B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E.　　　　　　　　　　　　　　　　　Semester: VII
Branch: Aerospace Engineering　　　　　　　　　　Duration: 3 hrs.
Course Code: 21AE7DEMLA　　　　　　　　　　　　Max Marks: 100
Course: Machine Learning in Aerospace Engineering　　Date: 05.03.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
　　　　　　　2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Define Machine Learning. Explain with examples why machine learning is important with its applications. **8**

b) Give examples of supervised, unsupervised and reinforcement learning. **6**

c) What is AI and why do we need it? List the applications of AI. **6**

UNIT - II

2 a) Define linear regression and explain how linear regression is advantageous over non-linear? **5**

b) What are Soft margins in support vector Machines and how do we represent mathematically? Explain with an example. **10**

c) Describe the types of Kernels. **5**

OR

3 a) How SVM kernel is advantageous in non-linear SVM and explain with an example. **10**

b) What are hard margins in support vector machines and how do we represent mathematically? Explain with an example. **10**

UNIT - III

4 a) Discuss Hypothesis Space Search in Decision tree Learning. **8**

b) Discuss Inductive Bias in Decision Tree Learning. **8**

c) What are issues in learning decision trees. **4**

OR

5	a)	Illustrate ID3 algorithm in detail with an example.	10
	b)	Consider the following set of training examples.	5

a) What is the entropy of this collection of training example with respect to the target function classification?

b) What is the information gain of a2 relative to these training examples?

Instance	Classification	a1	a2
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

| | c) | How do you build decision tree using information gain?. | 5 |

UNIT - IV

6	a)	Explain the followings with respect to Back Propagation algorithm.	8

    i.   Convergence and Local Minima.
    ii.   Generalization, Overfitting, and Stopping Criterion.

	b)	Explain the concept of a Perceptron with a neat diagram.	6
	c)	What is Artificial Neural Network? Explain appropriate problem for Neural Network Learning with its characteristics.	6

UNIT - V

7	a)	Define Bayesian theorem? What is the relevance and features of Bayesian theorem? Explain the practical difficulties of Bayesian theorem.	10
	b)	Explain Naïve Bayes classifier with an illustrative example.	10

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