Total No. of Printed Pages: 2

PRN No.	

PAPER CODE	U314-241-(ESE)

(AY: 2024-25) December 2024 (ENDSEM) EXAM

TY (SEMESTER - I)

COURSE NAME: ARTIFICIAL INTELLIGENCE Branch: CSE-AI COURSE CODE: CAUA31201

T.Y (PATTERN 2020)

Time: [1Hr 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks. Use of scientific calculator is allowed**
2) **Use suitable data wherever required**
3) **All questions are compulsory. Solve any two sub question each from Questions 1 and 2**
4) **Solve any one sub question (2 marks) from Questions 3 ,4 ,5 and 6 and sub question of 4 marks is compulsory from questions 3, 4, 5, and 6**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Discuss the characteristics of intelligent agents and provide examples of how these agents are utilized in various industries, such as healthcare.	[4]	CO1	Understand
	b) Explain the concept of Constraint Satisfaction Problems (CSPs) in artificial intelligence. What are the key elements that define a CSP, and how are they utilized to solve problems?	[4]	CO1	Understand
	c) Describe the difference between breadth-first search and depth-first search. Under what circumstances would one be preferred over the other?	[4]	CO1	Understand
Q2	a) Apply Generate-and-Test technique to find a path from the start to the exit of the given maze. Generate possible paths, test each one for validity whether it reaches the exit without hitting a wall, and explain how you determine the correct solution.	[4]	CO2	Apply
	b) Apply both Breadth-First Search and Depth-First Search to the same graph and find a path from node A to node D. Compare the paths found and explain the difference in their traversal behavior.	[4]	CO2	Apply
	c) Given the following graph with nodes A, B, C, D, and E, where the edges between nodes represent the cost of moving from one node to another, and the table below provides heuristic values (h) for each node, use the A* search algorithm to find the optimal path from node A to node E. Show step-by-step process.	[4]	CO2	Apply

Graph (G)	Heuristic values (h):
A to B: Cost = 2	h(A) = 6
A to C: Cost = 4	h(B) = 4
B to D: Cost = 3	h(C) = 3
C to D: Cost = 2	h(D) = 1
D to E: Cost = 1	h(E) = 0
B to E: Cost = 6	

Q3	a) Explain the differences between backward chaining and forward chaining in rule-based systems. What are the key characteristics of each method?	[2]	CO3	Understand
	OR			
	b) Describe knowledge representation in artificial intelligence. What are some common methods used, and why is it essential for AI systems?	[2]	CO3	Understand
	c) Discuss the applications of rule-based systems in real-world scenarios. What are some advantages of using these systems for problem-solving?	[4]	CO3	Understand
Q4	a) Apply and explain the concept of Goal Stack Planning to the process of building a resume. Outline the main goal and sub-goals involved in creating an effective resume, and describe how you would prioritize and manage these tasks.	[2]	CO4	Apply
	OR			
	b) Demonstrate how Induction Learning can be applied to predict student performance based on their study habits and attendance. What data would you collect, and how would you build your predictive model?	[2]	CO4	Apply
	c) Apply the Expert System concept to develop a health diagnosis application. Explain how the system would use patient symptoms and medical history to recommend possible conditions and treatments.	[4]	CO4	Apply
Q.5	a) Apply and illustrate the importance of Natural Language Processing (NLP) in a specific AI application, such as chatbots or sentiment analysis.	[2]	CO5	Apply
	OR			
	b) Apply and illustrate the use of AI in agriculture by discussing how robotic sensors can be implemented in precision farming.	[2]	CO5	Apply
	c) Apply AI techniques in the development of a delivery robot and explain the components involved in its functionality.	[4]	CO5	Apply
Q.6	a) Illustrate the function of Amazon Lex in the development of conversational agents.	[2]	CO6	Understand
	OR			
	b) Describe the Amazon SageMaker, and what role does it play in machine learning?	[2]	CO6	Understand
	c) Illustrate how Microsoft Azure Machine Learning Studio can be utilized for building a predictive model in healthcare.	[4]	CO6	Understand