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Question Paper Code: R4E02

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Fourth Semester

Artificial Intelligence & Data Science

R21UAD402 - ARTIFICIAL INTELLIGENCE

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 1 = 5Marks)

1. The Task Environment of an agent consists of _____ CO1- U

   (a) Sensors (b) Actuators

   (c) Performance Measures (d) All of the mentioned

2. The term _____ is used for a depth-first search that chooses values for one variable at a time and returns when a variable has no legal values left to assign. CO1- U

   (a) Forward search (b) Backtrack search

   (c) Hill algorithm (d) Reverse-Down-Hill search

3. Wumpus World is a classic problem, best example of _____ CO1- U

   (a) Single player Game (b) Two player Game

   (c) Reasoning with Knowledge (d) Knowledge based Game

4. General algorithm applied on game tree for making decision of win/lose is _____. CO1- U

   (a) DFS/BFS Search Algorithms (b) Heuristic Search Algorithms

   (c) Greedy Search Algorithms (d) MIN/MAX Algorithms

5. Which of the following applications include in the Strategic Computing Program? CO1- U

   (a) battle management (b) autonomous systems

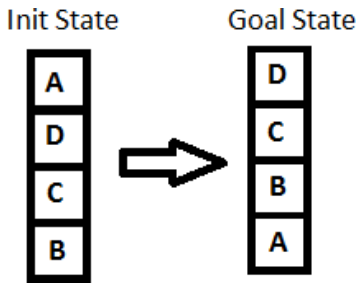
   (c) pilot's associate (d) all of the mentioned

PART – B (5 x 3= 15 Marks)

6.	What are the components of a problem formulation?	CO1- U	
7.	List the types of Hill-Climbing search techniques and explain with example.	CO1- U	
8.	Define First-Order Logic.	CO1- U	
9.	In state-space search for planning, how do you represent the problem space and search for solutions?	CO2- App	
10.	Define meta-knowledge in expert systems.	CO1- U	

PART – C (5 x 16= 80 Marks)

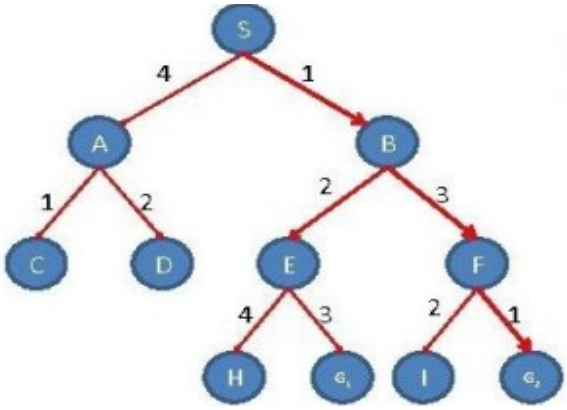
11.	(a)	Discuss about the various kinds of agents and their properties with neat diagram.	CO1- U	(16)
		Or		
	(b)	Explain how the Sussman Anomaly manifests in the evaluation of the proposed mathematical expression for stock price prediction, and discuss its implications for the team's modeling approach	CO1- U	(16)
12.	(a)	Consider the blocks world problem with four blocks A,B,C and D with the start and goal states given below.	CO2-App	(16)



Assume the following two operations: Pick and a block and put it on table, pick up a block and put it on another block. Solve the above problem using Hill climbing algorithm and a suitable heuristic function. Show the intermediate decisions and states

Or

	(b)	Consider the graph given in figure below. Assume that the initial state is S and goal state is I. Find a path from the initial state to the goal state using Best First Search. Also report the solution cost.	CO2-App	(16)



13.	(a)	Describe Forward Chaining and Backward Chaining with examples.	CO1- U	(16)
		Or		
	(b)	Explain the working of Production Rules in AI with suitable examples.	CO1- U	(16)
14.	(a)	Solve a Classical Planning problem where an agent must fetch an item from a warehouse with constraints on movement and carrying capacity.	CO2-App	(16)
		Or		
	(b)	Apply the concepts of Planning and Acting in the Real World to a self-driving car navigation problem.	CO2-App	(16)
15.	(a)	Explain the DART expert system and its role in military logistics.	CO1- U	(16)
		Or		
	(b)	Explain how machine translation works by applying statistical and deep learning methods with numerical examples.	CO1- U	(16)