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BMS College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

JAN / FEB – 2021 Grade Improvement Examinations of Even Semester

Programme: B.E.

Semester : VI

Branch : INFORMATION SCIENCE AND ENGINEERING

Duration: 3 hrs.

Course Code: 16IS6DEMLG

Max Marks: 100

Course: Machine Learning

Date: 15.02.2021

Instruction: Answer FIVE full questions, choosing one from each unit.

UNIT 1

1. a) Define machine learning. Explain different applications of machine learning. **06**
- b) Illustrate the use of candidate elimination algorithm with an example. Give its limitations. **10**
- c) Justify the need of inductive Bias in well posed learning problems. **04**

UNIT 2

2. a) Give decision trees to represent the following Boolean functions: **10**
 - i. $A \wedge \sim B$
 - ii. $A \vee [B \wedge C]$
 - iii. $A \text{ XOR } B$
 - iv. $[A \wedge B] \vee [C \wedge D]$
- b) Write and illustrate ID3 decision tree learning algorithm with an example. **10**

UNIT 3

3. a) Design and discuss appropriate problems for Neural Network Learning with its characteristics. **10**
- b) Write and illustrate the working of backpropagation algorithm with an example feed forward neural network. **10**

OR

4. a) Design a perceptron model with its learning algorithm that makes decisions by weighing up evidences. **10**

- b) Build an artificial neural network learning system for Alvin to steer an autonomous vehicle driving at normal speeds on public highways. **10**

UNIT 4

5. a) Illustrate the working of a Naïve Bayes algorithm for learning and classifying text. **10**
b) Discuss the maximum likelihood and least squared error hypothesis for evaluating hypothesis. **10**

OR

6. a) Discuss the relationship between Bayes Theorem and the problem of concept learning. **05**
b) Explain the maximum likelihood hypothesis for predicting probabilities **10**
c) Justify the importance of sampling theory in evaluating hypothesis. **05**

UNIT 5

7. a) Depict K-nearest neighbor learning algorithm for discrete valued target functions. **10**
Discuss one major drawback of this algorithm and how it can be corrected?
b) Define reinforcement learning. Explain how reinforcement learning problem differs from other function approximation tasks. Also elaborate on the problem of learning a control policy to maximize cumulative reward in a mobile robot. **10**
