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CSE423

Enrol. No. ....

[ET]

**END SEMESTER EXAMINATION: DECEMBER, 2022**

**PATTERN RECOGNITION**

*Time : 3 Hrs.*

*Maximum Marks : 60*

*Note: - Attempt questions from all sections as directed.*

**SECTION – A**

**(24 Marks)**

*Attempt any four questions out of five.*

*Each question carries 06 marks.*

1. Explain machine learning with respect to designing a spam classifier by identifying the tasks (T), experience (E), and performance measure (P). Explain the association of machine learning with pattern recognition. (5 + 1)
2. Explain the semi-supervised learning in the pattern recognition task. In which phase of Pattern Recognition design we should use the semi-supervised approach. (4 + 2)
3. Compare Hard Clustering approach with different Soft Clustering approaches. Describe how Fuzzy clustering can be converted into hard clustering. (4 + 2)

P.T.O.

4. Using the KNN algorithm predict the class for the Test dataset, Let, Test Set: (13,7) and  $K=2$  and  $k=3$ , the training dataset is as follows-

X1	X2	Label
17	7	Yes
16	4	Yes
13	4	No
11	4	No

5. "Bayes decision classifier follows parametric approach" comment. Explain the Bayes decision classifier with an example.

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8. F

### SECTION - B

(20 Marks)

Attempt any two questions out of three.

Each question carries 10 marks.

6. Consider the following dataset and build the confusion matrix and calculate Precision, Recall and F-Score. Analyze the performance of the classifier with respect to Precision, Recall and F-Score.

ID	Employee	Annual rating	Actual	Predicted
1	no	fair	no	yes
2	no	excellent	yes	yes
3	no	fair	yes	yes
4	yes	excellent	no	no
5	yes	excellent	yes	yes
6	no	fair	no	no
7	no	excellent	yes	yes
8	yes	fair	no	no
9	no	excellent	no	yes

(7 + 3)

7. Illustrate the Backward search technique and Filter approach for feature selection in detail.
8. For the below dataset find out the final clusters using K-Means algorithm. Note:(i)  $K=2$ ;(ii) Use 'Euclidean distance'; Centroids are  $c_1=[11.0, 1.0]$  and  $c_2=[11.5, 2.0]$  respectively. After two iterations comment on the convergence of the algorithm.

X	Y
11.0	11.0
11.5	12.0
13.0	14.5
15.0	17.0
13.5	15.0
14.5	15.0
13.5	14.5

P.T.O.

**SECTION – C****(16 Marks)***(Compulsory)*

9. Describe different types of linkages present in agglomerative hierarchical clustering. Merge the clusters using the Basic agglomerative hierarchical clustering algorithm and construct the dendrogram. Use complete linkage.

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18	0			
6	14	0		
12	10	18	0	
22	20	4	8	0

(6 + 10)

(227)