

Register No : _____

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Fourth Semester

Artificial Intelligence and Data science

AL3451- Machine Learning

Regulations - 2021

Duration: 3 Hrs

Maximum: 100 Marks

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	How machine learning differs from traditional programming?	UN	1	2
2.	What is hypothesis space?	RE	1	2
3.	Relate entropy and information gain.	UN	2	2
4.	State the use of gradient-descent in machine learning.	RE	2	2
5.	Compare bagging with boosting.	UN	3	2
6.	Identify the challenges in using clustering algorithms.	UN	3	2
7.	Enlist any four activation functions.	RE	4	2
8.	What is hyperparameter tuning?	RE	4	2
9.	Outline the need of t-test. How it is performed?	UN	5	2
10.	What is bootstrapping?	RE	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i Compare supervised, unsupervised and reinforcement algorithms.	UN	1	6
	ii Explain about VC dimension.	UN	1	7
	Or			
	b Explain Inductive bias with suitable diagram.	UN	1	13
12.	a Elaborate how optimal hyperplane differ from other hyperplanes. Explain how SVM is able to achieve this?	AP	2	13
	Or			
	b i Discuss about Random Forest algorithm with suitable example.	AP	2	6
	ii Elaborate on linear regression model.	AP	2	7

13. a Write the K means algorithm and perform K means clustering on the following dataset considering the initial centroids as (1,1) & (5,7). AP 3 13

	A	B
R1	1	1
R2	1.5	2
R3	3	4
R4	5	7
R5	3.5	5
R6	4.5	5
R7	3.5	4.5

Or

- b Consider the below dataset of five points with two features and a binary label: AP 3 13

Feature 1	Feature 2	Label
1	2	0
2	3	0
3	1	1
4	4	1
5	5	1

Illustrate the process of bagging, boosting and stacking.

14. a Explain the processes involved in backpropagation algorithm. UN 4 13

Or

- b Illustrate about batch normalization, regularization and dropout in detail. UN 4 13

15. a i Explain about cross-validation. UN 5 7
ii Explain the need to perform resampling. UN 5 6

Or

- b Show the various methods of measuring classifier performance. UN 5 13

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a Consider the below dataset of fruits with their features (Weight and Color) and their corresponding labels (Fruit Type). Classify the new fruit with the following features:- Weight: 145 grams, Color: Green using Naïve Bayes algorithm.	AP	2	15

Weight (grams)	Color	Fruit Type
150	Red	Apple
130	Red	Apple
160	Yellow	Banana
170	Yellow	Banana
120	Green	Kiwi
140	Green	Kiwi

Or

- | | | | | |
|---|---|----|---|----|
| b | Consider the below dataset of points in a 2D space, along with their labels. Classify a new point (5, 4) using KNN with K = 3. Illustrate the process involved. | AP | 3 | 15 |
|---|---|----|---|----|

Point (x, y)	Label
(1, 2)	A
(2, 3)	A
(3, 1)	B
(6, 5)	B
(7, 7)	B
(1, 4)	A