

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), JULY 2022**TELECOMMUNICATION ENGINEERING****(2021 Scheme)****Course Code: 21TE204-D****Course Name: Introduction to Machine Learning****Max. Marks: 60****Duration: 3 Hours****PART A***(Answer all questions. Each question carries 3 marks)*

1. Distinguish classification and regression with an example.
2. Define the following terms: i) Precision ii) Recall.
3. Describe the significance of optimal separating hyper plane in SVM and explain how they are computed.
4. Explain Gaussian mixture model algorithm.
5. Justify whether Principal Component Analysis is supervised or unsupervised.
6. Explain Expectation Maximization algorithm.
7. Illustrate how overfitting is employed in machine learning.
8. Explain the use of locally linear embedding.

PART B*(Answer one full question from each module, each question carries 6 marks)***MODULE I**

9. a) Explain hypothesis space, version space, most general hypothesis and most specific hypothesis with respect to a classification problem. (4)
- b) Determine the hypothesis space and version space with respect to the following data. (2)

Input	6	30	10	14	23	17	3	29
Output	low	high	low	low	high	high	low	high

OR

10. a) Compare supervised learning and unsupervised learning with examples. (4)
- b) Illustrate any two real life examples in which supervised learning technique can be applied. (2)

MODULE II

11. a) Explain resampling and elaborate the significance of resampling in machine learning. (3)
- b) Discuss about different methods of cross validation. (3)

OR

12. a) Explain Bayes theorem? A person is going to catch a train. But he was late in the morning. What should he do? Help the person to take a decision using Bayes theorem - whether he had to proceed to the railway station. (2)
Given:
- i) He was late on 90% days on which he got train
 - ii) He was late in the morning for many days (10%)
 - iii) He could catch train in 1% of days.
- b) The average production of a company (in tonnes) for certain years is shown in the table below: (4)

x (year)	2005	2006	2007	2008	2009
y (production)	12	19	29	37	45

Find the regression line $y = b_1x + b_0$.

MODULE III

13. Describe back propagation algorithm for a multi-layer perceptron. (6)

OR

14. a) Explain kernel trick in case of support vector machine. List any two-kernel function used in SVM. (4)
- b) Explain any one method to handle problem of missing attributes with respect to decision tree. (2)

MODULE IV

15. Using k-means algorithm and Euclidean distance, find the three clusters after one epoch for the following samples. (6)

A	2	2	8	5	7	6	1	4
B	10	5	4	8	5	4	2	9

Take (2,10), (5,8) and (1,2) as initial center of each cluster.

OR

16. Construct the dendrogram using single linkage, complete linkage and average linkage clustering algorithm for the following distance matrix. (6)

Item	X1	X2	X3	X4	X5
X1	0	1	2	2	3
X2	1	0	2	4	3
X3	2	2	0	1	5
X4	2	4	1	0	3
X5	3	3	5	3	0

MODULE V

17. Describe how dimensionality can be reduced using subset selection procedure? Explain the forward selection and backward selection algorithm. (6)

OR

18. Explain principal component analysis used in machine learning with an example. (6)

MODULE VI

19. Describe dimensionality reduction using factor analysis. (6)

OR

20. Explain independent component analysis used in machine learning. (6)
