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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.