

Code: 20ES1307

**II B.Tech - I Semester – Supplementary Examinations  
DECEMBER 2024**

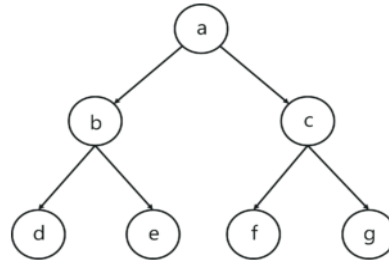
**FOUNDATIONS OF ARTIFICIAL INTELLIGENCE  
(ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.  
2. All parts of Question must be answered in one place.

<b><u>UNIT – I</u></b>			
1.	a)	Explain the foundations of AI and discuss how these foundations contribute to the development of intelligent systems.	7 M
	b)	Illustrate the different types of agents used in AI with suitable examples.	7 M
<b>OR</b>			
2.	a)	Discuss the history of AI, highlighting the significant milestones that have shaped the field.	7 M
	b)	Analyze the role of rationality in agent behavior and provide examples of rational agents in AI.	7 M
<b><u>UNIT – II</u></b>			
3.	a)	Describe the Hill Climbing algorithm and discuss its advantages and limitations in AI problem-solving.	7 M
	b)	Apply the Breadth-First Search algorithm to solve a given problem and evaluate its performance in terms of time and space complexity.	7 M



OR

4. a) Explain the concept of uninformed search strategies and differentiate them from informed search strategies. 7 M

b) Solve a given problem using the A\* algorithm and analyze its effectiveness. 7 M

Initial State			Goal State		
1	2	3	2	8	1
8		4		4	3
7	6	5	7	6	5

**UNIT-III**

5. a) Explain the syntax and semantics of First-Order Logic (FOL). Provide examples to demonstrate how FOL can be used to represent knowledge. 7 M

b) Analyze the process of unification in First-Order Logic (FOL) and solve the following problem using forward chaining: 7 M

Given Facts:

Parent(John, Mary)

Parent(Mary, Susan)

Female(Mary)

Given Rules:

Ancestor(X, Y) :- Parent(X, Y).

Ancestor(X, Y) :- Parent(X, Z), Ancestor(Z, Y).

		Query: Who are the Ancestors of Susan?	
OR			
6.	a)	Discuss the role of inference in AI and explain the different types of inference rules used in FOL.	7 M
	b)	Solve the following logical problem using backward chaining and evaluate its efficiency: Given Facts: Human(Socrates) Human(Plato) Human(Aristotle) Mortal(X) :- Human(X) Query: Is Socrates Mortal?	7 M
<b><u>UNIT – IV</u></b>			
7.	a)	Illustrate the concept of planning in AI and describe the different approaches to solving planning problems.	7 M
	b)	Using classical planning techniques, solve the following Tower of Hanoi problem with three disks: Initial State: All disks are on Peg 1. Goal State: All disks are moved to Peg 3. Task: Provide the sequence of moves required to solve the problem.	7 M
OR			
8.	a)	Describe the algorithm for forward state-space search in AI planning and discuss its application in real-world scenarios.	7 M
	b)	Analyze the multi-agent planning approach and provide an example where this technique is advantageous.	7 M

**UNIT – V**

9.	a)	What is an artificial neural network? Compare and contrast Single-layer and Multi-Layer feed forward neural networks.	7 M
	b)	Discuss the importance of activation functions in neural networks. How do different activation functions impact the learning process and the final performance of the model? Provide examples of commonly used activation functions.	7 M
<b>OR</b>			
10.	a)	Discuss the process of learning in AI, particularly focusing on Decision Tree Learning.	7 M
	b)	Compare and contrast supervised and unsupervised learning. Provide examples of AI applications that utilize each type of learning.	7 M