CE1.2-R4: MACHINE LEARNING

NOTE :

1.	**Answer question 1 and any FOUR from questions 2 to 7.**
2.	**Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1. (a) What is Machine learning? Mention at least 3 real life applications of machine learning.
   (b) What is 'Overfitting' in Machine learning? Explain with example.
   (c) How will you differentiate a machine learning algorithm from other algorithms?
   (d) Discuss the importance of Inductive biasing.
   (e) Explain what is the function of Unsupervised Learning?
   (f) What is ensemble learning? Explain with example.
   (g) What is the difference between heuristic for rule learning and heuristics for decision trees?

(7x4)

2. (a) Why ensemble learning is used? Justify your answer by taking an example.
   (b) When to use ensemble learning?
   (c) What are the two paradigms of ensemble methods?
   (d) What is the general principle of an ensemble method and what is bagging and boosting in ensemble method?

(4+4+4+6)

3. (a) What are the advantages of Naive Bayes?
   (b) What do you understand by the term Normal Distribution?
   (c) How can Naive Bayes classifiers be used for categorical features? What if some features are numerical?
   (d) What are support vector machines? What is the maximal margin classifier? How this margin canbe achieved and why is it beneficial?

(4+4+4+6)

4. (a) What is an Artificial Neural Network (ANN)?

   (b) What is Perceptron in Artificial Neural Network (ANN)? Describe the various activation functions that are employed and compare their merits and demerits.

   (c) How to train an ANN? What is back propagation algorithm?

   (d) How does a neural network with three layers (one input layer, one inner layer and one output layer) can be compared to a logistic regression? Justify your answer.

(4+6+4+4)

5. (a) Explain the steps to translate decision trees into rules.

   (b) How can the learning algorithm by statistical hypothesis testing be evaluated?

   (c) How to measure the accuracy of learned hypothesis?

   (d) Why regression is required in Classification Techniques?

(6+4+4+4)

6. (a) How does Markov net used to represent dependencies? Explain with example.

   (b) What is the importance of using parameter smoothing in Bayesian Learning?

   (c) What is 'Training set' and 'Test set'? Explain with example.

   (d) What is the requirement of cross validation in Learning? How does it improve the training?

(6+4+4+4)

7. (a) What is Inductive Logic Programming in Machine Learning? Explain with example.

   (b) Explain how statistical hypothesis testing is done giving an example.

   (c) What is the importance of inductive bias in machine learning? Explain with example.

   (d) What is the difference between Artificial Intelligence and Machine Learning?

(6+4+4+4)
