

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

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) What is the role of Inductive Bias in ANN?
- (b) How do you choose the number of hidden layers and nodes in a multi-layer perceptron?
- (c) What is Bayesian learning?
- (d) How can prior knowledge be incorporated into a Bayesian learning model?
- (e) Explain the concept of pruning in decision tree models.
- (f) Discuss overfitting and underfitting situation in decision tree learning.
- (g) How Reinforcement Learning different from other types of machine learning?
- (h) Explain the concept of a feedback network in reinforcement learning.
- (i) What is a random forest?
- (j) How does a random forest differ from a decision tree model?

SECTION B

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

- (a) Explain the concept of backpropagation and how it is used to train a neural network?
- (b) Explain the concept of Markov Chain Monte Carlo (MCMC) methods in Bayesian learning, and how they are used for parameter estimation and model selection?
- (c) How do decision trees compare to other machine learning algorithms, such as neural networks or support vector machines?
- (d) Explain the various learning models for reinforcement learning.
- (e) What is an ensemble in machine learning and how is it used to improve model performance?

SECTION C

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

- (a) Explain the concept of gradient descent and how it is used in backpropagation?
- (b) What are some real-world applications of multi-layer perceptron's and neural networks?

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

- (a) How is Bayes theorem used in machine learning? How naive Bayes algorithm is different from Bayes theorem.
- (b) What are some common challenges and limitations of Bayesian networks, and how can these be addressed?

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

- (a) How can decision trees be used for both classification and regression problems?
- (b) List down the attribute selection measures used by the ID3 algorithm to construct a Decision Tree.

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

- (a) Explain the role of Central Limit Theorem Approach for deriving Confidence Interval
- (b) Describe Markov Decision Process in reinforcement learning.

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

- (a) How do ensemble techniques compare to other machine learning algorithms, such as neural networks or support vector machines?
- (b) What are some advantages and disadvantages of using ensemble techniques in machine learning?

QP23EP1_290
| 21-06-2023 09:08:48 | 125.20.113.226