Printed Page:- **Subject Code**:- **ABT0614**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - THEORY EXAMINATION (20 ..... - 20.....)

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. Among the following identify the one in which dimensionality reduction reduces. CO1, K2 1

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

1-b. Which of the following is not a machine learning algorithm? CO1, K2 1

(a) SVM
(b) SVG
(c) Random Forest
(d) None of the above

1-c. What is the L2 norm also known as? CO2, K2 1

(a) Manhattan norm
(b) Chebyshev norm
(c) Euclidean norm
(d) None of the above

1-d. Which of the following operations is not allowed between matrices? CO2, K2 1

(a) Matrix addition
(b) Matrix subtraction

(c) Matrix multiplication

(d) Matrix division

1-e. What is the purpose of the discount factor in reinforcement learning? CO3, K2 1

(a) To determine the balance between exploration and exploitation

(b) To adjust the weights during training

(c) To reduce the impact of future rewards on the current state

(d) To increase the impact of future rewards on the current state

1-f. Which of the following is a common technique used in RNNs for natural language processing, where the input sequence is mapped to a fixed-length vector representation? CO3, K2 1

(a) One-hot encoding

(b) Embedding

(c) Dropout

(d) Batch normalization

1-g. What are independent variables? CO4, K2 1

(a) The values that interfere in the value we want to predict

(b) The features of our dataset

(c) The value we want to predict

(d) The parameters of the regression algorithm

1-h. In linear regression RMSE stands for…… CO4, K2 1

(a) Root Mean Squared Error

(b) Read Mean Squared Error

(c) Root Mode Squared Error

(d) none of these

1-i. What is the primary goal of using machine learning in drug discovery? CO5, K2 1

(a) To identify molecules that bind to specific targets and have therapeutic potential

(b) To optimize the properties of known drugs

(c) To predict the toxicity of potential drugs

(d) To identify the best drug delivery mechanisms

1-j. What is the primary goal of using machine learning in clinical decision support systems (CDSSs)? CO5, K2 1

(a) To improve the quality and safety of patient care

(b) To reduce healthcare costs

(c) To improve patient satisfaction

(d) To increase the efficiency of healthcare delivery

2. Attempt all parts:-

2.a. How Do You Handle Missing or Corrupted Data in a Dataset? CO1, K2 2

2.b. *Find* - B 2

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Let $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}, C = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$ CO2, K2

2.c. What are the benefits of using bootstrapping in reinforcement learning? CO3, K2 2

2.d. What is the exploration-exploitation tradeoff in reinforcement learning? CO4, K2 2

2.e. What are some applications of machine learning in financial forecasting and risk management? CO5, K2 2

SECTION-B 30

3. Answer any five of the following:-

3-a. What are the issues in Machine Learning. CO1, K2 6

3-b. Explain Machine Learning Approaches. CO1, K2 6

3-c. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 7 \end{bmatrix}$ find $f(A)$ where $f(x) = x^2 - 5x - 2$. CO2, K2 6

3-d. Use matrix method to solve the following system of equations : 5x – 7y = 2, 7x – 5y = 3. CO2, K2 6

3.e. How are CNNs trained, and what types of data are they typically used with? CO3, K2 6

3.f. What do you mean by Cluster Analysis? CO4, K2 6

3.g. How is machine learning being utilised in business to stop and detect fraud? CO5, K2 6

SECTION-C 50

4. Answer any one of the following:-

4-a. What is linear regression, and how does it differ from other types of regression in machine learning? How is it used to model the relationship between a dependent variable and one or more independent variables? CO1, K2 10

4-b. What is ridge regression, and how does it differ from other types of regression in machine learning? How is it used to overcome the problem of overfitting in linear regression models, and what are some examples of use cases for ridge regression? CO1, K3 10

5. Answer any one of the following:-

5-a. Find the eigen values and associated eigenvectors of the matrix CO2, K2 10

$$\mathbf{A} = \begin{bmatrix} 2 & -1 \\ 1 & 2 \end{bmatrix}.$$

5-b. Find the eigen values and associated eigenvectors of the matrix CO2, K2 10

$$\mathbf{A} = \begin{bmatrix} -1 & 2 \\ 0 & -1 \end{bmatrix}.$$

6. Answer any one of the following:-

6-a.	How does a support vector machine function? What is it? CO3, K2	10
6-b.	How does an Artificial Neural Network function? CO3, K2	10

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

7-a.	A medical test is 95% accurate in detecting a rare disease. If 1% of the population has the disease, what is the probability that a person who tests positive actually has the disease? CO4, K3	10
7-b.	How can you use cross-validation to select the optimal hyperparameters for a perceptron model? CO4, K3	10

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

8-a.	What role does machine learning play in cyber security? CO5, K2	10
8-b.	How are supply chain management and logistics optimization using machine learning? CO5, K3	10

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