

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
III B. Tech I Semester Regular Examinations November -2025
INTRODUCTION TO ARTIFICIAL INTELLIGENCE
ELECTRICAL& ELECTRONICS ENGINEERING

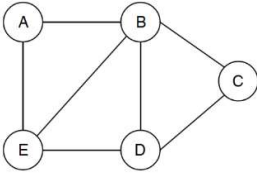
Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions. Part B Answers any one question from each unit.

1		PART-A	(20Marks)
	a)	Define the term "Turing Test" and explain its significance.	[2]
	b)	What is the PEAS description of a task environment? Give an example.	[2]
	c)	What is the difference between uninformed and informed search strategies?	[2]
	d)	State the purpose of alpha-beta pruning.	[2]
	e)	What is breadth-first search (BFS)? Mention one advantage and one disadvantage.	[2]
	f)	Define the term "branching factor" and explain its significance.	[2]
	g)	What is reasoning under uncertainty?	[2]
	h)	Define rule-based systems with one real-world application.	[2]
	i)	What is unification in first-order logic? Give one example.	[2]
	j)	What are the primary roles of an expert system in decision-making?	[2]
		PART-B	(50Marks)
		Question from Unit - I	
2	a)	What are the different fields and applications of AI? Explain with suitable examples.	[5]
	b)	Consider a vacuum cleaner world. Formulate the problem and describe the task environment. What type of agent is suitable for this?	[5]
		(OR)	
3	a)	Explain the architecture of a problem-solving agent.	[5]
	b)	Discuss the concept of rationality and explain the factors influencing rational agent design.	[5]
		Question from Unit - II	
4	a)	Explain uniform cost search. How does it differ from BFS?	[5]
	b)	For a given AND-OR graph, demonstrate how AO* search finds the optimal solution graph.	[5]
		(OR)	
5	a)	What is adversarial search? Describe the minimax algorithm and discuss its limitations.	[5]

	b)	Consider the undirected graph shown below with nodes A, B, C, D, E. Perform a Breadth-First Search (BFS) starting from node A. Write the order in which the nodes are visited. Draw the BFS tree generated from this traversal. If the goal node is C, at which level of the BFS tree will it be found?	[5]
			
		Question from Unit - III	
6	a)	Explain how knowledge can be represented using rules. Discuss forward and backward chaining.	[5]
	b)	Convert the following English sentences into predicate logic and demonstrate how the conclusion can be derived using logical inference: a) All birds can fly. b) Tweety is a bird. c) Therefore, Tweety can fly.	[5]
		(OR)	
7	a)	Explain predicate logic and how it is used in logic programming with suitable examples.	[5]
	b)	A spam filter correctly identifies 95% of spam emails and correctly recognizes 90% of non-spam emails. Suppose 20% of all emails are spam. If an email is flagged as spam, what is the probability that it is actually spam? (Hint: Use Bayes' theorem)	[5]
		Question from Unit - IV	
8	a)	Explain in detail the process of forward chaining and backward chaining with suitable algorithms and examples.	[5]
	b)	Explain unification in first-order logic with two worked-out examples.	[5]
		(OR)	
9	a)	What is explanation-based learning (EBL)? Describe its key steps with a suitable example. How does EBL improve learning efficiency?	[5]
	b)	Explain the basic model of reinforcement learning. Discuss the roles of agent, environment, reward, and policy. Illustrate with a suitable real-world example.	[5]
		Question from Unit - V	
10	a)	Differentiate between forward chaining and backward chaining in reasoning. Which type of problem suits each method?	[5]
	b)	Define certainty factor. How is it used in expert systems to handle uncertainty?	[5]
		(OR)	
11	a)	Describe the architecture and reasoning process of MYCIN. How did it use certainty factors?	[5]
	b)	Explain how knowledge acquisition bottleneck affects the scalability of expert systems. Suggest modern approaches to overcome this limitation.	[5]
