Printed Page:- 04 Subject Code:- AMICSML0701

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech. (Integrated)

SEM: VII - THEORY EXAMINATION (2024 - 2025)

Subject: Machine Learning

Time: 3 Hours Max. Marks: 100

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A 20

1. Attempt all parts:-

1-a. Which of the following clustering approaches calls for merging? (CO1, K1) 1

(a) Partitional

(b) Hierarchical

(c) Naive Bayes

(d) None of the mentioned

1-b. Which of the following results from hierarchical clustering in the end? (CO1, K1) 1

(a) final estimate of cluster centroids

(b) tree showing how close things are to each other

(c) assignment of each point to clusters

(d) all of the mentioned

1-c. Computers(ANN) work _____. (CO1, K2) 1

(a) asynchronously

(b) Synchronously

(c) Dimensions

(d) Simultaneously

1-d. Which of the following is not Biological Neurons?(CO1, K2) 1

(a) Axions

(b) Dendrites

(c) Synapse

(d) Weights

1-e. Movie Recommendation systems are an example of: (CO3, K1) 1

1. Classification
2. Clustering
3. Reinforcement Learning
4. Regression

(a) 2 Only
(b) 1 and 2
(c) 2 and 3
(d) None of the mentioned

1-f. Which of the following clustering requires merging approach?(CO3, K1) 1

(a) Partitional
(b) Hierarchical
(c) Naive Bayes
(d) None of the mentioned

1-g. The target attributes indicates the value of?(CO4, K1) 1

(a) Leaf Node
(b) Decision Node
(c) Path
(d) Arc/Edge

1-h. Which of the following is true about weight of XGB leaf node. (CO4, K1) 1

(a) "leaf weight" can be said as the model's predicted output associated with each leaf (exit) node
(b) leaf weight" can be said as the actual associated with each leaf (exit) node
(c) A or B depend on the situation
(d) None of these

1-i. A model of language consists of the categories which does not include?(CO5, K1) 1

(a) Language units
(b) Role structure of units
(c) System constraints
(d) Structural units

1-j. Thompson sampling is a- (CO5, K1) 1

(a) Probabilistic algorithm
(b) Based on Bayes inference rule
(c) Reinforcement learning algorithm
(d) All of the above

2. Attempt all parts:-

2.a. Define underfitting and overfitting in machine learning. (CO1, K1) 2

2.b.	List the key steps involved in the Apriori algorithm. (CO2, K2)	2
2.c.	Describe clustering and its significance in unsupervised learning. (CO3, K2)	2
2.d.	State two differences between Bagging and Boosting techniques. (CO4, K2)	2
2.e.	Mention any two applications of reinforcement learning. (CO5, K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Compare and contrast underfitting and overfitting. (CO1, K4)	6
3-b.	Describe the Find-S algorithm with an example. (CO1, K2)	6
3-c.	Describe the Decision Tree algorithms with example (CO2, K2)	6
3-d.	Explain logistic regression and its applications. (CO2, K2)	6
3.e.	Explain the steps involved in the K-Means clustering algorithm. (CO3, K2)	6
3.f.	Demonstrate the Naive Bayes Classifier with a suitable example. (CO4, K3)	6
3.g.	Illustrate the application of reinforcement learning in smart cities. (CO5, K3)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Elaborate on the issues in machine learning and the difference between Data Science and Machine Learning. (CO1, K4)	10
4-b.	Describe the Candidate Elimination Algorithm with an example and explain the concept of version space. (CO1, K2)	10

5. Answer any one of the following:-

5-a.	Explain multiple linear regression and its assumptions. Compare it with polynomial regression. (CO2, K4)	10
5-b.	Explain Neural Networks, focusing on perceptrons and multilayer perceptrons. Provide an example. (CO2, K3)	10

6. Answer any one of the following:-

6-a.	Discuss in detail hierarchical clustering techniques (AGNES and DIANA). Provide examples. (CO3, K3)	10
6-b.	Describe Expectation Maximization and its role in unsupervised learning with Gaussian Mixture Models. (CO3, K4)	10

7. Answer any one of the following:-

7-a.	Discuss the Bayes Optimal Classifier and Bayesian Belief Networks with suitable examples. (CO4, K3)	10
7-b.	Explain the working of Boosting techniques such as C5.0 Boosting, XGBoost, and their benefits. (CO4, K3)	10

8. Answer any one of the following:-

8-a.	Describe the Q-Learning Algorithm. Discuss its importance and illustrate it with an example. (CO5, K3)	10
8-b.	Write a detailed case study on the application of reinforcement learning in health	10

care or e-commerce. (CO5, K5)