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**B. Tech.**  
**(SEM V) THEORY EXAMINATION 2022-23**  
**MACHINE LEARNING TECHNIQUES**

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If you require any missing data, then choose suitably.

## SECTION A

1. Attempt all questions in brief. 2\*10 = 20
- Discuss model representation of artificial neuron.
  - Explain general to specific ordering hypothesis in concept learning.
  - Discuss support vectors in SVM.
  - Compare Artificial Intelligence and Machine Learning.
  - Discuss reinforcement learning.
  - Illustrate the advantages of instance-based learning techniques over other machine learning techniques.
  - Differentiate between Gradient Descent and Stochastic Gradient Descent.
  - Compare ANN and Bayesian network.
  - Illustrate Markov decision model.
  - Differentiate between Q learning and Deep Learning.

## SECTION B

2. Attempt any three of the following: 10\*3 = 30
- Explain supervised and unsupervised learning techniques.
  - Discuss linear regression and logistic regression in detail.
  - Describe the following concepts in decision tree in detail:
    - Avoiding overfitting in decision tree.
    - Incorporating continuous valued attributes.
  - Explain various types of activation functions with examples.
  - Illustrate the process of Q-learning and discuss the following terms:
    - Q-values or action value
    - Rewards and Episode
    - Temporal difference or TD update.

## SECTION C

3. Attempt any one part of the following: 10\*1 = 10
- Illustrate the various areas in which you can apply machine learning.
  - Compare regression, classification and clustering in machine learning along with suitable real-life applications.
4. Attempt any one part of the following: 10 \*1 = 10
- Discuss the role of Bayes theorem in machine learning. How naive Bayes algorithm is different from Bayes theorem?
  - Explain hyperplane (decision boundary) in SVM. Categorize various popular kernels associated with SVM.
5. Attempt any one part of the following: 10\*1 = 10
- Demonstrate K-Nearest Neighbors algorithm for classification with the help of an example.
  - Explain Instance based learning. Compare locally weighted regression and radial basis function networks.
6. Attempt any one part of the following: 10\*1 = 10
- Explain the different layers used in convolutional neural network with suitable examples.
  - Illustrate backpropagation algorithm by assuming the training rules for output unit weights and Hidden Unit weights.
7. Attempt any one part of the following: 10\*1 = 10
- Explain various types of reinforcement learning techniques with suitable examples.
  - How to Identify the reproduction cycle of genetic algorithm? Explain with suitable example.