SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF MEDICAL ELECTRONICS

QUESTION BANK

VII SEMESTER

1904012 MACHINE LEARNING

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Prepared by

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Unit -I INTRODUCTION

Machine learning: What and why? - Examples of Machine Learning Applications - Types Of Machine Learning Supervised Learning - Machine Learning Process- The Curse of Dimensionality, Over fitting - Training, Testing, and Validation Sets-The Confusion Matrix & Basic Statistics-Bias-Variance Tradeoff.

PART A

Q.No	Questions	Course Outcome	BT Level	Competence
1.	What is Machine learning?	CO1	BTL 1	Remembering
2.	List applications of machine learning.	CO1	BTL 1	Remembering
3.	Distinguish between supervised and unsupervised learning.	CO1	BTL 2	Understanding
4.	Mention the features of classifier in machine learning.	CO1	BTL 2	Understanding
5.	Outline the important objectives of machine learning?	CO1	BTL 1	Remembering
6.	Illustrate the standard approach to supervised learning?	CO1	BTL 2	Understanding
7.	Mention the issues in machine learning.	CO1	BTL 2	Understanding
8.	Interpret the term dimensions in context to machine learning.	CO1	BTL 2	Understanding
9.	What are the steps involved in ML process?	CO1	BTL 1	Remembering
10.	Examine the process of data preprocessing in Machine learning.	CO1	BTL 1	Remembering
11.	Write the applications of Machine Learning.	CO1	BTL 1	Remembering
12.	What is reinforcement learning?	CO1	BTL 1	Remembering
13.	In machine learning what does the term curse of dimensionality refer?	CO1	BTL 2	Understanding
14.	How can u detect over fitting in machine learning?	CO1	BTL 2	Understanding
15.	How can we avoid over fitting while learning?	CO1	BTL 2	Understanding
16.	Define generalization in ML.	CO1	BTL 2	Understanding
17.	What is 'Training set' and 'Test set'?	CO1	BTL 1	Remembering
18.	Compare the terms precision and recall.	CO1	BTL 1	Remembering
19.	Cite an example for Data sparsity.	CO1	BTL 1	Remembering
20.	What are the components in confusion matrix?	CO1	BTL 1	Remembering
21.	Write about the accuracy metrics in confusion matrix.	CO1	BTL 1	Remembering
22.	Summarize the significance of the terms variance and covariance.	CO1	BTL 2	Understanding
23.	Differentiate data mining and machine learning.	CO1	BTL 2	Understanding
24.	How does the bias-variance trade-off relate to over fitting?	CO1	BTL 2	Understanding

PART B

Q.No	Questions		Course Outcome	BT Level	Competence
1.	Explain about the regression in supervised learning algorithm with an example?	(13)	CO1	BTL 3	Applying
2.	(i)Elaborate in detail about Supervised learning.	(7)	CO1	BTL 3	Applying
	(ii)Summarize the Classification problem in machine learning.	(6)			
3.	(i)What is the role of preprocessing of data in machine learning? Why it is needed?	(7)	CO1	BTL 3	Applying
	(ii)Compare the supervised and unsupervised machine learning model with an example	(6)			
4.	Analyze and outline the various accuracy metrics for a machine learning algorithm with supporting mathematical expressions.	(13)	CO1	BTL 4	Analyzing
5.	Describe the key steps involved in the machine learning process.	(13)	CO1	BTL 4	Analyzing
6.	Categorize the machine learning algorithms and explain in detail.	(13)	CO1	BTL 4	Analyzing
7.	Summarize in detail about types of Regression and Classification in Supervised Learning.	(13)	CO1	BTL 4	Analyzing
8.	(i)How does the curse of dimensionality occur and how to solve it?	(6)	CO1	BTL 4	Analyzing
	(ii)Categorize the dimensionality reduction methods.	(7)			
9.	Explain the significance of Training, Testing and Validation sets	(13)	CO1	BTL 3	Applying

	in machine learning with an appropriate example.				
10.	Summarize the common causes of over fitting in machine learning models. How can these causes be mitigated or prevented?	(13)	CO1	BTL 4	Analyzing
11.	Illustrate the key components and the concept of Naïve Bayes Classification.	(13)	CO1	BTL 3	Applying
12.	How to calculate confusion matrix for a 2-class classification problem? Explain with an example.	(13)	CO1	BTL 4	Analyzing
13.	Given a sample of 12 individuals, 8 that have been diagnosed with cancer and 4 that are cancer-free. Assume that the classifier developed makes 9 accurate predictions and misses 3: 2 individuals with cancer wrongly predicted as being cancer-free and 1 person without cancer that is wrongly predicted to have cancer. Construct a confusion matrix and determine Sensitivity, Specificity and Accuracy of the classifier model.	(13)	CO1	BTL 3	Applying
14.	Suppose 10000 patients get tested for flu; out of them, 9000 are actually healthy and 1000 are actually sick. For the sick people, a test was positive for 620 and negative for 380. For the healthy people, the same test was positive for 180 and negative for 8820. Construct a confusion matrix for the data and compute the accuracy of the test.	(13)	CO1	BTL 3	Applying
15.	(i)Analyze the performance parameters that can be computed from the confusion matrix. (ii)From the given confusion matrix of a binary classification problem, compute accuracy, precision and recall.	(7) (6)	CO1	BTL 4	Analyzing

ACTUAL	PREDICTED	
	Spam	Not spam
Spam	80	20
Not spam	10	890

16.	Describe in detail about the statistics involved in Machine Learning.	(13)	CO1	BTL 4	Analyzing
17.	(i)Illustrate how the bias-variance tradeoff is achieved in machine learning? (ii)How does bias- variance tradeoff impact model performance, and what strategies can be employed to strike a balance?	(7) (6)	CO1	BTL 3	Applying
PART C					
1.	With the process flow diagram explain how does each processing step contribute to the development of an effective machine learning model?	(15)	CO1	BTL 3	Applying
2.	With the following data construct the confusion matrix and estimate the accuracy, precision and recall from the matrix values. **Actual values :** The patients who actually don't have a heart disease = 41 The patients who actually do have a heart disease = 50 **Predicted values :** Number of patients who were predicted as not having a heart disease = 40 Number of patients who were predicted as having a heart disease = 51	(15)	CO1	BTL 4	Analyzing
3.	Analyze how Machine Learning Algorithms can be tested with necessary examples.	(15)	CO1	BTL 4	Analyzing
4.	Describe Learning Process and explain Supervised Learning in detail, give necessary examples.	(15)	CO1	BTL 4	Analyzing

5.	(i)With the bull's eye diagram explain the bias- variance trade off in machine learning.	(7)	CO1	BTL 3	Applying
	(ii)Write a note on the importance of statistics in machine learning and summarize the basics statistics involved in defining the model.	(8)			

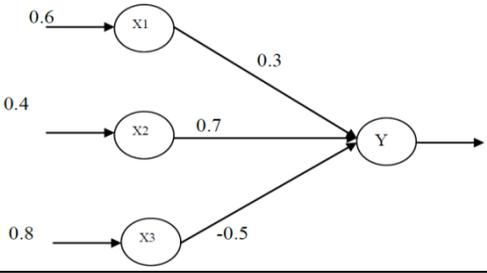## Unit -IINEURONS, NEURAL NETWORKS, AND LINEAR DISCRIMINANTS

Hebb's Rule - Neural Networks - The Perceptron – Linear Separability & Linear Regression. The Multi-layer Perceptron: Biases, Algorithm - Local minima and Stochastic gradient Descent Examples Of Using The MLP : Regression Problem & Classification Example - Deriving Back-Propagation

PART A

Q.No	Questions	Course Outcome	BT Level	Competence
1.	State the Hebb's Rule.	CO2	BTL 1	Remembering
2.	Draw the McCulloch and Pitts model of neuron.	CO2	BTL 2	Understanding
3.	Interpret characteristics of neural networks.	CO2	BTL 2	Understanding
4.	Outline the significance of the layers in neural networks.	CO2	BTL 2	Understanding
5.	Differentiate feed forward and feedback neural network.	CO2	BTL 1	Remembering
6.	List the requirements of an activation function.	CO2	BTL 1	Remembering
7.	What is Perceptron in Machine Learning?	CO2	BTL 2	Understanding
8.	How perceptron learning algorithm is used?	CO2	BTL 1	Remembering
9.	Examine the error function used for the perceptron.	CO2	BTL 1	Remembering
10.	Write about Linear Separability & Linear Regression.	CO2	BTL 2	Understanding
11.	State Perceptron Convergence theorem.	CO2	BTL 1	Remembering
12.	Generalize the structure of the multi layer perceptron.	CO2	BTL 2	Understanding
13.	Define Biases.	CO2	BTL 1	Remembering
14.	How local minima is used for optimization in machine learning?	CO2	BTL 2	Understanding
15.	Summarize the features stochastic gradient descent algorithm.	CO2	BTL 2	Understanding
16.	Differentiate optimal separating hyperplane and soft margin hyperplane.	CO2	BTL 2	Understanding
17.	Name few examples of using MLP.	CO2	BTL 1	Remembering
18.	How does a regression problem differ from a classification problem?	CO2	BTL 1	Remembering
19.	Interpret how classification is performed with MLP.	CO2	BTL 2	Understanding
20.	Compare hard-max activation function and soft-max activation function.	CO2	BTL 1	Remembering
21.	Define the term back propagation	CO2	BTL 1	Remembering
22.	Enumerate the steps of deriving Back Propagation.	CO2	BTL 1	Remembering
23.	Summarize Back propagation of error	CO2	BTL 2	Understanding
24.	Write any two conditions under which the back propagation algorithm can be employed.	CO2	BTL 2	Understanding

PARTB

1.	Draw the structure of a biological Neuron and explain in detail.	(13)	CO2	BTL 3	Applying
2.	Differentiate Biological neural network from artificial neural network.	(13)	CO2	BTL 4	Analyzing
3.	(i)Describe the McCulloch and Pitts Neuronal Model.	(7)	CO2	BTL 4	Analyzing
	(ii)Write the limitations of the McCulloch and Pitts Neuronal Model.	(6)			

4.	For the network shown in figure, Calculate the net input to the output neuron Y.	(13)	CO2	BTL 3	Applying
5.	Discuss about the learning rate and bias input for a perceptron.	(13)	CO2	BTL 3	Applying
6.	With the support of mathematical equations, describe the three steps in the perceptron learning algorithm.	(13)	CO2	BTL 4	Analyzing
7.	Implement AND function using perceptron networks for bipolar inputs and targets.	(13)	CO2	BTL 4	Analyzing
8.	Develop a neural model for OR logic function by using perceptron.	(13)	CO2	BTL 3	Applying
9.	What are the limitations of learning in perceptron? Explain with example.	(13)	CO2	BTL 3	Applying
10.	Illustrate the Perceptron Convergence Theorem with a supporting example	(13)	CO2	BTL 3	Applying
11.	Write the Single layer perceptron learning algorithm with the governing mathematical expressions.	(13)	CO2	BTL 4	Analyzing
12.	Describe a multi-layer perceptron algorithm.	(13)	CO2	BTL 3	Applying
13.	Analyze and explain why XOR problem cannot be solved by a single layer perceptron and how it is solved by a Multilayer Perceptron?	(13)	CO2	BTL 4	Analyzing
14.	Explain the linearly separable problem with an example.	(13)	CO2	BTL 4	Analyzing
15.	Illustrate the linearly in separable problem with an example.	(13)	CO2	BTL 4	Analyzing
16.	Write the algorithm for Back propagation in neural networks.	(13)	CO2	BTL 3	Applying
17.	Explain how to learn Multilayer Networks using Back propagation Algorithm.	(13)	CO2	BTL 4	Analyzing

PART - C (15 MARK)

1	Describe and analyze the steps involved to use the Multi-layer Perceptron when presented with a dataset.	(15)	CO2	BTL 4	Analyzing
2	(i)Cite an example and explain about Linear Regression. (ii)Analyze the functionalities of the Linear Separability.	(8) (7)	CO2	BTL 4	Analyzing
3	Illustrate some examples of using MLP and the four types of problems that are generally solved using MLP.	(15)	CO2	BTL 4	Analyzing
4	Illustrate with diagram a perceptron with two input features, x_1 and x_2, and corresponding weights w_1, w_2 respectively and with a bias term b. The activation function is a step function, which produce output as 1 if the weighted sum of inputs plus the bias is greater than or equal to zero, and 0 otherwise. The weights and bias are initialized as follows: w_1=0.5, w_2=−0.2, b=0.3. For the following set of input vectors, determine the output of the perceptron for each input. (i) x_1 =0.2, x_2 =0.4 (ii) x_1 = -0.5, x_2 = 0.7 (iii) x_1 = 0.6, x_2 = -0.1	(15)	CO2	BTL 3	Applying
5	Apply the multi-layer perceptron to develop a neural model for XOR logic function.	(15)	CO2	BTL 3	Applying

Unit -III   DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS

Linear Discriminant Analysis (LDA) - Principal Components Analysis (PCA), Factor Analysis - Independent Components Analysis - Probabilistic Model - Gaussian Mixture Models : EM Algorithm - Nearest Neighbour Methods - Support Vector Machines

PART - A

Q.No.	Questions	Course Outcome	BT Level	Competence
1.	Define LDA.	CO3	BTL1	Remembering
2.	List the primary goals of Linear Discriminant Analysis in machine learning.	CO3	BTL1	Remembering
3.	Mention the characteristics of Principal Component Analysis.	CO3	BTL2	Understanding
4.	Differentiate the LDA and PCA in machine learning.	CO3	BTL1	Remembering
5.	Write about the PCA and its relation with Multi Layer Perceptron.	CO3	BTL1	Remembering
6.	What is Kernel PCA?	CO3	BTL2	Understanding
7.	Summarize the algorithmic steps in PCA.	CO3	BTL1	Remembering
8.	Classify the different techniques used for dimensionality reduction.	CO3	BTL1	Remembering
9.	Mention the characteristics of Factor Analysis.	CO3	BTL2	Understanding
10.	Define Independent Component analysis.	CO3	BTL1	Remembering
11.	Illustrate blind signal separation, and why is it important?	CO3	BTL2	Understanding
12.	Examine probabilistic modeling in machine learning	CO3	BTL2	Understanding
13.	Categorize the probabilistic models.	CO3	BTL2	Understanding
14.	Interpret Naïve Bayes algorithm in probabilistic model.	CO3	BTL2	Understanding
15.	When the Gaussian Mixture Model is applied to the data points?	CO3	BTL2	Understanding
16.	Cite an example for Gaussian Mixture Models.	CO3	BTL2	Understanding
17.	Define EM algorithm.	CO3	BTL1	Remembering
18.	What is Convergence in the EM algorithm?	CO3	BTL1	Remembering
19.	Write about the General Expectation-Maximisation (EM) Algorithm.	CO3	BTL2	Remembering
20.	What is meant by Nearest Neighbor methods.	CO3	BTL2	Understanding
21.	Point out the distance measure in Nearest neighbor methods.	CO3	BTL2	Understanding
22.	What is Support Vector Machine?	CO3	BTL1	Remembering
23.	Summarize the advantages of SVM.	CO3	BTL1	Remembering
24.	What is SVM Regression?	CO3	BTL2	Understanding

PART-B (13 MARK)

1.	How the reduction in dimension is achieved using Linear Discriminant Analysis?	(13)	CO3	BTL3	Applying
2.	(i)What is Principal Component Analysis? (ii)Write the algorithm of PCA.	(7) (6)	CO3	BTL3	Applying
3.	(i)Describe the PCA relation with MLP. (ii)Explain Kernel PCA Algorithm.	(7) (6)	CO3	BTL3	Applying
4.	(i)Compare the LDA with PCA (ii)Mention the advantages and disadvantages of dimensionality reduction.	(7) (6)	CO3	BTL4	Analyzing
5.	Illustrate the trade-offs involved in choosing the number of principal components to retain after applying PCA.	(13)	CO3	BTL3	Applying
6.	Classify the types of Factor Analysis in an unsupervised system and explain the process of extraction.	(13)	CO3	BTL4	Analyzing
7.	How Independent Component Analysis is done?	(13)	CO3	BTL4	Analyzing
8.	Categorize the dimensionality reduction techniques. Explain any two methods in detail.	(13)	CO3	BTL4	Analyzing
9.	Discuss the Probabilistic Learning methods involved in Machine Learning.	(13)	CO3	BTL4	Analyzing

10.	Illustrate the Expectation-Maximization Algorithm with necessary example.	(13)	CO3	BTL3	Applying
11.	Explain the Nearest Neighbor methods with example.	(13)	CO3	BTL4	Analyzing
12.	(i) List and explain the different methods to calculate the distance between the points in Nearest Neighbor method. (ii)How the K factor is determined in the Nearest Neighbor method.	(8) (5)	CO3	BTL4	Analyzing
13.	(i) Describe the Nearest Neighbor Algorithm. (ii)Write in detail about Nearest Neighbor Smoothing.	(7) (6)	CO3	BTL4	Analyzing
14.	Elaborate the process of constructing the KD-Tree	(13)	CO3	BTL4	Analyzing
15.	Illustrate the concept of Support Vector Machine with necessary examples.	(13)	CO3	BTL3	Applying
16.	Explain optimal Separation in Support Vector Machine.	(13)	CO3	BTL4	Analyzing
17.	Describe the Kernel functions in support Vector Machine.	(13)	CO3	BTL3	Applying

PART - C (15 MARKS)

1.	Explain the EM Algorithm considering the flipping of a coin as an example.	(15)	CO3	BTL4	Analyzing
2.	Analyze in detail the working of Support Vector Machine, its implementation and examples.	(15)	CO3	BTL4	Analyzing
3.	What is multi modal data? When and how to use the GMM in machine learning, illustrate with a graphical representation.	(15)	CO3	BTL3	Applying
4.	Justify the need of Dimensionality Reduction by explaining the following methods (i) Linear Discriminant Analysis (ii) Principal Component Analysis (iii) Independent Component Analysis	 (5) (5) (5)	CO3	BTL4	Analyzing
5.	Using the Principal Component Analysis algorithm reduce the dimension of the given features from 2 to 1.	(15)	CO3	BTL3	Applying

Feature	Example 1	Example 2	Example 3	Example 4
X1	4	8	16	7
X2	11	4	5	14

UNIT 4

Evolutionary Learning **-** The Genetic Algorithms (GA)-Reinforcement Learning -Decision Trees – CLASSIFICATION AND REGRESSION TREES (CART)-Ensemble Learning: Boosting Bagging, Random Forests - Unsupervised Learning: K-Means – Algorithm - Vector Quantization.

Q.No.	Questions	Course Outcome	BT Level	Competence
1.	Distinguish between crossover and mutation.	CO4	BTL1	Remember
2.	Define Genetic Algorithm.	CO4	BTL1	Remember
3.	Write the concept involved in evaluating fitness.	CO4	BTL2	Understand
4.	Define mutation.	CO4	BTL1	Remember
5.	Describe about Genetic Algorithm.	CO4	BTL2	Understand
6.	Discover the use of Vector Quantization.	CO4	BTL1	Remember
7.	Write the disadvantage of Genetic Algorithm.	CO4	BTL1	Remember
8.	Define Boosting and Bagging.	CO4	BTL1	Remember
9.	Define Markov property.	CO4	BTL1	Remember
10.	Write a simple example of a Markov decision Process.	CO4	BTL1	Remember
11.	How K-Means Algorithm is used in Unsupervised Learning.	CO4	BTL1	Remember
12.	Express the basic concept involved in CART.	CO4	BTL1	Remember
13.	Define Gini Impurity.	CO4	BTL1	Remember
14.	Identify how reinforcement learning maps states to action.	CO4	BTL1	Remember
15.	Examine Genetic Programming.	CO4	BTL2	Understand
16.	Discuss about reward function.	CO4	BTL2	Understand
17.	Discover entropy function.	CO4	BTL2	Understand
18.	Differentiate Sarsa and Q-learning.	CO4	BTL2	Understand
19.	Analyze ID3.	CO4	BTL2	Understand
20.	Describe shortly Random Forest Algorithm.	CO4	BTL2	Understand
21.	Write about single point crossover.	CO4	BTL2	Understand
22.	What is the effects of mutation on a string?	CO4	BTL1	Remember
23.	List the Basic Genetic Algorithm steps.	CO4	BTL1	Remember
24.	Summarize the advantages of reinforcement learning cycle.	CO4	BTL2	Understand

	PART-B (13 MARK)			
1.	(i) Write the use of Genetic Algorithm. (ii) Discuss an example that illustrate the use of Genetic Algorithm.	(7) (6)	CO4	BTL4	Analyze
2.	Discuss in detail about Reinforcement Learning and elaborate on Markov Decision Process.	(13)	CO4	BTL3	Apply
3.	(i) Write in detail about Decision Tree. (ii) Write in detail Classification and Regression Tree (CART).	(7) (6)	CO4	BTL3	Apply
4.	Describe Random Forest Algorithm with an example.	(13)	CO4	BTL3	Apply
5.	(i) Explain in detail about Boosting (i) Discover the use of Bagging.	(7) (6)	CO4	BTL3	Apply
6.	Explain the concept and algorithm involved in Unsupervised Learning Environment.	(13)	CO4	BTL3	Apply
7.	(i) Describe Knapsack Problem using Genetic Algorithm. (ii) Describe about Limitations involved in Genetic Algorithm.	(7) (6)	CO4	BTL4	Analyze
8.	(i)Describe in detail about Generating Offspring Genetic Operators. (ii)Discuss the Basic Genetic Algorithm.	(7) (6)	CO4	BTL4	Analyze
9.	(i)Identify the difference between Sarsa and Q-learning.	(7)	CO4	BTL4	Analyze

Q.No.	Questions	Marks	CO	BTL	Competence
	(ii)Discuss an example for the reinforcement learning.	(6)			
10.	Describe Knapsack problem for GA.	(13)	CO4	BTL4	Analyze
11.	(i)Write in detail about reinforcement learning. (ii)Illustrate the use of reinforcement learning.	(7) (6)	CO4	BTL4	Analyze
12.	(i) Write about the ID3. (ii) Generalize how Classification is done with an Example.	(7) (6)	CO4	BTL4	Analyze
13.	(i) Write in detail about CART. (ii) List the different ways to combine classifiers.	(7) (6)	CO4	BTL3	Apply
14.	Describe in detail about K-Means Clustering algorithm.	(13)	CO4	BTL3	Apply
15.	Illustrate in detail about Vector Quantisation.	(13)	CO4	BTL4	Analyze
16.	Explain the peaks Problem in GA.	(13)	CO4	BTL4	Analyze
17.	Describe the bagging as a variance reducing algorithm.	(13)	CO4	BTL4	Analyze

PART - C (15 MARKS)

Q.No.	Questions	Marks	CO	BTL	Competence
1.	Generalize Decision Tree and explain the implementation of Decision Tree	(15)	CO4	BTL 3	Apply
2.	Write in detail about Reinforcement Learning, Give an Example implementation and write down its uses.	(15)	CO4	BTL 3	Apply
3.	Choose two destinations with different routes connecting them. Apply genetic algorithm to find the optional path based on distance.	(15)	CO4	BTL 4	Analyze
4.	(i) Explain about K-Means Algorithm with an example. (i) Explain about Normalization and Vector Quantization.	(8) (7)	CO4	BTL 4	Analyze
5.	Analyze in detail the working of ID3 Algorithm.	(15)	CO4	BTL 4	Analyze

Unit -V

Bayesian Networks - Markov Random Fields - Hidden Markov Models (HMMS) - Markov Chain Monte Carlo (MCMC) Methods - Deep Belief Networks (DBN)

Q.No.	Questions	Course Outcome	BT Level	Competence
1.	Point the concept involved in Bayesian Networks.	CO5	BTL1	Remember
2.	Define MCMC.	CO5	BTL1	Remember
3.	Distinguish random numbers and Gaussian Random numbers	CO5	BTL2	Understand
4.	Define Deep Belief Network.	CO5	BTL1	Remember
5.	Describe Markov Chains	CO5	BTL2	Understand
6.	Discover Graphical models use.	CO5	BTL1	Remember
7.	List the Various MCMC methods.	CO5	BTL1	Remember
8.	Define graphical models.	CO5	BTL1	Remember
9.	Define HMM.	CO5	BTL1	Remember
10.	Write Variable Elimination Algorithm.	CO5	BTL1	Remember
11.	List the purpose of Gibbs Sampling.	CO5	BTL1	Remember
12.	Express Bayesian Belief network	CO5	BTL1	Remember
13.	Difference Deep learning and Machine Learning.	CO5	BTL1	Remember
14.	Write about Baum–Welch or Forward–Backward Algorithm	CO5	BTL1	Remember
15.	Examine the various tracking methods.	CO5	BTL2	Understand
16.	Discuss the concept of Deep Learning.	CO5	BTL2	Understand
17.	Discover the Markov Random Field Image Denoising Algorithm.	CO5	BTL2	Understand
18.	State in detail about Viterbi algorithm.	CO5	BTL2	Understand

19.	Analyze Markov Random Fields.	CO5	BTL2	Understand
20.	Describe the Forward algorithm.	CO5	BTL2	Understand
21.	Write about Gibbs sampler.	CO5	BTL2	Understand
22.	What is the simulated annealing?	CO5	BTL1	Remember
23.	State the Metropolis–Hastings.	CO5	BTL1	Remember
24.	List out the use of random walk.	CO5	BTL1	Remember

PART-B (13 MARK)					
1.	Analyze the concept involved in Markov Random Fields.	(13)	CO5	BTL4	Analyze
2.	Discuss Gaussian Random numbers. Describe Markov Random Fields.	(7) (6)	CO5	BTL4	Analyze
3.	Write the Rejection Sampling Algorithm. Show the histogram of a mixture of two Gaussians.	(7) (6)	CO5	BTL4	Analyze
4.	Describe Sampling –importance resampling algorithm. Describe Gibbs Sampling.	(7) (6)	CO5	BTL4	Analyze
5.	Explain in detail about MCMC. Discover Simulated Annealing by a distribution.	(7) (6)	CO5	BTL3	Apply
6.	(i)Structure two graphical models and show the various relationship between the nodes. ii) Explain about conditional table.	(7) (6)	CO5	BTL4	Analyze
7.	(i).Describe variable elimination algorithm. (ii)Describe the Approximate Inference.	(7) (6)	CO5	BTL4	Analyze
8.	Describe the concept involved in Simulated Annealing and Gibbs Sampling.	(13)	CO5	BTL4	Analyze
9.	Explain the decoding problem by viterbi algorithm.	(13)	CO5	BTL4	Analyze
10.	Describe in detail Markov Random fields. Write the Markov Random Field Image Denoising Algorithm.	(7) (6)	CO5	BTL3	Apply
11.	(i)Write in detail forward algorithm. (ii)Discuss HMM forward algorithm.	(7) (6)	CO5	BTL3	Apply
12.	Write a HMM Baum-Welch(forward –Backward)algorithm.	(13)	CO5	BTL 3	Apply
13.	Write about Tracking methods. Identify hidden Markov models in detail.	(7) (6)	CO5	BTL 3	Apply
14.	(i)Describe in detail about Kalman Filter Algorithm. (ii)Discuss about The particle Filter.	(7) (6)	CO5	BTL 3	Apply
15.	Illustrate in detail about the effects of adding noise to the estimate of the covariance in the training data with the squared exponential kernel.	(13)	CO5	BTL4	Analyze
16.	Explain the data and the model based on random parameters the fitted model in covariance function.	(13)	CO5	BTL 3	Apply
17.	Describe the two nodes in a Markov Random Field (MRF).	(13)	CO5	BTL 3	Apply

PART - C (15 MARKS)					
1.	Discuss about Bayesian Network and discuss in detail with "Exam Fear" example. Also explain the making of Bayesian Networks.	(15)	CO5	BTL3	Apply
2.	Write the concept involved in Deep Belief Network and its algorithm also justify how Deep learning is the most prominent field in current generation.	(15)	CO5	BTL 3	Apply

3.	Explain about Markov Chain Monte Carlo Methods, algorithm and Implementation with example.	(15)	CO5	BTL 3	Apply
4.	Describe in detail about the Hidden Markov Models.(HMMS) also generate the Forward, Viterbi and BaumWelch Algorithm.	(15)	CO5	BTL 3	Apply
5.	Analyze in detail of Hopfield network with Schematic diagram.	(15)	CO5	BTL 4	Analyze