Question Bank

UNIT-I

Short Answer Questions

S.NO	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	Define a well-posed learning problem with an example.	CO1	K1	2 M	Unit-I
2	State the concept of inductive bias in machine learning.	CO1	K1	2 M	Unit-I
3	Explain the Find-S algorithm with a simple example.	CO1	K2	2 M	Unit-I
4	Find the maximally specific hypothesis using the Find-S algorithm for a given set of training data.	CO1	K3	2 M	Unit-I
5	Define the version space in concept learning.	CO1	K1	2 M	Unit-I

Long Answer Questions

Q.No	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	State and explain the general-to-specific ordering in concept learning with examples.	CO1	K5	5 M	Unit-I
2	Using the Candidate Elimination algorithm, find the version space for a given set of hypotheses.	CO1	K3	5 M	Unit-I
3	Derive an expression for the inductive bias and explain its significance in decision tree learning.	CO1	K4	5 M	Unit-I
4	Using an example, illustrate the process of constructing a decision tree from training data.	CO1	K4	5 M	Unit-I
5	Draw the decision tree for a given dataset and discuss the issues related to decision tree learning.	CO1	K4	5 M	Unit-I

I Multiple Choice questions:

1.	The process of learning from examples and generalizing to unseen cases is called _____. (CO1, K1)	[ ]

A.Deduction	B. Concept learning	C. Overfitting	D. Cross-validation

2.	The Find-S algorithm is used to _____. (CO1, K1)			[ ]
A. Find the most general hypothesis	B. Find the maximally specific hypothesis	C. Find the least specific hypothesis	D. Eliminate inconsistent hypotheses	
3.	In concept learning, the space of all hypotheses consistent with the training data is called the _____. (CO1, K1)			[ ]
A.Hypothesis space	B. Version space	C. Concept space	D. Candidate space	
4.	Decision trees are most appropriate for _____. (CO1, K2)			[ ]
A.Continuous output problems	B. Problems with discrete, categorical outcomes	C. Regression tasks	D. Unsupervised learning	
5.	Big Data is that which (CO1,K2)			[ ]
A. Small involume, yet growing exponentially	B. is huge in volume, yet growing exponentially with time	C. huge in volume, yet reduces with time	D. none	
6.	he algorithm that searches the hypothesis space to find the most specific hypothesis consistent with positive examples is _____. (CO1, K1)			[ ]
A. Decision Tree Learning	B. Candidate Elimination Algorithm	C. Find-S Algorithm	D. Naïve Bayes	
7.	The inductive bias in decision tree learning is that _____. (CO1, K2)			[ ]
A. Simpler trees are preferred over complex ones	B. More complex trees are preferred	C. Only specific hypotheses are considered	D. Version space is eliminated	
8.	The process of removing inconsistent hypotheses from the version space is known as _____. (CO1, K2			[ ]
A. Pruning	B. Candidate Elimination	C. Data Cleaning	D. Hypothesis Generation	
9.	A key limitation of the Find-S algorithm is that it _____. (CO1, K2)			[ ]
A. Fails to guarantee finding the target concept	B. Finds the most general hypothesis	C. Always finds a correct hypothesis	D. Requires negative examples to function	
10.	Inductive bias in machine learning refers to _____. (CO1, K1)			[ ]
A. The set of assumptions a learner makes to generalize	B. The process of finding patterns in data	C. The quality of data	D. The noise present in data	

II Fill in the Blanks:

1.	The Find-S algorithm is used to find the _____. hypothesis that is consistent with all positive examples. (CO1, K1)
2.	In decision tree learning, the search strategy employed is known as _____. (CO1, K2)
3.	In concept learning, the process of narrowing down the set of hypotheses by eliminating those inconsistent with examples is called _____. (CO1, K2)
4.	1. In concept learning, the process of narrowing down the set of hypotheses by eliminating those inconsistent with examples is called _____. (CO1, K2)
5.	_____ is the assumption made by a learning algorithm to generalize beyond the observed data. (CO1, K1)
6.	A decision tree is most appropriate for problems where the target output is _____. (CO1, K2)
7.	The initial hypothesis in the Find-S algorithm is set to the _____ hypothesis. (CO1, K1)
8.	The _____ algorithm is used to systematically eliminate hypotheses that do not fit the training data. (CO1, K2)
9.	In decision tree learning, _____ refers to the preference for simpler hypotheses over complex ones. (CO1, K1)
10	The process of learning a decision tree from labeled examples is called _____ learning. (CO1, K1)

UNIT-II

Short Questions:

Q.No	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	Define a neural network.	CO2	K1	2 M	Unit-II

2	State the role of perceptrons in neural networks.	CO2	K1	2 M	Unit-II
3	Explain the significance of the back-propagation algorithm in training neural networks.	CO2	K2	2 M	Unit-II
4	Identify appropriate problems for neural network learning.	CO2	K3	2 M	Unit-II
5	Define the concept of hypothesis evaluation in machine learning.	CO2	K1	2 M	Unit-II

Long Questions:

Q.No	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	Explain the architecture of a multilayer neural network and the process of back-propagation.	CO2	K5	5 M	Unit-II
2	Derive the equations used in the back-propagation algorithm for updating the weights in a neural network.	CO2	K4	5 M	Unit-II
3	Analyze the challenges faced by neural networks in learning from complex datasets.	CO2	K4	5 M	Unit-II
4	Compare and contrast the performance of different neural network architectures in solving real-world problems.	CO2	K4	5 M	Unit-II
5	Evaluate the effectiveness of hypothesis evaluation techniques in improving the accuracy of machine learning models.	CO2	K5	5 M	Unit-II

I Multiple Choice Questions:

1.	The primary function of the backpropagation algorithm is to _____. (CO2, K1)	[ ]

A. Train neural networks	B. Validate hypotheses	C. Eliminate noise	D. Extract features

2.	The primary function of a perceptron is to _____. (CO2, K1)			[ ]
A. Classify data		B. Store information	C. Perform complex calculations	D. Generate random numbers
3.	A multilayer neural network consists of _____. (CO2, K1)			[ ]
A. One layer		B. Two layers	C. Multiple layers	D. No layers
4.	In the context of neural networks, activation functions are used to _____. (CO2, K2)			[ ]
A. Normalize data		B. Introduce non-linearity	C. Simplify computations	D. Reduce dimensions
5.	Big Data is that which (CO2,K2)			[ ]
A. Small involume, yet growing exponentially		B. is huge in volume, yet growing exponentially with time	C. huge in volume, yet reduces with time	D. none
6.	he algorithm that searches the hypothesis space to find the most specific hypothesis consistent with positive examples is _____. (CO2, K1)			[ ]
A. Decision Tree Learning		B. Candidate Elimination Algorithm	C. Find-S Algorithm	D. Naïve Bayes
7.	Which neural network model was developed by Frank Rosenblatt? [CO2, K1]			[ ]
A. Hopfield Network		B. Ada line	C. SOM	D. Perceptron
8.	Which element of a neural network determines how quickly or slowly the model learns? [CO2, K1]			[ ]
A. Weight		B. Bias	C. Learning rate	D. Activation Function
9.	Which network is known for minimizing the squared error between the actual output and the target output? [CO2, K1]			[ ]
A. Perceptron		B. Ada Line	C. Max Net	D. Hopfield Networks
10.	What does BAM stand for in neural networks? [CO2, K1]			[ ]
A. Binary Associative Memory		B. Backward Adaptive Mechanism	C. Bidirectional Associative Memory	D. Binary Adaptive Memory

II Fill in the Blanks:

1.	The _____ in a neural network represents the strength of the connection between neurons.

	[CO2, K1]
2.	The _____ function in a neural network introduces non-linearity to the model. [CO2, K1]
3.	The Perceptron model was designed to solve _____ classification problems. [CO2, K1]
4.	In a Back-Propagation network, the _____ is propagated backwards through the network to update the weights. [CO2, K1]
5.	_____ Learning uses labeled data to train neural networks. [CO2, K1]
6.	ADALINE stands for _____ [CO2, K1]
7.	The _____ rate in a neural network controls how much the weights are adjusted with respect to the loss gradient. [CO2, K1]
8.	A _____ is a computational model inspired by the structure and functioning of biological neural networks. [CO2, K1]
9.	Associative Memory Networks are used for pattern _____ and recall. [CO2, K1]

UNIT-III

Short Questions

Q.No	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	Define Bayesian learning.	CO3	K1	2 M	Unit-III
2	State Bayes' theorem and its application in	CO3	K1	2 M	Unit-III

	machine learning.				
3	Identify the role of the Naïve Bayes classifier in text classification tasks.	CO3	K3	2 M	Unit-III
Mid-II					
1	Explain conditional probability	CO3	K3	2 M	Unit-III
2	Define the EM algorithm and its significance in machine learning.	CO3	K1	2 M	Unit-III
3	Explain the concept of maximum likelihood hypothesis.	CO3	K2	2 M	Unit-III

Long Answer Questions

<table>
<tr><th>Q.No</th><th>Question</th><th>Course Outcome</th><th>Bloom's Taxonomy Level</th><th>Marks</th><th>Unit No.</th></tr>
<tr><td>1</td><td>Explain the process of Bayesian learning with the help of an example.</td><td>CO3</td><td>K5</td><td>5 M</td><td>Unit-III</td></tr>
<tr><td>2</td><td>Compare the performance of the Naïve Bayes classifier with other classification algorithms in text classification.</td><td>CO3</td><td>K4</td><td>5 M</td><td>Unit-III</td></tr>
<tr><td>3</td><td>Analyze the role of Bayesian belief networks in capturing uncertainty in machine learning models.</td><td>CO3</td><td>K4</td><td>5 M</td><td>Unit-III</td></tr>
<tr><td colspan="6">Mid-II</td></tr>
<tr><td>4</td><td>Consider the training dataset given in the following table. Use Weighted k-NN and determine the class. Test instance (7.6, 60, 8) and K=3.

<table><tr><td>S.No.</td><td>CGPA</td><td>Assessment</td><td>Project Submitted</td><td>Result</td></tr><tr><td>1</td><td>9.2</td><td>85</td><td>8</td><td>Pass</td></tr><tr><td>2</td><td>8</td><td>80</td><td>7</td><td>Pass</td></tr><tr><td>3</td><td>8.5</td><td>81</td><td>8</td><td>Pass</td></tr><tr><td>4</td><td>6</td><td>45</td><td>5</td><td>Fail</td></tr><tr><td>5</td><td>6.5</td><td>50</td><td>4</td><td>Fail</td></tr><tr><td>6</td><td>8.2</td><td>72</td><td>7</td><td>Pass</td></tr><tr><td>7</td><td>5.8</td><td>38</td><td>5</td><td>Fail</td></tr><tr><td>8</td><td>8.9</td><td>91</td><td>9</td><td>Pass</td></tr></table></td><td>CO3</td><td>K6</td><td>5 M</td><td>Unit-III</td></tr>
<tr><td>5</td><td>Evaluate the effectiveness of the EM algorithm in handling missing data in machine learning.</td><td>CO3</td><td>K5</td><td>5 M</td><td>Unit-III</td></tr>
<tr><td></td><td>Derive the maximum likelihood hypothesis for predicting probabilities in machine learning.</td><td>CO3</td><td>K4</td><td>5 M</td><td>Unit-III</td></tr>
</table>

I Multiple Choice Questions:

1.	Bayes' theorem is primarily used to calculate _____. (CO3, K1)	[ ]

A. Probabilities	B. Hypotheses C. Errors D. Weights	C. Big data analytics	D. Data analysis	
2.	The Naïve Bayes classifier assumes that features are _____. (CO3, K1)			[ ]
A. Dependent	B. Independent	C. Correlated	D. Sequential	
3.	The principle that suggests a model should be as simple as possible while fitting the data is known as _____. (CO3, K2)			[ ]
A. Occam's Razor	B. Bayesian inference	C. Maximum likelihood	D. Minimum description length	
4.	In Bayesian learning, the term "prior" refers to _____. (CO3, K2)			[ ]
A. Initial beliefs before seeing data	B. Final conclusions	C. Likelihood of evidence	D. Error margins	
5.	The EM algorithm is primarily used for _____. (CO3, K2)			[ ]
A. Parameter	B. Data	C. Model evaluation	D. Data visualization	
Mid-II				
6.	In computational learning theory, the term PAC stands for _____. (CO3, K1)			[ ]
A.Probably Approximately Correct	B. Partial Accuracy Calculation	C. Predictive Algorithmic Computation	D. Pattern Accuracy Clustering	
7.	In Bayesian learning, "likelihood" refers to _____. (CO3, K2)			[ ]
A. The probability of the data given the model	B. The prior knowledge	C. The posterior probability	D. Error minimization	
8.	Which of the following is a key assumption of the Naive Bayes classifier? (CO3, K2)			[ ]
A. Conditional independence	B. Complete dependence	C. Perfect correlation	D. Variable feature correlation	
9.	Instance-based learning focuses on _____. (CO3, K2)			[ ]
A. Storing all training examples	B. Generalizing from examples	C. Creating rules	D. Ignoring training data	
10.	In computational learning theory, the Vapnik-Chervonenkis (VC) dimension measures _____. (CO3, K2)			[ ]
A. The capacity of a model to learn	B. The error rate of a classifier	C. Data distribution	D. Noise levels	

II Fill in the blanks

S.NO	

1	Bayes' theorem calculates _____ in probabilistic models. (CO3, K1)
2	The Naïve Bayes classifier assumes _____ between features. (CO3, K2)
3	The principle that prefers the simplest hypothesis is called _____. (CO3, K2)
4	In Bayesian learning, the belief before seeing the data is called the _____. (CO3, K1)
5	The term PAC stands for _____ learning. (CO3, K2)
Mid-II	
6	The EM algorithm involves two steps: Expectation and _____. (CO3, K1)
7	The Vapnik-Chervonenkis (VC) dimension measures the _____ of a model. (CO3, K2)
8	In instance-based learning, predictions are based on the _____ data points. (CO3, K1)
9	The term "likelihood" in Bayesian learning refers to the _____ of the data given the model. (CO3, K1)
10	Instance-based learning stores _____ training examples for future use. (CO3, K2)

UNIT – IV

Short Questions:

Q.No	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	Define genetic algorithms and their application in machine learning.	CO4	K1	2 M	Unit-IV
2	State the key principles behind reinforcement learning.	CO4	K1	2 M	Unit-IV
3	Explain the process of hypothesis space search in genetic algorithms.	CO4	K2	2 M	Unit-IV
4	Identify the role of Q-learning in reinforcement learning tasks.	CO4	K3	2 M	Unit-IV
5	Define the concept of non-deterministic rewards and actions in reinforcement learning.	CO4	K1	2 M	Unit-IV

Long Questions:

Q.No	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	Explain the working of genetic algorithms with an example.	CO4	K5	5 M	Unit-IV
2	Derive the fitness function used in a genetic algorithm for solving optimization problems.	CO4	K4	5 M	Unit-IV
3	Analyze the relationship between genetic algorithms and evolutionary learning models.	CO4	K4	5 M	Unit-IV
4	Compare the effectiveness of rule-based learning with genetic algorithms in complex problem-solving scenarios.	CO4	K4	5 M	Unit-IV
5	Evaluate the impact of reinforcement learning in improving the performance of intelligent agents.	CO4	K5	5 M	Unit-IV

I Multiple Choice Questions:

1.	Genetic algorithms are inspired by _____. (CO4, K1)	[ ]

A. Natural selection	B. Artificial intelligence	C. Neural networks	D. Evolutionary psychology	
2.	The process of selecting individuals for reproduction in a genetic algorithm is called _____. (CO4, K2)			[ ]
A. Crossover	B. Mutation	C. Selection	D. Elimination	
3.	In genetic programming, the individuals are typically represented as _____. (CO4, K1)			[ ]
A. Strings	B. Trees	C. Graphs	D. Matrices	
4.	The main objective of reinforcement learning is to learn _____. (CO4, K2)			[ ]
A. Optimal actions	B. Optimal parameters	C. Decision trees	D. Neural networks	
5.	A characteristic of genetic algorithms is _____. (CO4, K1)			[ ]
A. Exploitation	B. Exploration	C. Convergence	D. Randomness	
6.	In reinforcement learning, the feedback received from the environment is called _____. (CO4, K2)			[ ]
A. Reward	B. Cost	C. Output	D. Feedback	
7.	Genetic algorithms primarily use a fitness function to _____. (CO4, K1)			[ ]
A. Select individuals for reproduction	B. Measure learning accuracy	C. Track convergence	D. Modify hypotheses	
8.	In reinforcement learning, the process of exploring and exploiting to maximize rewards is called _____. (CO4, K2)			[ ]
A. Exploration-exploitation tradeoff	B. Decision balancing	C. Random search	D. Genetic convergence	
9.	The process of combining two parent solutions to form new offspring in genetic algorithms is called _____. (CO4, K2)			[ ]
A. Crossover	B. Mutation	C. Selection	D. Cloning	
10.	Reinforcement learning is typically used in _____ environments. (CO4, K1)			[ ]
A. Dynamic	B. Static	C. Stationary	D. Predictable	

II Fill in the Blanks:

S.NO	
1	Genetic algorithms are based on the concept of _____. (CO4, K1)
2	The process of combining parts of two parent solutions in genetic algorithms is called _____. (CO4, K2)

3	In reinforcement learning, the feedback received after performing an action is called a _____. (CO4, K1)
4	In genetic algorithms, mutations introduce _____ into the population. (CO4, K2)
5	A reinforcement learning agent aims to maximize its _____ over time. (CO4, K2)
6	Genetic algorithms use a _____ function to evaluate the quality of solutions. (CO4, K1)
7	The _____ tradeoff in reinforcement learning involves choosing between exploring new actions or exploiting known ones. (CO4, K2)
8	Reinforcement learning typically involves interacting with a _____ environment. (CO4, K1)
9	In genetic algorithms, _____ helps introduce diversity into the population. (CO4, K2)
10	Reinforcement learning algorithms aim to find the _____ strategy for a task. (CO4, K1)

UNIT-V

Short Answer Questions

Q.No	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	Define analytical learning and its role in machine learning.	CO5	K1	2 M	Unit-V
2	State the significance of using prior knowledge in analytical learning.	CO5	K1	2 M	Unit-V
3	Explain the PROLOG-EBG approach in explanation-based learning.	CO5	K2	2 M	Unit-V
4	Identify the challenges in combining inductive and analytical learning methods.	CO5	K3	2 M	Unit-V
5	Define the concept of explanation-based generalization (EBG) in machine learning.	CO5	K1	2 M	Unit-V

Long Answer Questions

Q.No	Question	Course Outcome	Bloom's Taxonomy Level	Marks	Unit No.
1	Explain the process of analytical learning with an example.	CO5	K5	5 M	Unit-V
2	Derive the equation for explanation-based generalization in analytical learning.	CO5	K4	5 M	Unit-V
3	Analyze the challenges and benefits of combining inductive and analytical learning methods.	CO5	K4	5 M	Unit-V
4	Compare the effectiveness of analytical learning and inductive learning in different machine learning tasks.	CO5	K4	5 M	Unit-V
5	Evaluate the role of prior knowledge in enhancing the performance of machine learning models through analytical learning.	CO5	K5	5 M	Unit-V

I Multiple Choice Questions:

1	Analytical learning focuses on _____. [CO5, K1]	[ ]

A. Combining prior knowledge with examples	B. Purely learning from data	C. Generalizing from examples	D. Pattern matching	
2	In analytical learning, prior knowledge is used to _____. [CO5, K1]			[ ]
A. Generate hypotheses	B. Evaluate data	C. Simplify learning tasks	D. All of the above	
3	The combination of inductive and analytical learning helps in _____ .[CO5, K1]			[ ]
A. Reducing training time	B. Improving accuracy	C. Enhancing generalization	D. All of the above	
4	Analytical learning is particularly useful in _____ domains . [CO5, K1]			[ ]
A. Static	B. Dynamic	C. Complex	D. Simple	
5	The process of using examples to refine knowledge is known as _____. [CO5, K2]			[ ]
A. Conceptual learning	B. Case-based reasoning	C. Model-based learning	D. Knowledge refinement	
6	Combining analytical and inductive learning leads to _____ [CO5, K1]			[ ]
A. Faster learning	B. More robust models	C. Better predictions	D. All of the above	
7	A significant advantage of analytical learning is its ability to incorporate _____ [CO5, K2]			[ ]
A. Noise	B. Uncertainty	C. Expert knowledge	D. Randomness	
8	In the context of analytical learning, the term "explanation-based learning" refers to _____ [CO5, K1]			[ ]
A. Learning from previous cases	B. Learning from mistakes	C. Learning from reasoning	D. Learning from intuition	
9	Analytical learning can help in _____ decision-making processes. [CO5, K2]			[ ]
A. Complex	B. Simple	C. Automated.	D. None of the above	
10	The combination of inductive and analytical learning can improve _____ performance. [CO5, K1]			[ ]
A. Predictive	B. Descriptive	C. Prescriptive	D. All of the above	

II. Fill in the Blanks:

1.	Analytical learning emphasizes the use of _____ knowledge. [CO5, K1]
2.	The integration of inductive and analytical learning enhances _____ [CO5, K1]
3.	A significant advantage of analytical learning is its ability to handle _____ [CO5, K2]
4.	The process of refining knowledge based on examples is known as _____. [CO5, K1]
5.	In analytical learning, the term "explanation-based learning" involves _____. [CO5, K1]
6.	Combining analytical and inductive approaches results in _____ models. [CO5, K2]]
7.	Analytical learning is particularly beneficial in _____ domains. [CO5, K1]
8.	[CO5, K2] One key feature of analytical learning is its reliance on _____ knowledge
9.	The integration of different learning approaches can lead to improved _____ performance. [CO5, K1]
10.	Analytical learning can assist in making _____ decisions. [CO5, K1]