference between supervised learning and unsupervised learning.
 - d. How do we evaluate the performance of a classifier?
 - e. What is Hidden Markov Model (HMM)?
 - f. What is discriminant function?
 - g. Write short notes on Gaussian mixture model.
 - h. Discuss cluster validation.
 - i. Write K-means clustering algorithm.
 - j. Write the difference between clustering and classification.

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- a. What do you mean by learning and adaptation? Explain the components of a learning system.
 - b. Explain the Chi-Square test and discuss their significance in pattern recognition with suitable example.
 - c. Explain the concept of expectation maximization with the help of an algorithm.
 - d. How K-nearest neighbor (KNN) method works? Explain with KNN estimation and KNN rule.
 - e. Explain Naïve Bayes Classifier.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- (a) Consider a two-class problem where the classes are labeled pen drive and laptop. Suggest a set of features that could be used to discriminate between these two classes of objects.
 - (b) What is Baysian Decision Theory? Discuss two-class category Classification in details.

4. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) Illustrate statistical and syntactic pattern recognition (SPR) approach.
 - (b) Explain normal density function and discuss its significance in pattern recognition?
5. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) Write short notes on following-
 - i. Maximum likelihood estimation
 - ii. Bayesian Estimation
 - (b) What is Parzon window? Explain. Derive the conditions for (i) convergence of mean (ii) convergence of variance.
6. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) What do you mean by Fuzzy Decision making? Also discuss the Fuzzy Classification using suitable example.
 - (b) Name the different methods of non-parameter estimation strategies. What are the main differences between them?
7. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) What are different clustering techniques? Why is clustering important? What is an agglomerative clustering algorithm? Explain.
 - (b) Write short notes on following-
 - i. Cluster validation
 - ii. Criteria function for clustering