FIFTH SEMESTER

B.Tech. (IT)

END SEMESTER EXAMINATION

FEBRURARY 2019

(Supplementary Examination)

IT-307 PATTERN RECOGNITION

TIME: 3 Hours

Max. Marks: 40

Note: *Attempt any FIVE questions.*
      Assume suitable missing data, if any.

Question No. 1   [4x2=8]

[a] What are the fundamental steps of pattern recognition system? Discuss and demonstrate with suitable diagram.

[b] What are the applications of pattern recognition and how it enhances the life of a human beings?

Question No. 2   [4x2=8]

Let us consider a situation where each of the 3 classes is separable from other by a single decision boundary. How one can determine class membership of a pattern to any of these 3 classes. The decision boundary is as given:

$$d_i(x) = \begin{cases} -x_1 - x_2 + 5 = 0 & for\ i = 1 \\ -x_1 - 2 = 0 & for\ i = 2 \\ -x_1 - 2x_2 - 2 = 0 & for\ i = 3 \end{cases}$$

Also test the pattern vector $(5, 3)$ and $(9, 3)$ to belong to which class.

Question No. 3   [4x2=8]

What is distance based classifier? Consider the following training patterns:

Pattern	Features	Class
x_1	(3,0)	1
x_2	(4,1)	1
x_3	(3,2)	1
x_4	(1,-1)	2
x_5	(1,-2)	2

Classify the input feature vector $x = (1,1)$.

Question No. 4   [4x2=8]

[a] Define the following terms: prior probability, posterior probability, likelihood ration.

[b] What are the fundamental features and also discuss the characteristics of feature?

Question No. 5   [4x2=8]

[a] What is activation function? Discuss different types of activation function used in artificial neural network.

[b] What is Multilayer Neural Network? And discuss the process of learning in Multilayer Layer Perceptrons (MLP).

Question No. 6   [2x4=8]

Write short notes on the followings:

[a] Support vector machine
[b] Principal Component Analysis
[c] Linear discriminant Analysis
[d] Singular value decomposition