



**SIDDHARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR  
(AUTONOMOUS)**

Siddharth Nagar, Narayanavanam Road – 517583

**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code: Artificial Intelligence &  
Machine Learning (18CS0535)**

**Course & Branch: B.Tech - CSE**

**Regulation: R18**

**Year & Sem: IV-B.Tech & I - Sem**

**UNIT –I  
INTRODUCTION**

1.	a	Mention the categorization of intelligent systems	[L1][CO1]	[2M]
	b	Define components of AI program.	[L1][CO1]	[2M]
	c	What are the foundations of AI?	[L1][CO1]	[2M]
	d	List characteristics of a problem.	[L1][CO1]	[2M]
	e	Write about the analysis of search methods.	[L1][CO1]	[2M]
2.	a	Illustrate various characteristics of Intelligent agents.	[L3][CO1]	[5M]
	b	Express the Approaches of Artificial Intelligence.	[L2][CO1]	[5M]
3.	a	Decide PEAS for at least four agent types?	[L5][CO1]	[5M]
	b	Recall the applications of Artificial Intelligence?	[L1][CO1]	[5M]
4.		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]	[10M]
5.	a	Compare and contrast Human Intelligence to Artificial Intelligence.	[L4][CO1]	[5M]
	b	Discuss about agents and various Properties of environment.	[L2][CO1]	[5M]
6.	a	Explain in detail about structure of Intelligent agents?	[L2][CO1]	[7M]
	b	Adapt the suitable strategy to solve a N-Queen Problem.	[L6][CO1]	[3M]
7.	a	Explain water jug problem in AI with operators involved in it.	[L2][CO1]	[5M]
	b	Design a solution strategy for vacuum Cleaner toy problem in AI.	[L3][CO1]	[5M]
8.	a	Define an agent. What are the characteristics of Intelligent agent? Describe typical Intelligent system briefly.	[L1][CO1]	[6M]
	b	Give your opinion how Artificial intelligence helps in achieving Data Security. Justify your opinion.	[L5][CO1]	[4M]
9.	a	Illustrate the different Artificial Intelligence problems?	[L4][CO1]	[5M]
	b	Predict and analyse future application areas of Artificial Intelligence.	[L5][CO1]	[5M]
10.	a	Explain the components of problem definition with an example.	[L1][CO1]	[5M]
	b	Predict the foundations of Artificial Intelligence?	[L5][CO1]	[5M]

**UNIT –II**  
**PROBLEM SOLVING METHODS**

1	a	What is goal formulation?	[L1][CO2]	[2M]
	b	Define initial state.	[L1][CO2]	[2M]
	c	Discuss about path cost.	[L1][CO2]	[2M]
	d	What is parent node and child node?	[L1][CO2]	[2M]
	e	What are the four ways to evaluate an algorithm? Name them?	[L1][CO2]	[2M]
2	a	Define local search algorithm. List various local search techniques available in AI. Show how it is different from conventional search techniques.	[L1][CO2]	[5M]
	b	Demonstrate working of Alpha – Beta pruning with neat sketch.	[L2][CO2]	[5M]
3	a	State and explain in detail about optimization problems?	[L2][CO2]	[5M]
	b	Describe the process of simulated annealing with example?	[L1][CO2]	[5M]
4	a	How A* Algorithm finds a shortest distance between Source and Goal state? Show how evaluation function calculated in A*?	[L2][CO1]	[4M]
	b	<p>Simulate the A* Algorithm for the above problem, Here S denotes Starting State, G-Goal State.</p>	[L3][CO2]	[6M]
5	a	Analyze the concept of depth Limited search, Uniform cost search and Bidirectional search techniques?	[L4][CO2]	[6M]
	b	Review the process of simulated annealing with example?	[L2][CO1]	[4M]
6	a	Summarize various types of Hill climbing search techniques in AI.	[L2][CO2]	[5M]
	b	Outline the concept of breadth-first search technique with suitable example. List performance measure of BFS.	[L2][CO2]	[5M]
7	a	Explain in detail AO* Algorithm with suitable example.	[L2][CO2]	[5M]
	b	Examine how the steepest accent hill climbing works.	[L3][CO2]	[5M]
8	a	Explain about fully and partial observation search algorithm?	[L2][CO2]	[6M]
	b	Justify how optimal decisions in gaming helps to maximize chances?	[L5][CO2]	[4M]
9	a	Describe the backtracking search algorithm with examples?	[L2][CO1]	[7M]
	b	Report different ways to evaluate an algorithm?	[L3][CO2]	[3M]
10	a	Define constraint satisfaction problem. Recall the Crypt arithmetic Problem of CSP in AI.	[L1][CO2]	[3M]
	b	Devise 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	What is supervised learning?	[L1][CO3]	[2M]
	b	State Pruning.	[L1][CO3]	[2M]
	c	Identify types of pruning processes.	[L2][CO3]	[2M]
	d	Define classification.	[L1][CO3]	[2M]
	e	What is meant by noise in learning?	[L1][CO3]	[2M]
2	a	Define machine learning. Why machine learning is important and discuss with example?	[L2][CO3]	[5M]
	b	List out an applications of machine learning.	[L1][CO3]	[5M]
3	a	What is classification? Where do we use classification with an example?	[L1][CO3]	[5M]
	b	Describe classification in machine learning.	[L2][CO3]	[5M]
4	a	Explain decision tree with an example.	[L2][CO3]	[5M]
	b	Difference between univariate and multivariate decision tree.	[L2][CO3]	[5M]
5	a	Generalize Alpha–Beta pruning Algorithm with example.	[L6][CO3]	[5M]
	b	Compare and contrast parametric and non-parametric methods.	[L4][CO3]	[5M]
6		Explain the following models. (i) Linear regression (ii) Logistic regression	[L2][CO3]	[5M]
7	a	Analyze linear discrimination in machine learning.	[L4][CO3]	[5M]
	b	Discriminate logistic discrimination analysis in machine learning.	[L5][CO3]	[5M]
8	a	Illustrate multi-layer perception learning.	[L2][CO3]	[5M]
	b	Analyze Regression discrimination in machine learning.	[L4][CO3]	[5M]
9	a	Extend back propagation algorithm with example.	[L2][CO3]	[5M]
	b	Explain Bayesian Decision Theory in artificial intelligence.	[L2][CO3]	[5M]
10	a	Implement for the finite words classification system using back propagation algorithm.	[L6][CO3]	[5M]
	b	Illustrate Gradient descent algorithm and its variants.	[L2][CO3]	[5M]

**UNIT –IV****UNSUPERVISED LEARNING**

1	a	What is unsupervised learning?	[L1][CO4]	[2M]
	b	Discuss short notes on clustering?	[L1][CO4]	[2M]
	c	Discuss the application of unsupervised learning?	[L1][CO4]	[2M]
	d	Differentiate between supervised learning and unsupervised learning	[L1][CO4]	[2M]
	e	What are latent variable models?	[L1][CO4]	[2M]
2	a	Write in detail about principle component analysis.	[L1][CO4]	[5M]
	b	How mixture density is calculated in unsupervised learning?	[L1][CO4]	[5M]
3	a	Demonstrate in detail about supervised learning after clustering.	[L2][CO4]	[5M]
	b	Illustrate about the spectral clustering in supervised learning.	[L2][CO4]	[5M]
4	a	Implement for the finite words classification system using back propagation algorithm.	[L4][CO4]	[5M]
	b	Explain how to choose the number of clusters in USL?	[L2][CO4]	[5M]
5	a	Describe briefly about subset selection.	[L2][CO4]	[5M]
	b	What are the similarities and differences between average-link clustering and k-means?	[L4][CO4]	[5M]
6	a	Generalize K-Means algorithm in Machine Learning.	[L6][CO4]	[5M]
	b	How can we make k-means robust to outliers?	[L2][CO4]	[5M]
7	a	Illustrate in detail about multidimensional scaling?	[L2][CO5]	[5M]
	b	Describe about Singular Value Decomposition and Matrix Factorization.	[L2][CO5]	[5M]
8	a	Describe in detail about maximization algorithm?	[L2][CO4]	[5M]
	b	In factor analysis, how can we find the remaining ones if we already know some of the factors?	[L2][CO5]	[5M]
9	a	Summarize about hierarchical learning?	[L2][CO4]	[5M]
	b	Tell about linear discriminate analysis?	[L1][CO5]	[5M]
10	a	Explain in detail about K-Means algorithm?	[L2][CO4]	[5M]
	b	Write about factor analysis in unsupervised learning?	[L1][CO5]	[5M]

**UNIT –V****REINFORCEMENT LEARNING**

1	a	What is reinforcement learning?	[L1][CO6]	[2M]
	b	Write about density estimation?	[L1][CO6]	[2M]
	c	Discuss about nearest neighbor?	[L1][CO6]	[2M]
	d	Give some example for reinforcement learning?	[L1][CO6]	[2M]
	e	Compare unsupervised learning and reinforcement learning ?	[L2][CO6]	[2M]
2	a	State and explain non parametric density estimation?	[L4][CO6]	[5M]
	b	How can we have a Smooth Histogram?	[L2][CO6]	[5M]
3	a	Analyze the K-Nearest Neighbor Estimator	[L4][CO6]	[5M]
	b	Elaborate non parametric classification?	[L6][CO6]	[5M]
4	a	Justify the condensed nearest neighbor?	[L5][CO6]	[5M]
	b	Discuss the term how Agents are interacts with an environments	[L2][CO6]	[5M]
5	a	Write in detail about single state case with an example?	[L1][CO6]	[5M]
	b	What are the Elements are involving Reinforcement Learning using Markov process decision process (MDP)	[L1][CO6]	[5M]
6	a	Discuss the term i. Non parametric estimation ii. Instance based learning	[L2][CO6]	[10M]
	b	Elaborate model based learning with an example?	[L6][CO6]	[5M]
7	a	Illustrate in detail about K-armed bandit?	[L2][CO6]	[5M]
	b	List and explain in detail about elements of reinforcement learning?	[L1][CO6]	[5M]
8	a	Describe Temporal Difference Learning	[L2][CO6]	[5M]
	b	Elaborate model based learning with an example?	[L6][CO6]	[5M]
9	a	What is the use of temporal difference algorithms in reinforcement learning?	[L1][CO6]	[5M]
	b	Explain in detail about partially observables state in learning?	[L2][CO6]	[5M]
10	a	Explain Sarsa algorithm, which is an on-policy version of $Q$ learning	[L2][CO6]	[5M]
	b	State and explain non parametric density estimation?	[L4][CO6]	[5M]