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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**   |  |  |  | | --- | --- | --- | | 1 | 2 | 3 | | 4 | 6 |  | | 7 | 5 | 8 |   **Goal State**   |  |  |  | | --- | --- | --- | | 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 |