Indian Statistical Institute, Bangalore
M.S. (QMS) First Year
Second Semester – Pattern Recognition

Final Exam   Duration: 3 Hrs   Date: May 06, 2017   Max Marks: 50

<u>Note: Answer For any 50 marks</u>

1.   State and derive the back error propagation algorithm for a multi-layer perceptron with one hidden layer.   [10]

2.   What is ROC curve? Describe the interpretation of this curve.   [4]

3.   Provide the significance of dispersion score with equation in the classification of a data set.   [6]

4.   Differentiate between real and artificial data set for pattern classification task. With Bayes decision rule, demonstrate the behaviour of misclassification error with the increase of training and test samples.   [2 + 4 = 6]

5.   [3 + 3 = 6]
a.   What is clustering problem and its mathematical formulation?
b.   Describe three different types of issues in clustering operation.

6.   What are generalization and over-fitting, and their relations? Discuss the effect of these factors in pattern classification problems.   [3 + 3 = 6]

7.   Explain with equations and illustrations the binary and grayscale morphological erosions and dilations along with their multiscale versions. How these basic morphological operations could be employed in computing both binary and grayscale morphological medians between the source and target sets, as well as between the source and target functions.   [6 + 6 = 12]