B.TECH.
(SEM VI) THEORY EXAMINATION 2022-23
MACHINE LEARNING TECHNIQUES

Time: 3 Hours   *Total Marks: 100*

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

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 10 = 20**

   (a)   Define classification tree and regression tree.
   (b)   Discuss reason of opting unsupervised learning over supervised learning.
   (c)   Discuss the features of learning problems.
   (d)   Discuss the issues in machine learning.
   (e)   List the issues in Decision tree learning.
   (f)   Discuss the characteristics of the problems suited for decision tree learning.
   (g)   Write different applications of neural networks (NN).
   (h)   Define Delta Rule.
   (i)   What are the types of neuron connection?
   (j)   Discuss the perspective and issues in machine learning.

SECTION B

2.   **Attempt any *three* of the following:**   **10x3=30**

   (a)   Discuss Inductive Bias in Decision Tree Learning. Differentiate between two types of biases. Discuss the reason to prefer short hypotheses?
   (b)   Write the algorithm for back propagation.
   (c)   Write a detail note on naive bayes linear models.
   (d)   Discuss the types of problems in which Artificial Neural Network can be applied.
   (e)   Explain in detail the concept of evaluating hypotheses.

SECTION C

3.   **Attempt any *one* part of the following:**   **10x1=10**

   (a)   Describe the reinforcement learning in detail with suitable examples.
   (b)   Discuss the learning. Write any four learning techniques and in each case give the expression for weight- updating.

4.   **Attempt any *one* part of the following:**   **10x1=10**

   (a)   Explain the process to find complexity for finite hypothesis spaces and Complexity for infinite hypothesis spaces.
   (b)   Discuss the neighbors? Also discuss the reason of necessary use of nearest neighbor while classifying justify the answer with suitable example.

5.   **Attempt any *one* part of the following:**   **10x1=10**

   (a)   Discuss Bayesian learning and its impacts in machine learning?
   (b)   Write a short note on following:
       i.   Hypothesis space search
       ii.   General-to-specific ordering of hypotheses

6.   **Attempt any *one* part of the following:**   **10x1=10**

(a) Explain that genetic algorithms are influenced by knowledge based techniques. Also discuss the how genetic algorithm is different from traditional algorithms.

(b) Write a short note on the following:
    i.   EM algorithm
    ii.   Generalization

7.   **Attempt any *one* part of the following:**   **10x1=10**

(a) Explain Find -S Algorithm in detail. Also discuss the properties and complaints of Find S.

(b) Explain the inductive biased hypothesis space, unbiased learner and the futility of bias free learning. Describe the three types of learner.