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| **P.V.P SIDDHARTHA INSTITUTE OF TECHNOLOGY** |
| **BRANCH: Computer Science & Engineering** | **REGULATION: PVP20** |
| **Course: B. Tech** | **SUBJECT:**  **Artificial Intelligence** |
| **Subject Code: 20CS4501D** | **Year and Semester: III-I** |
| **QUESTION BANK**  |

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|  **Unit-I** | **CO**  | **Level** |
| 1 | 1. Define Artificial Intelligence. Explain any 5 real-time applications of AI technology.
2. Summarize the different types of agents?
 | CO1 | L2 |
| 2 | 1. Identify the characteristics of Intelligent Agent.
2. Model how the PEAS associated with AI Agent? List the properties of environments.
 | CO2 | L3 |
| 3 |  (A) Define Intelligent Agent. List the characteristics of Intelligent Agent.(B)Illustrate the architecture of Utility based agent. How is it different from model-based agent with neat sketch.  | CO1 | L2 |
| 4 | 1. Compare and contrast planning agent with Problem solving agent
2. Illustrate the characteristics of AI problem.
 | CO2 | L2 |
| 5 | 1. Explain different types of environments with a suitable example.
2. Classify the roles of sensors and actuators.
 | CO1 | L2 |
| 6 | 1. Make use of the factors that a rational agent should depend on at any given time?
2. Choose the context for Episodic Vs Sequential environments.
 | CO2 | L3 |
| 7 | 1. Discuss the future and evolution of AI in detail
2. What are the challenges associated with dynamic environment.
 | CO2 | L3 |
| 8 | Apply the properties of various AI environments and explain them with suitable examples.  | CO2 | L3 |
| 9 | Build the structure of Simple reflex agents and Goal Based agents with a suitable example for each. | CO2 | L3 |
| 10 | 1. Compare Fully Observable vs Partially Observable environment.
2. Explain the challenges associated with Partially observable environment.
 | CO1 | L2 |
| **Unit-II** |  |
| 1 | 1. Build problem solving agents and list its algorithms.
2. Identify the following types of HilI Climbing search techniques.
3. Simple Hill Climbing.
4. Steepest-Ascent Hill Climbing
 | CO2 | L3 |
| 2 | Analyse the A\* searching technique works. Discuss conditions for the optimality. | CO4 | L4 |
| 3 | 1. Apply the heuristic search problem with an example.
2. Make use of Informed and Uninformed searching strategies in problem solving.
 | CO2 | L3 |
| 4 | 1. Analyse Hill climbing Algorithm with a suitable example.
2. Distinguish Breadth first search and depth first search.
 | CO4 | L4 |
| 5 | Consider the given 8-puzzle problem with ini9tial state and goal state **Initial State**

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| 1 | 2 | 3 |
| 4 | 6 |  |
| 7 | 5 | 8 |

**Goal State**

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| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 |  |

Analyse uninformed searching strategy with respect to solving 8-puzzle problem.  | CO4 | L4 |
| 6 | Contrast the role of Constraint Satisfaction problem with an algorithm for solving a Cryptarithmetic problem. | CO4 | L4 |
| 7 | Apply the Alpha-Beta pruning for problem solving. | CO2 | L3 |
| 8 | 1. List the steps involved in simple problem solving technique.
2. Distinguish between A\* algorithm and Best First Search algorithm.
 | CO4 | L4 |
| 9 | 1. Analyse the limitations of Hill Climbing Algorithm.
2. List the advantages of Uninformed Search Strategies.
 | CO4 | L4 |
| 10 | 1. Examine the techniques used in searching for solution.
2. List the limitations of Constraint Satisfaction Problem.
 | CO4 | L4 |
| **Unit-III** |  |
| 1 | 1. Distinguish the keywords Data, Belief, Hypothesis and Knowledge.
2. Analyse the use of First order Logic to represent the knowledge.
 | CO4 | L4 |
| 2 | 1. Make use of the desired properties for representation of knowledge.
2. Choose the best among the Forward and Backward chaining techniques
 | CO2 | L3 |
| 3 |  Distinguish forward and backward chaining with a suitable example. | CO4 | L4 |
| 4 | (A) List the issues in knowledge representation.(B)Examine the First order logic for the following statements* If a perfect square is divisible by a prime p hen it is also divisible by square of p
* Every perfect square is divisible by some prime.
* Alice does not like chemistry and History.
* If it is Saturday and warm, then am is in park.
* Anything anyone eats and is not killed by is food.
 | CO4 | L4 |
| 5 | 1. Analyse the role of reasoning in AI. How predicate logic is used in Al to represent knowledge?
2. Contrast the Syntax and Semantics in First Order Logic.
 | CO4 | L4 |
| 6 | 1. Identify the differences between propositional and predicate knowledge with suitable examples.
2. Build the algorithm for propositional resolution and Unification algorithm
 | CO2 | L3 |
| 7 | Make use of first order logic with proposition logic and discuss in detail about the same.  | CO2 | L3 |
| 8 | 1. Identify the key principles of knowledge-based agents.
2. Model the Resolution techniques in first order logics.
 | CO2 | L3 |
| 9 | 1. Identify the role of Unification, explain any two associated constraints.
2. Utilize the First Order Logic to develop any real-time application.
 | CO2 | L3 |
| 10 | 1. Identify the role of inference engine in AI.
2. Model the properties of Backward chaining.
 | CO2 | L3 |
| **Unit-IV** |  |
| 1 | 1. Apply state space search for planning.
2. Identify various components of a planning system?
 | CO3 | L3 |
| 2 | 1. List the limitations of the problem-solving approach and what is the motivation behind the design of planning systems
2. Inference planning with propositional logic with a suitable example.
 | CO4 | L4 |
| 3 | Identify “A literal that does not appear in the final level of the graph cannot be achieved.” | CO3 | L3 |
| 4 | Examine whether “The level cost of a literal in a serial graph is no greater than the actual cost of an optimal plan for achieving it.” | CO4 | L4 |
| 5 | Distinguish between problem solving and planning | CO4 | L4 |
| 6 | Utilize the backward search with PDDL for analysing the problem. | CO3 | L3 |
| 7 | Analyze the planning approaches. | CO4 | L4 |
| 8 | Identify high-level plans that work while avoiding high-level plans that don't using a hierarchical planning algorithm  | CO3 | L3 |
| 9 | Inspect the operation of GRAPHPLAN on the spare tire problem | CO4 | L4 |
| 10 | Build planning graph for the “have cake and eat cake too” problem up to S2. | CO3 | L3 |
| **Unit-V** |  |
| 1 | 1. List various forms of learning.
2. Analyse the major issues that affect the design of the learning element.
 | CO4 | L4 |
| 2 | 1. Analyse various phases of Reinforcement learning agents.
2. Contrast the concept of logical formulation of learning with suitable example.
 | CO4 | L4 |
| 3 | Distinguish various forms of learning. | CO4 | L4 |
| 4 | Contrast the role of decision list can represent the same function as a decision tree while using at most as many rules as there are leaves in the decision tree for that function. Give an example of a function represented by a decision list using strictly fewer rules than the number of leaves in a minimal-sized decision tree for that same function. | CO4 | L4 |
| 5 | Build a neural network that computes the XOR function of two inputs. Make sure to specify what sort of units you are using. | CO3 | L3 |
| 6 | Analyse how a reinforcement learning an appropriate abstract model for evolution? What connection exists, if any, between hardwired reward signals and evolutionary fitness? | CO4 | L4 |
| 7 | Analyse the process of applying the boosting method to naive Bayes learning.  | CO4 | L4 |
| 8 | Analyse the process of flow of knowledge acquisition through learning.  | CO4 | L4 |
| 9 | Apply the process of reinforcement learning in the real-time self-driving cars. | CO3 | L3 |
| 10 | Analyse the role of learning in Feedback-Based models. | CO4 | L4 |