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**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA****(An Autonomous Institute Affiliated to AKTU, Lucknow)****B.Tech****SEM: IV - THEORY EXAMINATION (2022-2023 )****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. What is the application of machine learning methods to a large database called? (CO1) 1
- (a) Big data computing  
(b) Internet of Things  
(c) Data mining  
(d) Artificial Intelligence
- 1-b. The father of machine learning is \_\_\_\_\_ (CO1) 1
- (a) Geoffrey Everest Hinton  
(b) Geoffrey Hill  
(c) Geoffrey Chaucer  
(d) None of the above
- 1-c. Decision Tree is the most powerful for..... (CO2) 1
- (a) Classification  
(b) Prediction

- (c) Both of the above
- (d) None of the above
- 1-d. Which of the following statement is true about outliers in Linear regression? (CO2) 1
- (a) Linear regression is sensitive to outliers
- (b) Linear regression is not sensitive to outliers
- (c) Can't say
- (d) None of these
- 1-e. Which of the following is required by K-means clustering? (CO3) 1
- (a) Defined distance metric
- (b) Number of clusters
- (c) Both of the above
- (d) None of these
- 1-f. Which of the following clustering requires merging approach? (CO3) 1
- (a) Partitional
- (b) DBSCAN
- (c) Naive Bayes
- (d) Hierarchical
- 1-g. Naive Bayes requires? (CO4) 1
- (a) Numerical Values
- (b) Nominal Values
- (c) Categorical values
- (d) None of the above
- 1-h. Given a list of symptoms, predict whether a patient has disease X or not is an example of (CO4) 1
- (a) Weather Diagnosis
- (b) Medical Diagnosis
- (c) Spam Diagnosis
- (d) All of the above
- 1-i. There are \_\_\_\_\_ types of reinforcement. (CO5) 1
- (a) 3
- (b) 2
- (c) 4

(d) None of these

- 1-j. \_\_\_\_\_ is a type of Machine Learning paradigms in which a learning algorithm is trained not on preset data but rather based on a feedback system. (CO5) 1
- (a) Supervised learning
- (b) Unsupervised learning
- (c) Reinforcement Learning
- (d) None of the above

**2. Attempt all parts:-**

- 2.a. Define the role of Machine Learning in our daily life. (CO1) 2
- 2.b. Explain Underfitting. (CO2) 2
- 2.c. Explain single linkage. (CO3) 2
- 2.d. Explain Bayesian Learning. (CO4) 2
- 2.e. What is Q-Learning? (CO5) 2

**SECTION B**

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**3. Answer any five of the following:-**

- 3-a. Explain well posed learning system with example. (CO1) 6
- 3-b. Differentiate between Training data and Testing Data. (CO1) 6
- 3-c. Differentiate between ID3 and C4.5 algorithm with suitable example. (CO2) 6
- 3-d. What do you mean by Regression? Explain types of regression algorithms. (CO2) 6
- 3.e. Explain Market Basket Analysis in detail (CO3) 6
- 3.f. Distinguish between Bagging and Boosting. (CO4) 6
- 3.g. What is deep learning? Discuss the importance of Deep Learning. (CO5) 6

**SECTION C**

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**4. Answer any one of the following:-**

- 4-a. What are the basic design issues and approaches to machine learning? (CO1) 10
- 4-b. How is Candidate Elimination algorithm different from Find-S Algorithm. Explain in detail. (CO1) 10

**5. Answer any one of the following:-**

- 5-a. Build decision tree using any algorithm for following dataset (CO2) 10

| Day No. | Outlook  | Temp | Humidity | Wind   | Play Tennis |
|---------|----------|------|----------|--------|-------------|
| D1      | Sunny    | Hot  | High     | Weak   | No          |
| D2      | Sunny    | Hot  | High     | Strong | No          |
| D3      | Overcast | Hot  | High     | Weak   | Yes         |
| D4      | Rain     | Mild | High     | Weak   | Yes         |
| D5      | Rain     | Cool | Normal   | Weak   | Yes         |
| D6      | Rain     | Cool | Normal   | Strong | No          |
| D7      | Overcast | Cool | Normal   | Strong | Yes         |
| D8      | Sunny    | Mild | High     | Weak   | No          |
| D9      | Sunny    | Cool | Normal   | Weak   | Yes         |
| D10     | Rain     | Mild | Normal   | Weak   | Yes         |
| D11     | Sunny    | Mild | Normal   | Strong | Yes         |
| D12     | Overcast | Mild | High     | Strong | Yes         |
| D13     | Overcast | Hot  | Normal   | Weak   | Yes         |
| D14     | Rain     | Mild | High     | Strong | No          |

Predict class label for:

| S. No. | Outlook | Temp | Humidity | Wind | Play Tennis |
|--------|---------|------|----------|------|-------------|
| D15    | Sunny   | Hot  | Normal   | Weak |             |

- 5-b. Compare regression, classification and clustering in machine learning along with suitable real life examples. (CO2) 10

**6. Answer any one of the following:-**

- 6-a. Explain AGNES Clustering. Consider the given dataset and explain how clustering can be done for the same .(CO3) 10

| Observations | P1 | P2 | P3 | P4 | P5 |
|--------------|----|----|----|----|----|
| P1           | 0  |    |    |    |    |
| P2           | 9  | 0  |    |    |    |
| P3           | 3  | 7  | 0  |    |    |
| P4           | 6  | 5  | 9  | 0  |    |
| P5           | 11 | 10 | 2  | 8  | 0  |

- 6-b. Differentiate between K Means and K mode clustering. (CO3) 10

**7. Answer any one of the following:-**

- 7-a. Explain KNN algorithm with an example. (CO4) 10
- 7-b. Differentiate between Random Forest and C4.5 (CO4) 10

**8. Answer any one of the following:-**

- 8-a. What is Reinforcement Learning? Explain Markov Decision Process in detail. (CO5) 10
- 8-b. How Reinforcement Learning is different from Supervised and Unsupervised Learning (CO5) 10