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B.E. (Computer Science & Engineering) Eighth Semester (C.B.S.)

# Elective - III : Pattern Recognition

P. Pages : 2 **NJR/KS/18/4748**

Time : Three Hours * 0 6 2 1 * Max. Marks : 80

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Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Diagrams and chemical equations should be given whenever necessary.
11. Illustrate your answers whenever necessary with the help of neat sketches.
12. Use of non programmable calculator is permitted.

**1.** a) Define pattern recognition. Also explain it's design principles. **7**

b) Explain various applications of pattern recognition with example. **6**

**OR**

**2.** a) Write a short note on. **6**
i) Supervised learning.
ii) Unsupervised learning.
iii) Reinforcement learning.

b) Explain the design cycle of pattern recognition with block diagram. **7**

**3.** a) What is conditional probability? Explain it's characteristics. **6**

b) Define random variables? Also explain the distribution function of a random variable. **7**

**OR**

**4.** a) Illustrate the concept of minimum risk estimators with example. **6**

b) Differentiate between probability distribution and probability density function with example. **7**

**5.** a) Write an explain Baye's decision theory with proper example. **9**

b) Define Minimum error rate classification and it's relation to Bayesion risk minimization. **5**

**OR**

**6.** a) Explain Leave-one-out technique with suitable example. **7**

b) What does a confusion matrix do? Explain in details with proper example. **7**

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|---|---|---|---|
| **7.** | a) | Explain hidden Markov model in detail. | **6** |
| | b) | How does Support Vector Machine (SVM) work explain in detail. | **7** |

**OR**

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|---|---|---|---|
| **8.** | a) | Write and explain about back propagation algorithm. | **7** |
| | b) | What is fuzzy classifier? Explain fuzzy rule based classifiers. | **6** |
| **9.** | a) | What is a Histogram? How is a real histogram mode? | **6** |
| | b) | Explain nearest neighbour algorithm with example. | **7** |

**OR**

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|---|---|---|---|
| **10.** | a) | Define parzen windows approach to estimate density also define its drawbacks. | **6** |
| | b) | Explain smooth Kernal function and its interpretation. | **7** |
| **11.** | a) | What is clustering? Explain types of clustering. | **7** |
| | b) | Write and explain k-means clustering algorithm with example. | **7** |

**OR**

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|---|---|---|---|
| **12.** | a) | Differentiate between hierarchical clustering and partitional clustering technique. | **7** |
| | b) | Explain any one hierarchical clustering algorithm basic steps with suitable example. | **7** |

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**Itâ€™s hard to beat a person who never gives up.**

**~ Babe Ruth**