Printed Pages:02 **Sub Code: NCS-080**

Paper Id: | 1 | 1 | 0 | 8 | 2 | 1 | **Roll No.** | | | | | | | | | | |

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