



III Semester M.C.A. Examination, April/May 2022  
(CBCS – Y2K20)  
COMPUTER SCIENCE  
3MCAE1 : Machine Learning (Elective)

Time : 3 Hours

Max. Marks : 70

**Instructions :** Answer **any five** from Part – A.  
Answer **any four** from Part – B.

PART – A

Answer **any 5** questions. **Each** question carries **6** marks. (5×6=30)

1. Define the terms hypothesis space and version space. Illustrate with example.
2. What is Overfitting ? What are the measures to avoid it in Decision Trees ?
3. What is Clustering ? Differentiate between K-Means and Hierarchical Clustering.
4. Explain basic elements of Hidden Markov Model (HMM). List any two applications of HMM.
5. Explain FP growth algorithm with an example.
6. What is perceptron ? Explain working of a perceptron with a neat diagram.
7. State the mathematical formulation of SVM problem. Give an outline of method for solving the problem.
8. Explain the different operators in Genetic Algorithm.

PART – B

Answer **any 4** questions. **Each** question carries **10** marks. (4×10=40)

9. a) Differentiate between supervised and unsupervised learning with suitable examples. 5  
b) Explain Find-S algorithm and state its disadvantages. 5
10. a) Explain any two types of activation function. 4



b) Suppose 10000 patients get tested for flu; Out of them 9000 are actually healthy and 1000 are actually sick. For the sick people, a test was positive for 620 and negative for 380. For healthy people, same test was positive for 180 and negative for 8820. Construct a Confusion matrix for data and compute sensitivity and specificity for the data.

6

11. a) Identify only the first splitting attribute for decision Tree by using ID3 algorithm with following data set :

6

Major	Experience	Tie	Hired ?
CS	Programming	Pretty	No
CS	Programming	Pretty	No
CS	Management	Pretty	Yes
CS	Management	Ugly	Yes
Business	Programming	Pretty	Yes
Business	Programming	Ugly	Yes
Business	Management	Pretty	No
Business	Management	Pretty	No

b) What are the steps involved in expectation Maximization Algorithm ?

4

12. a) What is Bayes optimal classifier ?

4

b) With a suitable example, explain Naive Bayes algorithm.

6

13. a) What is Market basket analysis ? How Apriori algorithm works ?

5

b) Using K-means clustering, cluster the following data into two groups.

Assume cluster centres are  $m_1 = 2$  and  $m_2 = 4$ . The distance function used is Euclidean distance. {2, 4, 10, 12, 3, 20, 30, 11, 25}.

5

14. a) Explain the need of mutation in Genetic algorithm.

5

b) Explain the parameters used to analyse Genetic algorithm.

5