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

Elective - III : Pattern Recognition

P. Pages : 2 **KNT/KW/16/7598**

Time : Three Hours * 0 2 9 9 * Max. Marks : 80

Note : 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 histogram. How it is helpful in statistical decision theory? **6**

B) Explain digital image with it various characteristics & terminologies. What type of analysis are performed on digital image? **7**

OR

2. A) Explain the following types of events with example. **6**
i) Mutually exclusive event.
ii) Independent event.
What is the value of P(A and B) for mutually exclusive event & independent event.

B) Explain conditional probability. **3**

C) An x-ray source events 10 photon per second on the average, with a Poisson distribution what is the probability that exactly 10 photons will be emitted in a given second? **4**

3. A) Explain the steps for calculation of moments of random variables. **6**

B) Find the expected value of **7**
i) uniform random variable.
ii) exponential random variable.

OR

4. A) Explain minimum Risk Estimators. **7**

B) Explain Maximum likelihood estimates in detail & with example. **6**

5. A) Explain the following with example. **6**
i) Euclidean Distance.
ii) City block distance.
iii) Maximum Distance.

B) Find the decision region for the following set of linear discriminant functions. **8**

$D_A = 1+x+y$
$D_B = 2-x-2y$
$D_C = -3-2x+4y$

OR

6. Explain adaptive decision boundary algorithm in detail. **14**

7. A) Explain component analysis and dimension reduction techniques. **7**

B) Explain principal component analysis. **7**

OR

8. A) Define fisher Linear discriminant. **7**

B) What is locally linear embedding? Explain with example. **7**

9. A) Explain in detail the Discrete Fourier transform. **7**

B) Explain the Hear transform. **6**

OR

10. A) Explain in detail the Karhunen - Loeve transform. **7**

B) Explain the singular value decomposition. **6**

11. Explain the following Hierarchical clustering algorithm. **13**

i) The single linkage algorithm.
ii) The complete Linkage algorithm.
iii) The average Linkage algorithm.

Perform hierarchical clustering using the complete linkage algorithm for following five samples having feature x & y.

	1	2	3	4	5
x	4	8	15	24	24
y	4	4	8	4	12

OR

12. A) Explain Forgy's algorithm. **6**

B) Explain k-means algorithm. **7**

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