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FIFTH SEMESTER
END SEMESTER EXAMINATION
(Supplementary Examination)

Roll _____
B.Tech. (IT)
FEBRUARY 2019

IT-307 PATTERN RECOGNITION

Max. Marks: 40

TIME: 3 Hours
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:

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

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 ratio.
- [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

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