



SIDDHARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: **Artificial Intelligence & Machine Learning(19CS0522)** Course & Branch: **B.Tech - CSE**

Regulation: **R19**

Year & Sem: **III-B.Tech & II - Sem**

UNIT –I
INTRODUCTION

1.	a	Illustrate various characteristics of Intelligent agents.	[L3][CO1]	[6M]
	b	Explain Foundations of Artificial Intelligence.	[L1][CO1]	[6M]
2.	a	Illustrate any four PEAS description of the task environment for intelligent agents and explain it.	[L3][CO1]	[8M]
	b	What are the applications of Artificial Intelligence?	[L1][CO1]	[4M]
3.	Sketch the following agent types and illustrate its working principle with merits, demerits. i) Simple reflex agent. ii) Model based agent. iii) Utility based agent iv) Goal based agent		[L3][CO1]	[12M]
	a	Tabulate comparison of Human Intelligence with Artificial Intelligence.	[L4][CO1]	[6M]
4.	b	Discuss about agents and various Properties of environment.	[L2][CO1]	[6M]
	a	Explain in detail about structure of Intelligent agents.	[L2][CO1]	[6M]
5.	b	Adapt the suitable strategy to solve a N-Queen Problem.	[L6][CO1]	[6M]
	a	Analyse water jug problem in AI with operators involved in it.	[L4][CO1]	[6M]
6.	b	Design and Solve Vacuum Cleaner toy problem in AI.	[L3][CO1]	[6M]
	a	Describe typical Intelligent system briefly.	[L1][CO1]	[6M]
7.	b	Give your opinion how Artificial intelligence helps in achieving Data Security. Justify your opinion.	[L5][CO1]	[6M]
	a	Illustrate the different Artificial Intelligence problems.	[L3][CO1]	[6M]
8.	b	Predict and analyse future application areas of Artificial Intelligence.	[L5][CO1]	[6M]
	a	Demonstrate the various Components of problem definition in AI.	[L2][CO1]	[6M]
9.	b	Discuss learning Agent in AI.	[L2][CO1]	[6M]
	10.	Summarize various Typical Intelligent Agents in Artificial Intelligence?	[L6][CO1]	[12M]

**UNIT –II
PROBLEM SOLVING METHODS**

1	List various uninformed search techniques and explain any four techniques with appropriate step-by-step sketch.		[L2][CO2]	[12M]
2	a	Identify and explain in detail about optimization problems?	[L2][CO2]	[6M]
	b	Demonstrate the process of simulated annealing with example?	[L3][CO2]	[6M]
3	a	Explain A* Algorithm finds a shortest distance between Source and Goal state?	[L2][CO1]	[6M]
	b	<p>Simulate the A* Algorithm for the above problem, Here S denotes Starting State, G-Goal State.</p>	[L3][CO2]	[6M]
4	a	Analyze Depth Limited search and Bidirectional search techniques with suitable examples?	[L4][CO2]	[8M]
	b	Describe the process of simulated annealing with example?	[L2][CO1]	[4M]
5	a	Summarize various types of Hill climbing search techniques in AI.	[L2][CO2]	[6M]
	b	Outline the concept of breadth-first search technique with suitable example and also specify the performance measure of BFS.	[L1][CO2]	[6M]
6	a	Demonstrate AO* Algorithm in AI with suitable example.	[L3][CO2]	[6M]
	b	What is Constraint Satisfaction Problem? Explain it with example.	[L2][CO2]	[6M]
7	a	Describe fully and partial observation search algorithms?	[L2][CO2]	[6M]
	b	Justify how optimal decisions in gaming helps to maximize chances?	[L5][CO2]	[6M]
8	a	Describe the DFS algorithm with examples?	[L2][CO1]	[6M]
	b	Identify different informed search techniques in AI?	[L3][CO2]	[6M]
9	Illustrate the working principle of Alpha – Beta pruning with neat sketch.		[L3][CO2]	[12M]
10	a	Interpret backtracking search in graph coloring problem?	[L2][CO2]	[4M]
	b	Design a solution for the following Crypt arithmetic Problem of CSP in AI.	$\begin{array}{r} \text{SEND} \\ + \text{MORE} \\ \hline \text{MONEY} \end{array}$	[L6][CO2]

UNIT –III
SUPERVISED LEARNING

1	a	Explain the various types of Machine Learning techniques.	[L2][CO3]	[6M]
	b	List out an applications of Machine Learning.	[L1][CO3]	[6M]
2	a	Describe classification techniques in supervised learning with an example.	[L2][CO3]	[6M]
	b	List out various Regression techniques in Machine Learning.	[L1][CO3]	[6M]
3	a	Explain about Decision Trees in supervised learning.	[L2][CO3]	[6M]
	b	Compare Univariate and Multivariate Decision Trees.	[L4][CO3]	[6M]
4	a	Differentiate various Parametric and Non-Parametric Methods.	[L4][CO3]	[8M]
	b	Differentiate Supervised and Unsupervised Machine learning.	[L4][CO3]	[4M]
5	Summarize the following models. (i) Linear regression (ii) Logistic regression		[L5][CO3]	[12M]
6	a	Analyze linear discrimination model in Machine Learning.	[L4][CO3]	[6M]
	b	Discriminate logistic discrimination analysis in machine learning.	[L5][CO3]	[6M]
7	a	Illustrate multi-layer perception learning.	[L3][CO3]	[6M]
	b	Analyze Regression discrimination in machine learning.	[L4][CO3]	[6M]
8	Discuss Back Propagation Algorithm with an example.		[L2][CO3]	[12M]
9	Apply Bayesian Decision Theory in artificial intelligence.		[L3][CO3]	[12M]
10	a	Elaborate the Bayes Estimator in supervised learning?	[L6][CO3]	[6M]
	b	Illustrate Gradient descent algorithm and its variants.	[L3][CO3]	[6M]

UNIT –IV**UNSUPERVISED LEARNING**

1	a	Discuss the following terms i. unsupervised learning ii. Clustering	[L2][CO4]	[6M]
	b	Illustrate the mixtures of latent variable models?	[L2][CO4]	[6M]
2	a	Illustrate the Principle Component Analysis technique?	[L3][CO4]	[6M]
	b	How mixture density is calculated in unsupervised learning?	[L1][CO4]	[6M]
3	a	Demonstrate supervised learning after clustering.	[L2][CO4]	[6M]
	b	Illustrate about the spectral clustering in supervised learning.	[L2][CO4]	[6M]
4	a	Implement for the finite words classification system using back propagation algorithm.	[L4][CO4]	[6M]
	b	Explain the procedure for choose the number of clusters in USL?	[L2][CO4]	[6M]
5	a	Describe briefly about subset selection.	[L2][CO4]	[6M]
	b	Infer the similarities and differences between average-link clustering and k-means?	[L4][CO4]	[6M]
6	a	Generalize K-Means algorithm in Machine Learning.	[L6][CO4]	[6M]
	b	How can we make k-means robust to outliers?	[L2][CO4]	[6M]
7	a	Illustrate in detail about multidimensional scaling?	[L3][CO4]	[6M]
	b	Describe Singular Value Decomposition and Matrix Factorization.	[L2][CO4]	[6M]
8	a	Analyze the maximization algorithm with simple example?	[L4][CO4]	[6M]
	b	In factor analysis, how can we find the remaining ones if we already know some of the factors?	[L2][CO4]	[6M]
9	a	Demonstrate Hierarchical Clustering with simple example?	[L2][CO4]	[6M]
	b	List out the various unsupervised learning techniques?	[L1][CO4]	[6M]
10		Summarize the following terms briefly i. PCA ii. LDA	[L2][CO4]	[12M]

UNIT –V**REINFORCEMENT LEARNING**

1	a	Explain the following terms i. Reinforcement learning ii. Density Estimation	[L2][CO5]	[6M]
	b	Compare unsupervised learning and Reinforcement learning?	[L4][CO5]	[6M]
2	a	State and explain Non Parametric Density Estimation?	[L1][CO5]	[6M]
	b	Explain Histogram Estimator with simple example?	[L2][CO5]	[6M]
3	a	Analyze the K-Nearest Neighbor Estimator.	[L4][CO5]	[6M]
	b	Elaborate Non Parametric Classification?	[L6][CO5]	[6M]
4	a	Illustrate Condensed Nearest Neighbor in reinforcement learning?	[L3][CO5]	[12M]
5	a	Write in detail about Single State Case: K-Armed Bandit.	[L1][CO5]	[6M]
	b	What are the Elements are involving Reinforcement Learning using Markov Decision Process (MDP)	[L1][CO5]	[6M]
6	a	Discuss the following terms i. Non parametric estimation ii. Instance based learning	[L2][CO3]	[12M]
	b	Explain Model-Based Learning with an example?	[L2][CO5]	[6M]
7	a	Illustrate in detail about K-Armed Bandit in reinforcement learning?	[L2][CO5]	[6M]
	b	List and explain in detail about elements of reinforcement learning?	[L1][CO5]	[6M]
8	a	Describe Exploration Strategies and deterministic rewards in Temporal Difference Learning?	[L2][CO3]	[6M]
	b	State and explain non parametric density estimation?	[L2][CO5]	[6M]
9	a	Explain the Nonparametric rewards and actions in temporal difference learning?	[L2][CO5]	[6M]
	b	Assess in detail about partially observables states in learning?	[L5][CO5]	[6M]
10	a	Explain Generalization process in Temporal difference Learning?	[L2][CO5]	[6M]
	b	List and explain in detail about elements of reinforcement learning?	[L1][CO5]	[6M]

Prepared by:

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