B.E. (Computer Technology) Eighth Semester (C.B.S.)

Elective - III : Pattern Recognition

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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. Assume suitable data whenever necessary.
9. Use of non programmable calculator is permitted.

1. a) Explain the application of pattern recognition system. **6**

b) The values of features x for nine samples from class A are {1, 2, 3, 3, 4, 4, 6, 6, 8}. Nine samples from class B had x values of {4, 6, 7, 7, 8, 9, 9, 10, 12}. Make a histogram for each class & find a decision boundary that minimizes the misclassification. **7**

OR

2. a) Explain following terms with example. **6**
   i) Sample space   ii) Random variable
   iii) Probability   iv) Venn diagram

b) Classes A & B are not mutually exclusive. In a data set of 11 samples, 7 samples belonged to class A, 5 belonged to class B, 2 belonged to both, and 1 belong to neither. What is P (A/B) for this data ? **7**

3. Explain following normal density function with formulas of each. **13**
   i)   Multivariate Normal Density.   ii) Bivariate Normal Density.
   iii) Univariate Normal Density.   iv) Standard Normal Density.

OR

4. a) Explain the three methods of estimation of parameters from samples. **9**

b) Prove that E (ax+by) = a E (x) + b E (y). Assume that x & y are discrete random variables. **4**

5. a) Explain Kernel and Window Estimator in detail. **8**

b) Explain the K-nearest neighbor technique. **6**

OR

6. a) Explain minimum squared Error Discriminant function. **6**

b) Differentiate between parametric & non parametric decision technique. **4**

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	c)	Explain the Histogram technique for non parametric decision making.	**4**

7.	a)	What is locally linear Embedding ? Explain with the help of suitable example.	**7**
	b)	Explain principle component analysis.	**7**

<div align="center">OR</div>

8.	a)	Explain Fisher linear Discriminant in detail.	**7**
	b)	Explain component analysis and dimension reduction techniques.	**7**
9.	a)	Explain Independent component analysis.	**7**
	b)	Explain the singular value decomposition.	**6**

<div align="center">OR</div>

10.	a)	Explain Haar transform.	**6**
	b)	Explain Discrete Fourier transform.	**7**

11. Perform Partitional clustering using Forgy's algorithm on the data given below. **13**

	1	2	3	4	5
X	4	8	15	24	24
Y	4	4	8	4	12

<div align="center">OR</div>

12. Explain Hierarchical clustering in detail. **13**

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