

**M.E. (Computer Engineering)  
Elective III  
Pattern Recognition  
(2017 Course) (610103D)**

**Time: 3 Hours**

**[Max Marks: 50]**

**Instructions to the candidates:-**

- 1) Solve any 5 from Q. No 1 to Q. No.6
- 2) Neat diagram must be drawn whenever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

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|------|---|----|
| Q. 1 | a. What is learning? Explain general forms of learning                              | 6  |
|      | b. State essential characteristics of features in pattern recognition system        | 2  |
|      | c. Draw block diagram of typical pattern recognition system                         | 2  |
| Q. 2 | a. Explain the problem of feature selection based on statistical hypothesis testing | 5  |
|      | b. Write short note on ROC curve  | 5  |
| Q.3  | a. Explain Bayes decision rule to minimize overall risk                             | 4  |
|      | b. Show that maximum likelihood estimate for unknown population mean is sample mean | 4  |
|      | c. State K-nearest neighbor rule  | 2  |
| Q.4  | a. What are hierarchical clustering algorithms? Explain their categories            | 5  |
|      | b. Explain K-means clustering algorithm   | 5  |
| Q.5  | a. What is template matching? Explain Bellman's optimality principle                | 5  |
|      | b. Explain with example Edit distance   | 5  |
| Q.6  | Explain the design with the block diagram following pattern recognition systems     | 10 |
|      | i. Finger print recognition system  |    |
|      | ii. Object recognition system   |    |

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