Printed page: 02 Subject Code:ACSBS0513

Roll No: | | | | | | | | | | 1 | 3 |

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute)

Affiliated to Dr. A.P. J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow

Course : B.Tech **Branch : CSBS**

Semester: V **Sessional Examination: Second**

Subject Name: Machine Learning **Year- (2022 - 2023)**

Time: 1.15 Hours **Max. Marks:30**

General Instructions:

- *This Question paper consists of 02.pages &05.questions. It comprises three Sections -A, B, &C. You are expected to answer them as directed.*
- *Section A –Q.No- 1 is of one 1 mark each & Q. No- 2 carries 2 mark each.*
- *Section B- Q. No- 3 carries 5 marks each.*
- *Section C - Q.No-4 & 5 carries 6 marks each. Attempt any one part a or b*

SECTION – A [08Marks]

1. All questions are compulsory- (4×1=4)

a. Which of following provide task of dividing data points into number of groups (1) CO3
a.Supervised Learning
b.Clustering
c.Reinforcement learning
d.Classification

b. Point out the correct statement. (1) CO3
a The choice of an appropriate metric will influence the shape of the clusters
b Hierarchical clustering is also called HCA
c In general, the merges and splits are determined in a greedy manner
d All of the mentioned

c. Which is used to learn a linear classifier to classify a non-linear dataset (1) CO2
a.Class variable
b.Dependent feature
c.Kernel trick

d.None

d. Spam classification and Weather forecasting is an example of (1) CO4
a.Random forest
b.Discriminative classification
c.Naive Bayes
d.None of the above

2. All questions are compulsory- (2×2=4)

a. What do you understand by Hierarchical Clustering. (2) CO3

b. Describe the term Probabilistic learning model . (2) CO4

SECTION – B [10Marks]

3. Answer any two of the following- (2×5=10)

a. Discuss the concept of SVM model and its hyperplane. What affects the decision boundary in SVM (5) CO2

b. Describe the KNN algorithm in detail (5) CO2

c. Calculate the probability of "Fire" when "Smoke" is given with data as: (5) CO4
P(Fire)=0.3 , P(Smoke|Fire)=0.5 , P(Smoke)=0.7, find P(Fire|Smoke)?

SECTION – C [12Marks]

4 Answer any one of the following- (1×6=6)

a. Describe the Bayes optimal classifier. Given a hypothesis space with 4 hypothesis. Determine if patient is diagnosed as Covid Positive or Covid Negative using Bayes Optimal Classifier. (6) CO3

$P(h_i\|T)$	P(Covid Positive$\|h_i$)	P(Covid Negative$\|h_i$)
0.3	0	1
0.1	1	0
0.2	1	0
0.1	1	0

b. Explain the following terms: Marginal probability, Joint Probability , Navie Bayes Classifier (6) CO4

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5. **Answer any <u>one</u> of the following-** **(1×6=6)**

a. Using K-means algorithm Cluster the following eight points (with (x, y) representing locations) into three clusters:k=3 upto 2 iterations. **(6) CO3**

A1(2, 10), A2(2, 5), A3(8, 4), A4(5, 8), A5(7, 5), A6(6, 4), A7(1, 2), A8(4, 9)

Initial cluster centers are: A1(2, 10), A4(5, 8) and A7(1, 2)

b. Describe the concept of clustering. explain various types of clustering in ML **(6) CO3**