

Reg.No.:



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 130005

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024

Seventh Semester

Computer Science and Technology

U19CTV31 – PATTERN RECOGNITION TECHNIQUES

(Regulation 2019)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Compare “Auto-correlation” and cross- correlation.	2	K1	CO1
2.	Define Bayes theorem.	2	K2	CO2
3.	What is Minimum-error-rate classification?	2	K1	CO1
4.	What is parametric estimation method?	2	K1	CO1
5.	Highlight the advantages of Gaussian Mixture Model (GMM).	2	K1	CO1
6.	Differentiate supervised learning and unsupervised learning.	2	K2	CO2
7.	Explain any one nonparametric method for density estimation.	2	K2	CO2
8.	Explain K- nearest neighbour method with a suitable example.	2	K3	CO3
9.	In which circumstances is pruning applied on Decision Tree.	2	K2	CO2
10.	Justify how segmentation is beneficial in Pattern Recognition.	2	K2	CO2

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Find the eigenvalues and corresponding eigenvectors for the matrix $A = \begin{bmatrix} 2 & 2 \\ 5 & -1 \end{bmatrix}$.	13	K3	CO3
	(OR)			
b)	Explain loss function. How can it be factored into Bayes Decision theory?	13	K2	CO4
12. a)	Explain “Maximum a Posteriori” estimation with respect to Bayes’ theorem. Also discuss the discriminate function.	13	K2	CO3
	(OR)			
b)	Enunciate on Maximum-likelihood estimation. Compare and contrast the various estimate technique.	13	K2	CO2
13. a)	Apply K-means clustering algorithm on given data for K=3. Use C1(2), C2(16), C3(38) as initial cluster centers. Data: 2, 4, 6, 3, 31, 12, 15, 16, 38, 35, 14, 21, 23, 25, 30.	13	K3	CO3
	(OR)			
b)	Elucidate on the various criterion functions used in clustering task with its advantages over other methods and limitation.	13	K2	CO2
14. a)	Explain the Parzen window method for density estimation and highlight the advantage over other methods.	13	K2	CO4
	(OR)			
b)	Explain the Fisher discriminant analysis. Specify the significance of it in Pattern Recognition.	13	K2	CO2
15. a)	Formulate SVM as an optimization problem. How support vector machines can be used for classification of data which are not linearly separable?	13	K2	CO4
	(OR)			
b)	With suitable example discuss Decision Tree learning based on the CART approach.	13	K2	CO2

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	What is the curse of dimensionality? Explain the principal component analysis for dimensionality reduction.	15	K2	CO4
	(OR)			
b)	Explain Hidden Markov model and its role in the classifier design.	15	K2	CO4