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Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: V - 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. Application of machine learning methods to a large database is called? (CO1, K1) 1

(a) Big data computing

(b) Internet of Things

(c) Data mining

(d) Artificial Intelligence

1-b. Learning algorithm for "facial identities for facial expressions" is known as (CO1, K1) 1

(a) Prediction

(b) Recognition Patterns

(c) Recognizing anomilies

(d) Generating patterns

1-c. _____neural network was the first and simplest type of artificial neural network devised. (CO2, K1) 1

(a) feedbackward neural network

(b) Feed neutral Neural network

(c) feedforward neural network

(d) None of these

1-d. The Euclidean distance between two set of numerical attributes is called ? (CO2, K1) 1

(a) Closeness
(b) Validation Data
(c) Error Rate
(d) None of these

1-e. Among the following, which one is dimensionality reduction technique. (CO3, K1) 1

(a) Performance
(b) Entropy
(c) Stochastics
(d) PCA

1-f. The minimum time complexity for training an SVM is O(n2). According to this fact, what sizes of datasets are not best suited for SVM'? (CO3, K1) 1

(a) Large datasets
(b) Small datasets
(c) Medium sized datasets
(d) Size does not matter

1-g. Which of the following are the two key characteristics of the Genetic Algorithm? (CO4, K1) 1

(a) Crossover techniques and Fitness function
(b) Random mutation and Crossover techniques
(c) Random mutation and Individuals among the population
(d) Random mutation and Fitness function

1-h. A loop that constantly moves in the direction of growing value that is uphill, ……. is an algorithm. (CO4, K1) 1

(a) Up-Hill Search
(b) Hill-Climbing
(c) Hill algorithm
(d) Reverse-Down-Hill search

1-i. Choose from the following that are Decision Tree nodes? (CO5, K1) 1

(a) Decision Nodes
(b) Leaf nodes
(c) Root nodes
(d) All of the mentioned

1-j. Which of the following are the advantages of Decision Trees? (CO5, K1) 1

(a) Possible Scenarios can be added
(b) Use a white box model, If given result is provided by a model
(c) Worst, best and expected values can be determined for different scenarios
(d) All of the mentioned

2. Attempt all parts:-

2.a.	Draw the Van diagram of relationship among key technologies (AI, ML, Deep Learning, Data science). (CO1, K2)	2
2.b.	Explain Attribute Selection Measure (ASM)? (CO2, K2)	2
2.c.	Discuss the reason behind dropping the unimportant features? (CO3, K2)	2
2.d.	Discuss the examples of optimization? (CO4, K2)	2
2.e.	Describe some real life examples of dynamics in Reiforcement Learning? (CO5, K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Differentiate between inductive learning and deductive learning? (CO1, K4)	6
3-b.	Explain regression and classification based on decision theory.(CO1, K21)	6
3-c.	Explain Gradient and Gradient Descent? Explain. (CO2, K2)	6
3-d.	Explain how does the learning rate affect the training of the Neural Network? (CO2, K2)	6
3.e.	Discuss in detail about working of KNN classifier algorithm with suitable example. (CO3, K2)	6
3.f.	Define punctuated equilibrium. Explain its evolution with major evidences. (CO4, K2)	6
3.g.	Describe ID3 algorithm. (CO5, K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Illustrate the univariate normal distribution model through the suitable example. (CO1, K2)	10
4-b.	Explain the three stages to build the hypotheses or model in machine learning? (CO1, K2)	10

5. Answer any one of the following:-

5-a.	Explain Representational Power of Perceptron. (CO2, K2)	10
5-b.	Differentiate between Gradient Descent and Stochastic Gradient Descent. (CO2, K4)	10

6. Answer any one of the following:-

6-a.	Can LDA be used as a multi-class classifier? If so how would it work? (CO3, K2)	10
6-b.	Explain Principal Component Analysis and derive the appropriate equations.(CO3, K2)	10

7. Answer any one of the following:-

7-a.	Explain the operation of Hill climbing algorithm with suitable graph. State its advantages and limitations. (CO4, K2)	10
7-b.	Describe the following: (i) Population, (ii) Chromosomes, (iii) Mutation &	10

Crossover. (CO4, K2)

8. Answer any <u>one</u> of the following:-

8-a.	Differentiate between a Reward and a Value for a given State? Illustrate with appropriate example. (CO5, K4)	10
8-b.	Differentiate between CART algorithm and simple ID3 algorithm. (CO5, K4)	10