Register No.: .... Name: ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIFTH SEMESTER B.TECH DEGREE EXAMINATION (Regular), DECEMBER 2023

(2020 SCHEME)

Course Code :   **20CST383**

Course Name: **Concepts In Machine Learning**

Max. Marks :   **100**   **Duration: 3 Hours**

PART A
(Answer all questions. Each question carries 3 marks)

1. Differentiate between supervised and unsupervised learning using an example.
2. Explain Maximum Aposteriori Estimation.
3. What is over fitting and why is it a problem?
4. Distinguish between Linear and logistic regression.
5. Why SVM is called as Maximum Marginal Classifier?
6. Explain perceptron with a diagram.
7. Differentiate Agglomerative clustering with Divisive Clustering.
8. What do you mean by curse of dimensionality problem? How dimensionality reduction techniques help to solve it?
9. Ensemble classifiers gives a better performance for classification tasks. Justify.
10. Explain about AUC.

PART B
(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Reinforcement learning is a suitable for modelling self-driving cars. Justify your answer with explanation. With a diagram explain the reward and punishment strategy in reinforcement learning (10)

    b) What do you meant by Machine learning? List and explain any 3 machine learning paradigms (4)

OR

12. a) What are the different parameter estimation techniques in machine learning? Explain about Maximum Likelihood Estimator (7)

    b) State Bayes Theorem. The following table represents the incidence rate of disease of 1 lakh people based on the symptom. Calculate the probability of having the disease when the person has symptoms (7)

		SYMPTOMS		
		YES	NO	TOTAL
	YES	1	0	1
	NO	10	99989	99999
DISEASE	TOTAL	11	99989	100000

MODULE II

13. a) Differentiate between classification and regression with examples. (11)
    b) List and write any 3 applications of machine learning. (3)

OR

14. a) What are activation functions? Whether activation functions are necessary in a perceptron? Justify your answer. List any 3 activation functions. (5)
    b) Explain in detail with neat diagram, the working of Iterative Dichotomizer 3 (ID3) algorithm. (9)

MODULE III

15. a) Explain back propagation algorithm for multilayer perceptron with a diagram (11)
    b) What are RBF networks? (3)

OR

16. a) Demonstrate an algorithm to find the SVM classifier and describe the mathematical formulation to the problem, (10)
    b) Why soft margin SVM classifier is called so? (4)

MODULE IV

17. a) Write any 2 commonly used equations for measuring the distance between data points of numeric data in Clustering with explanation. (4)
    b) Illustrate the algorithm for K-means clustering of unsupervised learning. Write the disadvantages of K-means clustering method. (10)

OR

18. a) Compare and contrast Principal Component Analysis and Linear Discriminant Analysis. (14)

MODULE V

19. a) Explain Receiver Operating Characteristics (ROC) curve in machine learning. (7)
    b) Given a dataset of 1200 instances, how k-fold cross validation is done with k=1200 with a diagram (7)

OR

20. a) Given an image classifier that distinguishes the face between CAT and DOG as Positive (P) and Negative (N) classes respectively. (12)

Confusion matrix is as shown below. Find the Accuracy, Precision, recall and f1 score of the classifier.

		PREDICTED	
		P	N
ACTUAL	P	1984	447
	N	336	107

b)   Explain the terms *bias* and *variance.*   *(2)*

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