SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203.

DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK

VII SEMESTER

1908703 – MACHINE LEARNING TECHNIQUES II

Regulation – 2019

Academic Year 2025 – 2026
(Odd Semester)

Prepared by

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DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK

Year &Semester	:	**IV /VII**
Subject	:	**190870–Machine Learning Techniques II**
Degree &Branch	:	**B.Tech- IT**

UNIT I- INTRODUCTION
Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

PART A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define a Learning System	Remember	BTL1
2.	State Learning with an example	Remember	BTL1
3.	What are the features involved in the well-defined Learningproblem?	Understand	BTL2
4.	Define the issues in machine learning	Understand	BTL2
5.	Write short notes on concept learning as a search.	Remember	BTL 1
6.	Point out few examples of machine learning applications	Remember	BTL1
7.	List the algorithms of concept learning.	Understand	BTL2
8.	What is Function Approximation Algorithm?	Understand	BTL2
9.	What is vector space?	Understand	BTL 2
10.	State LIST-THEN-ELIMINATE Algorithm	Understand	BTL 2
11.	What is Inductive bias of CANDIDATE-ELIMINATION algorithm?	Remember	BTL 1
12.	What is the use of general-to-specific partial ordering of hypotheses	Remember	BTL 1
13.	Define Find S.	Remember	BTL1
14.	Generalize the concept of Biased Hypothesis Space	Remember	BTL 1
15.	Examine how are these three Hypotheses h1, h2,h3 from Enjoy Sport example related by the >=g relation?	Understand	BTL 2
16.	List out the steps involved in machine learning process.	Understand	BTL 2
17.	What is Candidate – Elimination algorithm?	Remember	BTL1
18.	What is the drawback of CANDIDATE-ELIMINATION algorithm.	Remember	BTL1
19.	Where we can apply decision Tree?	Understand	BTL2
20.	Plot Decision Tree for the concept of Playing Cricket.	Remember	BTL1
21.	State the formula for Entropy.	Remember	BTL1
22.	List down some popular algorithms used for deriving Decision Trees and their attribute selection measures.	Remember	BTL1

23.	What are the different types of nodes in Decision Trees?	Understand		BTL 2
24.	State the problem domains in which Decision Trees are most suitable.	Understand		BTL 2
PART B				
1.	Explain in detail about Learning Problem with suitable example.	(13)	Understand	BTL 2
2.	What is T, P, E in a Learning Problem. Explain it with handwriting recognition Learning Problem.	(13)	Analyze	BTL 4
3.	Discuss with examples about various disciplines and their influence in Machine Learning.	(13)	Understand	BTL 2
4.	How will you estimate training values? Analyse in detail about the rule for estimating the training values.	(13)	Evaluate	BTL 5
5.	Apply the various choices involved in the design of Checkers Learning Problem.	(13)	Apply	BTL 3
6.	Discuss about hypothesis involved in any Learning Task?	(13)	Understand	BTL 2
7.	Explain the procedure involved in General-to-Specific Ordering of Hypotheses	(13)	Understand	BTL 2
8.	Analyze about i) FIND-S Algorithm ii) LIST THEN ELIMINATE Algorithm	(6) (7)	Apply	BTL 3
9.	Explain the need for Decision Tree. Construct Decision Tree with suitable example.	(13)	Understand	BTL 2
10.	Write short notes of the following i) CANDIDATE-ELIMINATION algorithm ii) Version Space	(6) (7)	Create	BTL 6
11.	Explain in detail about Enjoy Sport concept learning problem	(13)	Understand	BTL 2
12	Discuss about Inductive bias of CANDIDATE-ELIMINATION algorithm.	(13)	Create	BTL 6
13	Explain about the following , the following three learning algorithms i) ROTE-LEARN ii) CANDIDATE-ELIMINATION algorithm iii) FIND-S	(5) (4) (3)	Evaluate	BTL 5
14	Describe the Version Spaces and Candidate–Elimination Algorithm with an example	(13)	Apply	BTL 3
15	A training dataset collected while navigating autonomous vehicle is shown below.	(13)	Evaluate	BTL 5

Speed	Distance to intersection	Traffic Control Device	Pedestrian Presence	Decision
0.5	0.7	Stop sign	Pedestrian crossing	Slow down
0.2	0.9	Green traffic light	No pedestrian crossing	Stop
0.8	0.4	Red traffic light	No pedestrian crossing	Go
0.6	0.1	Pedestrian crossing	No traffic light	Slow down
0.3	0.5	No traffic sign	Pedestrian crossing	Go
0.9	0.8	No traffic sign	No pedestrian crossing	Stop
0.7	0.2	Green traffic light	No pedestrian crossing	Stop
0.4	0.6	Stop sign	No pedestrian crossing	Slow down
0.1	0.3	No traffic sign	No pedestrian crossing	Stop
0.5	0.5	Red traffic light	Pedestrian crossing	Go

Identify discrete & continuous attributes along with their features. Calculate information gain of two discrete attributes individually.

16	Consider the following set of training examples:			

Instance	Classification	a_1	a_2
1	+	T	T
2	+	T	T
3	−	T	F
4	+	F	F
5	−	F	T
6	−	F	T

	(i) What is the entropy of this collection of training examples with respect to the target function classification? (ii) What is the information gain of a2 relative to these training examples?	(6) (7)	Apply	BTL 3
17	Examine the sequence of choices available for the design of checkers learning problem	(13)	Analyze	BTL 4

Part C

1	Give the sequence of S and G boundary sets computed by the CANDIDATE-ELIMINATION algorithm	(15)	Analyze	BTL 4

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	EnjoySport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

2	Explain in detail about hypothesis space search performed by FINDS.	(15)	Evaluate	BTL 5
	Example Sky AirTemp Humidity Wind Water Forecast EnjoySport 1 Sunny Warm Normal Strong Warm Same Yes 2 Sunny Warm High Strong Warm Same Yes 3 Rainy Cold High Strong Warm Change No 4 Sunny Warm High Strong Cool Change Yes			
3	Define vector space. Analyse the vector space involved in concept learning problem with suitable example.	(15)	Analyze	BTL 4
4	Consider the same training dataset shown in Table and construct a decision tree.	(15)	Evaluate	BTL 5
5	Construct a decision tree using ID3 Algorithm	(15)	Evaluate	BTL5

Day	Outlook	Temp	Humidity	Wind	Play Tennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

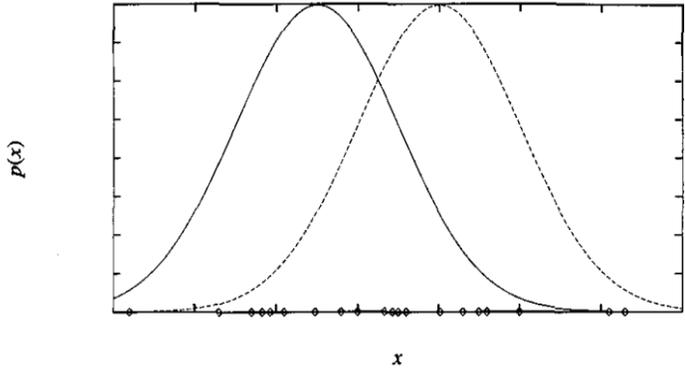|	UNIT II-- NEURAL NETWORKS AND GENETIC ALGORITHMS		
	Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.		
	PART-A		
Q.No	**Questions**	**BT Level**	**Competence**
1	Define what a perceptron is in the context of artificial neural networks.	Understand	BTL2
2	List the characteristics that make a problem appropriate for neural network learning.	Understand	BTL2
3	State the purpose of the hidden units in the ALVINN neural network.	Remember	BTL 2
4	Outline the structure of the neural network used in the ALVINN system.	Remember	BTL 2
5	How the output of the ALVINN neural network determines the steering direction of the vehicle?	Understand	BTL 2

6	What is the role and importance of the BACKPROPAGATION algorithm in training neural networks, with reference to the ALVINN system?	Remember	BTL 1
7	How dynamically modifying network structure can improve training efficiency?	Understand	BTL 2
8	What is the purpose of weight sharing in neural networks?	Understand	BTL 2
9	Outline the key steps in the BACKPROPAGATION algorithm for training a neural network.	Remember	BTL 1
10	State the primary difference between feedforward networks and recurrent networks.	Understand	BTL 2
11	List two alternative error functions mentioned in the text and briefly describe their purpose.	Remember	BTL 2
12	Define the cross entropy error function in the context of neural networks.	Analyze	BTL 4
13	Define Genetic Algorithm (GA)	Remember	BTL 1
14	List Components of a Genetic Algorithm:	Understand	BTL 2
15	State the Purpose of Fitness Function in a Genetic Algorithm	Understand	BTL 2
16	Outline the Main Steps of a Genetic Algorithm	Remember	BTL 1
17	Draw the Representation of Hypotheses in Genetic Algorithms.	Understand	BTL 2
18	List out the Importance of Occam's Razor in Inductive Learning	Remember	BTL1
19	Define Genetic Programming (GP).	Understand	BTL 2
20	List out the three primitive functions commonly used in Genetic Programming (GP)	Remember	BTL 2
21	State the role of fitness evaluation in Genetic Programming (GP)	Remember	BTL1
22	Outline the crossover operation in Genetic Programming (GP)	Apply	BTL 3
23	Give example for Genetic Programming (GP) application.	Understand	BTL 2
24	What is the impact of problem representation on Genetic Programming (GP) effectiveness?	Understand	BTL 2

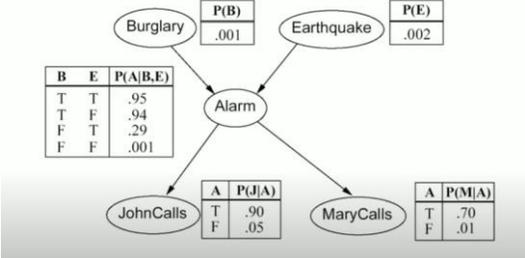|	PART-B			
1	Apply the concept of backpropagation to describe how the ALVINN system learns to steer an autonomous vehicle.	(13)	Apply	BTL 3
2	i) Compare the effectiveness of Artificial Neural Networks (ANNs) and Decision Tree learning in handling noisy, complex sensor data. ii) Use specific examples from the text, such as ALVINN for ANNs, and discuss how each method deals with training data errors, training time, and evaluation speed.	(6) (7)	Analyze	BTL 4
3	Develop a hypothetical extension of the ALVINN system that not only steers the vehicle but also controls its speed and detects obstacles.	(13)	Evaluate	BTL 5
4	i) Choose between using a perceptron-based network and a multilayer ANN for a new project involving real-time image recognition in autonomous drones ii) Justify your choice by discussing the advantages and limitations of each approach, referring to their learning	(6) (7)	Create	BTL 6

	capabilities, handling of complex data, and interpretability of the learned functions.			
5	**Apply** the concept of adding a penalty term for weight magnitude in neural networks. Explain how this strategy can reduce overfitting and derive the new weight update rule that incorporates this penalty term.	(13)	Apply	BTL 3
6	Discuss the scenarios in which each of these error functions (sum of squared errors, cross entropy, errors in slope) is most appropriate and why.	(13)	Analyze	BTL 4
7	Explain with an example of a recurrent neural network (RNN) for a time series prediction task.	(13)	Remember	BTL 1
8	Explain how the Genetic Algorithm (GA) applies the concept of fitness to evaluate and select hypotheses from one generation to the next in the search for the best hypothesis.	(13)	Create	BTL 6
9	Compare and contrast the representation of hypotheses in Genetic Algorithms (GAs) using bit strings versus symbolic descriptions. Discuss the advantages and disadvantages of each representation in the context of hypothesis space exploration.	(13)	Analyze	BTL 4
10	Compare the inductive bias of ID3 with that of the Candidate-Elimination algorithm in the context of hypothesis space search.	(13)	Analyze	BTL 4
11	Propose an extension to the prototypical Genetic Algorithm (GA) to handle multi-objective optimization problems. Outline the necessary modifications to the selection, crossover, and mutation operators.	(13)	Remember	BTL-1
12	Evaluate the effectiveness of using Occam's razor as an inductive bias in decision tree learning algorithms like ID3.	(13)	Analyze	BTL 4
13	Demonstrate the process of genetic programming (GP) using a detailed example.	(13)	Apply	BTL-3
14	i) Choose a method for dynamically modifying the network structure (either growing or pruning). ii) Describe the chosen method in detail, including its algorithmic steps, and discuss the advantages and potential pitfalls of using this method in practice.	(6) (7)	Create	BTL 6
15	Examine the challenges and advancements in parallelizing genetic algorithms (GAs), highlighting different approaches and their effectiveness.	(13)	Analyze	BTL 4
16	Develop an argument for the applicability of the Baldwin effect in enhancing evolutionary algorithms, drawing on computational and theoretical perspectives.	(13)	Evaluate	BTL 5
17	Justify the choice of problem representation in genetic programming, using examples from Koza's experiments.	(13)	Create	BTL 6
PART C				
1	Justify the use of dynamically modifying network structures in neural network learning, comparing the CASCADE-CORRELATION algorithm with the "optimal brain damage" approach. Discuss the benefits and drawbacks of each method in terms of training efficiency and generalization accuracy.	(15)	Create	BTL 6

2	Construct a detailed explanation of the process of training recurrent neural networks (RNNs), including the method of unfolding the network in time and the challenges associated with training RNNs compared to feed forward networks.	(15)	Evaluate	BTL 5
3	Evaluate the effectiveness of alternative error functions in artificial neural networks, specifically focusing on their impact on over fitting and generalization.	(15)	Analyze	BTL 4
4	Evaluate the effectiveness of Genetic Algorithms (GAs) as a search technique for optimizing hypotheses in machine learning.	(15)	Analyze	BTL 4
5	Classify the advantages and disadvantages of Genetic Programming (GP) based on the information provided in the text. Discuss its applications and implications in solving complex problems.	(15)	Analyze	BTL 4

	UNIT III- BAYESIAN AND COMPUTATIONAL LEARNING		
	Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.		
	PART-A		
Q.No	Questions	BT Level	Competence
1	State Bayes Theorem	Remember	BTL1
2	What is (MAP) hypothesis?	Remember	BTL1
3	What is the procedure to calculate conditional probability?	Understand	BTL 2
4	State Total Probability.	Understand	BTL 2
5	Define Product rule	Remember	BTL 2
6	Define Sum rule	Remember	BTL2
7	How will u calculate conditional probability?	Understand	BTL2
8	What is the pros and cons of Bayes optimal classifier?	Understand	BTL2
9	Write an expression for the maximum likelihood hypothesis	Remember	BTL 1
10	What is the use of MDL principle?	Remember	BTL1
11	Write the equation for Bayes Optimal Classification?	Remember	BTL 1
12	What is the basic assumption in the case of the Naive Bayes classifier?	Remember	BTL 1
13	What are the possible advantages of choosing the Naive Bayes classifier?	Remember	BTL1
14	Impact of missing values on naive Bayes?	Remember	BTL 1
15	What are different problem statements you can solve using Naive Bayes?	Remember	BTL 2
16	Define Bayesian belief network.	Understand	BTL 2
17	Define Gibbs Algorithm	Remember	BTL1

18	What is EM algorithm?		Remember	BTL2
19	Define Error of a Hypothesis.		Remember	BTL1
20	What are the broad classes of learning algorithms characterized by the hypothesis?		Understand	BTL 2
21	What is the use of EM Algorithm?		Remember	BTL1
22	Define PAC-learnable		Understand	BTL 2
23	Define €-exhausted.		Remember	BTL 1
24	What are the two types of hypothesis classes?		Remember	BTL1
PART-B				
1	Three persons A, B and C have applied for a job in a private company. The chance of their selections is in the ratio 1 : 2 : 4. The probabilities that A, B and C can introduce changes to improve the profits of the company are 0.8, 0.5 and 0.3, respectively. If the change does not take place, find the probability that it is due to the appointment of C.	(13)	Analyze	BTL 4
2	Two players, Sangeet and Rashmi, play a tennis match. The probability of Sangeet winning the match is 0.62. What is the probability that Rashmi will win the match?	(13)	Analyze	BTL 4
3	Illustrate Bayes rule for a medical diagnosis problem in which there are two alternative hypotheses: (1) that the patient has a particular form of cancer. and (2) that the patient does not	(13)	Understand	BTL 2
4	Extrapolate MINIMUM DESCRIPTION LENGTH PRINCIPLE(MDL).	(13)	Understand	BTL 2
5	(i) A doctor is called to see a sick child. The doctor has prior information that 90% of sick children in that neighbourhood have the flu, while the other 10% are sick with 1 measles. Let F stand for an event of a child being sick with flu and M stand for an event of a child being sick with measles. Assume that the probability of having a rash if one has measles is $P(R \mid M) = 0.95$. However, occasionally children with flu also develop rash, and the probability of having a rash if one has flu is $P(R \mid F) = 0.08$. Upon examining the child, the doctor finds a rash. What is the probability that the child has measles? (ii) It is estimated that 50% of emails are spam emails. Some software has been applied to filter these spam emails before they reach your inbox. A certain brand of software claims that it can detect 99% of spam emails, and the probability for a false positive (a non-spam email detected as spam) is 5%. Now if an email is detected as spam, then what is the probability that it is in fact a non-spam email?	(7) (6)	Apply	BTL 3
6	Explain Bayesian Belief Network (BBN) with suitable example.	(13)	Understand	BTL 2
7	Summarize Naive Bayes algorithms for learning and classifying text.	(13)	Understand	BTL 2

8	Explain Bayesian belief network with suitable example.	(13)	Understand	BTL 2
9	Illustrate the essence of the EM approach using the below Instances generated by a mixture of two Normal distributions with identical variance a. The instances are shown by the points along the x axis	(13)	Understand	BTL 2
10	Demonstrate the General Statement of EM Algorithm	(13)	Apply	BTL 3
11	Draw the Bayesian belief network that represents the conditional independence assumptions of the naive Bayes classifier for the PlayTennis problem . Give the conditional probability table associated with the node Wind.	(5) (4) (5)	Evaluate	BTL 5
12	Assess the Mistake Bound for the HALVING Algorithm		Evaluate	BTL 5
13	Explain about the types of hypothesis classes	(13)	Analyze	BTL 4
14	Explain about Optimal Mistake Bounds.	(13)	Understand	BTL 2
15	Illustrate the Mistake Bound for the FIND-S Algorithm.	(13)	Understand	BTL 2
16	Compare K-TERM DNF AND K-CNF CONCEPTS.	(13)	Analyze	BTL 4

For question 11:

Day	Outlook	Temp	Humidity	Wind	Play Tennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

17	Explain about probably approximately correct (PAC) learning model?	(13)	Analyze	BTL 4
PART-C				
1	Consider the Bayesian Belief Network given below. i) What is the probability that the alarm has sounded but neither a burglary has sounded but neither a burglary nor an earthquake has occurred, and both john and Merry call? ii) What is the probability that John call?	(8) (7)	Create	BTL 6
2	What is Naïve Bayes? What is posterior probability and prior probability in Naïve Bayes? How does Naïve Bayes works? What are the applications of Naïve Bayes.	(15)	Analyze	BTL 4
3	Consider the dataset shown below i) Estimate the conditional probabilities for P (A|+), P (B|+), P (C|+), P (A|−), P (B|−), and P (C|−) ii) Use the estimate of conditional probabilities given in the previous question to predict the class label for a test sample (A = 0, B = 1, C = 0) using the naıve Bayes approach. iii) Estimate the conditional probabilities using the m-estimate approach, with p = 1/2 and m = 4 iv) Repeat part (ii) using the conditional probabilities given in part (iii).	(4) (4) (4) (3)	Create	BTL 6
4	Harry installed a new burglar alarm at his home to detect burglary. The alarm reliably responds at detecting a burglary but also responds for minor earthquakes. Harry has two neighbors David and Sophia, who have taken a responsibility to inform Harry at	(15)	Evaluate	BTL 5

	work when they hear the alarm. David always calls Harry when he hears the alarm, but sometimes he got confused with the phone ringing and calls at that time too. On the other hand, Sophia likes to listen to **high music, so sometimes she misses to hear the alarm. Here we would like to compute the probability of Burglary Alarm.** Calculate the probability that alarm has sounded, but there is neither a burglary, nor an earthquake occurred, and David and Sophia both called the Harry.			
5	Define Naïve Bayes Classifier. Explain the working procedure of Naïve Bayes Classifier with suitable example.	(15)	Evaluate	BTL 5

	UNIT IV		
	INSTANT BASED LEARNING K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.		
	PART-A		
Q.No	Questions	BT Level	Competence
1	Define KNN learning.	Remember	BTL1
2	Write the operation of the nearest Neighbour algorithm.	Remember	BTL1
3	What is the curse of dimensionality?	Remember	BTL1
4	Define instance-based learning.	Remember	BTL1
5	Write the equation for Euclidean distance.	Remember	BTL 1
6	Which is called the Voronoi *diagram?*	Remember	BTL 1
7	Mention the meaning of regression.	Remember	BTL 1
8	Infer residual.	Remember	BTL 1
9	Write the function of the kernel function.	Remember	BTL 1
10	How shall we modify this procedure to derive a local approximation rather than a global one?	Understand	BTL 2
11	Give the gradient descent training rule.	Remember	BTL 1
12	What is radial basis function?	Remember	BTL 1
13	Draw the diagram of the radial basis function network.	Remember	BTL 1
14	Write the three key properties of locally weighted regression.	Understand	BTL 2
15	What is the rewrite rule?	Understand	BTL 2
16	What is the use of the CADET system?	Remember	BTL 1
17	Mention the three properties of KNN?	Remember	BTL 1
18	List the names of three lazy learning methods.	Remember	BTL1
19	What is eager learning method?	Understand	BTL 2
20	What is the difference between lazy and eager methods?	Remember	BTL 1
21	What is case based reasoning approach?	Understand	BTL 2
22	What is RBF?	Remember	BTL1
23	Which is the key advantages of RBF?	Remember	BTL 2
24	Write the equation for learned hypothesis function?	Remember	BTL 1

		PART-B			
1		Explain about k-nearest neighbour learning.	(13)	Apply	BTL 3
2		Describe the distance-weighted nearest eighbora algorithm and its remarks.	(13)	Analyze	BTL 4
3		Explain about locally weighted linear regression	(13)	Evaluate	BTL 5
4.		Elaborately discuss the difference between lazy and eager learning methods.	(13)	Understand	BTL 2
5		Explain the Radial Basis Function.	(13)	Remember	BTL 1
6		Explain the case based reasoning method.	(13)	Understand	BTL 2
7		Describe the remarks on lazy and eager learning	(13)	Understand	BTL 2
8		Why Radial Basis Kernel Is much powerful? Justify.	(13)	Evaluate	BTL 5
9		Describe the RBF network architecture.	(13)	Understand	BTL 2
10		How to choose the value of k for KNN Algorithm?	(13)	Remember	BTL 1
11		Why do we need a KNN algorithm?	(13)	Remember	BTL 1
12		What is Case Based Reasoning (CBR) Classifier?	(13)	Understand	BTL 2
13		Write the Distance Metrics Used in KNN Algorithm.	(13)	Understand	BTL3
14		Describe the Workings of KNN algorithm	(13)	Analyze	BTL 4
15		Write the Implementation code for KNN classifier using Sklearn	(13)	Understand	BTL2
16		Describe the Principles of Locally Weighted Linear Regression	(13)	Understand	BTL 2
17		Explain KNN using code in Python.	(13)	Understand	BTL2
		PART C			
1		Derive the gradient descent rule for a distance-weighted local linear approximation the target function.	15	Evaluate	BTL5
2		Suggest a lazy version of the eager decision tree learning algorithm ID3 . What are the advantages and disadvantages of your lazy algorithm compared to the original eager algorithm?	15	Evaluate	BTL5
3		Explain K nearest neighbour algorithm with an example.	15	Understand	BTL 2
4		Describe Radial Basis Functions: Types, Advantages, and Use Cases	15	Understand	BTL 2
5		Explain about instance-based learning.	15	Understand	BTL 2

	UNIT V
	ADVANCED LEARNING-Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction –

	Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm– Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning(Chapter 10 ,11 &13Text Book1)			
	PART-A			
Q.No	**Questions**		**BT Level**	**Competence**
1	Define Horn Clauses.		Remember	BTL1
2	What are propositional rules?		Understand	BTL2
3	What is a sequential covering algorithm?		Remember	BTL 1
4	Write the sequential covering algorithm.		Remember	BTL1
5	Write the example for the Learn One Rule algorithm.		Remember	BTL1
6	What is the One Rule Algorithm?		Remember	BTL1
7	Define FOIL.		Remember	BTL1
8	Write the uses of FOIL in searching.		Remember	BTL1
9	Write the general form of the propositional resolution operator.		Remember	BTL1
10	What is the inverse resolution rule?		Remember	BTL1
11	Infer first-order resolution.		Remember	BTL1
12	Give the inverse resolution rule for first-order logic.		Remember	BTL1
13	What is analytical learning?		Remember	BTL1
14	Write the weakest preimage of the explanation		Remember	BTL1
15	What is the role of Prolog-EBG?		Understand	BTL 2
16	Describe regression procedure.		Understand	BTL2
17	What is explanation based learning?		Remember	BTL2
18	What is detective learning?		Understand	BTL2
19	Name the types of learning.		Understand	BTL2
20	What is Inductive Bias in Explanation-Based Learning.		Understand	BTL2
21	What is deductive learning?		Remember	BTL1
22	Define reinforcement learning.		Remember	BTL1
23	What is Q learning?		Understand	BTL 2
24	What is Temporal difference learning?		Understand	BTL 2
	PART-B			
1	Write the sequential covering algorithms and explain them elaborately.	(13)	Understand	BTL2
2	Explain with example learn one rule proceeds from general to Specific Beam Search.	(13)	Remember	BTL1
3	Describe induction as inverted deduction**.**	(13)	Understand	BTL2
4	Write the basic FOIL Algorithm. Guiding the search in FOIL.	(7) (6)	Understand	BTL2
5	Explain the analytical learning problems.	(13)	Create	BTL 6
6	Demonstrate the Prolog EBG regression process.	(13)	Apply	BTL4

7	Algorithm for regressing a set of literals through a single Horn clause.	(13)	Understand	BTL 2
8	Explain the need of Reinforcement Learning in the Gaming application with suitable example.	(13)	Remember	BTL 1
9	i) Inverting resolution First-Order Case ii) Generalization, 8-Subsumption, and Entailment	(7) (6)	Remember	BTL 1
10	Describe Inductive and Analytical Learning Problems	(13)	Analyze	BTL 4
11	Write the remarks on explanation-based learning.	(13)	Apply	BTL3
12	i) Explain about knowledge level learning. ii) Explanation-based learning of search control knowledge	(7) (6)	Apply	BTL3
13	Explain learning sequential control strategies in reinforcement learning	(13)	Understand	BTL 2
14	How reinforcement learning problem differs from other function approximation tasks in several important respects.	(13)	Analyze	BTL 4
15	Explain temporal difference learning with an example.	(13)	Understand	BTL 2
16	Explain the Convergence of Q learning for deterministic Markov decision processes.	(13)	Understand	BTL 2
17	Write the summary of learning rule set.	(13)	Analyze	BTL 4
	PART C			
1	Explain learning sets of first-order rules: FOIL	(15)	Create	BTL6
2	Explain Q-learning algorithms, and functions and write an algorithm.	(15)	Evaluate	BTL5
3	Explain about reinforcement learning new task.	(15)	Analyze	BTL4
4	Describe learning with perfect domain theories with example	(15)	Evaluate	BTL5
5	Describe General to Specific Beam Search	(15)	Evaluate	BTL5