Course Code: 23CS0516 **R23**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
Siddharth Nagar,Narayanavanam Road–517583

Subject with Code: Artificial Intelligence (23CS0516) **Course & Branch:** CSE,CSIT

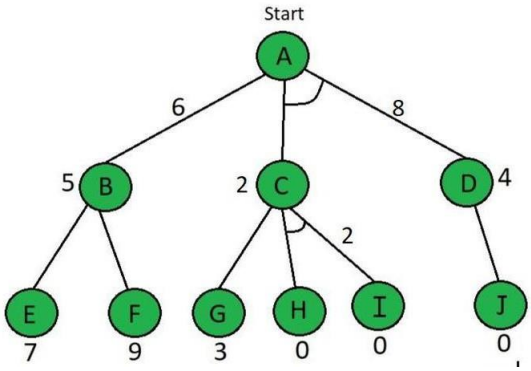
Year & Sem: III B.Tech & I Sem **Regulation:** R23

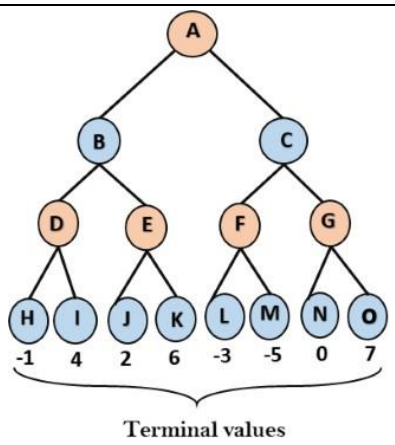
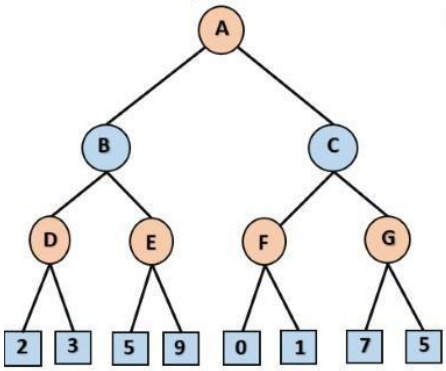
UNIT I
Introduction

1	**a)**	State AI? Identify the categories in which AI definitions are organized.	**[L1,CO1]**	**[2M]**
	b)	Define intelligent agent.	**[L1,CO1]**	**[2M]**
	c)	Name the key factors that determine the rationality of an agent at any given time?	**[L1,CO1]**	**[2M]**
	d)	Discuss and Classify the PEAS for Medical diagnosis system.	**[L1,CO1]**	**[2M]**
	e)	Classify the different types of problems in AI	**[L2,CO1]**	**[2M]**
2	**a)**	Summarize some definitions of artificial intelligence, and how can they be categorized.	**[L2,CO1]**	**[5M]**
	b)	Discuss how artificial intelligence categorized based on different approaches, and what do these categories entail?	**[L2,CO1]**	**[5M]**
3		Analyze the foundation of Artificial Intelligence.	**[L4,CO1]**	**[10M]**
4		Justify the major milestones in the history of artificial intelligence	**[L5,CO1]**	**[10M]**
5	**a)**	Implement any two applications of AI in real time.	**[L3,CO1]**	**[5M]**
	b)	Analyze in what ways can an agent's rational behavior be influenced by its performance measure, prior knowledge, actions, and percept sequence?	**[L4,CO1]**	**[5M]**
6	**a)**	How do the properties of task environments influence the design and performance of intelligent agents in various applications?	**[L4,CO1]**	**[5M]**
	b)	What is the PEAS framework, and what are its components? Discuss with an example	**[L2,CO1]**	**[5M]**
7		Analyze different types of agents, and explain how do they interact with their environments?	**[L4,CO1]**	**[10M]**
8		Explain the different types of agent programs and their internal structures which influence the efficiency and autonomy of intelligent agents?	**[L4,CO1]**	**[10M]**
9	**a)**	What are the four conceptual components of a learning agent, and how do they contribute to the agent's ability to improve its performance in unknown environments? Describe in detail.	**[L4,CO1]**	**[5M]**
	b)	Illustrate the list of sequence done by the intelligent agent to maximize the performance measure.	**[L3,CO1]**	**[5M]**
10	**a)**	Discuss the four components used to define a problem formally.	**[L2,CO1]**	**[5M]**
	b)	Illustrate with an example what is meant by formulating problems.	**[L3,CO1]**	**[5M]**

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UNIT II
Searching

1	**a)**	List the components of a search problem.	**[L1,CO2]**	**[2M]**
	b)	List and define how the search algorithms are classified?	**[L1,CO2]**	**[2M]**
	c)	State Heuristic function and Heuristic values.	**[L1,CO2]**	**[2M]**
	d)	Differentiate between A* and AO*algorithm.	**[L4,CO2]**	**[2M]**
	e)	State the concept of adversarial search in Artificial Intelligence.	**[L1,CO2]**	**[2M]**
2		Describe the concept of search and explain the different types of search algorithms used in Artificial Intelligence	**[L2,CO2]**	**[10M]**
3		Discuss Uninformed search with its search algorithms stating examples and complexity in its implementation.	**[L2,CO2]**	**[10M]**
4		Analyze heuristic algorithms and discuss their different types with suitable examples.	**[L4,CO2]**	**[10M]**
5		Describe the Hill Climbing Algorithm in Artificial Intelligence with its State-space Diagram. Discuss its key features, advantages, and limitations.	**[L4,CO2]**	**[10M]**
6	**a)**	Demonstrate the A* Search Algorithm in Artificial Intelligence using a suitable example.	**[L3,CO2]**	**[5M]**
	b)	Describe the AO* Algorithm in Artificial Intelligence. Demonstrate how the AO algorithm* works for given AND-OR graph 	**[L4,CO2]**	**[5M]**
7	**a)**	Discuss how efficient the problem reduction search helps in problem-solving technique of AI.	**[L2,CO2]**	**[5M]**
	b)	Explain in detail the Role of Adversarial Search and its algorithms in AI.	**[L2,CO2]**	**[5M]**
8	**a)**	Identify common problems encountered in game-playing AI and discuss suitable solutions with an example.	**[L3,CO2]**	**[5M]**
	b)	State Game Tree and discuss the concepts for defining a Game Tree with an example.	**[L2,CO2]**	**[5M]**
9		Describe Mini-Max Algorithm in Artificial Intelligence. Solve the following Game tree using Mini-Max Algorithm.	**[L2,CO2]**	**[10M]**

				
10		Explain Alpha-Beta Pruning algorithm in detail and apply it on the given game tree illustrating the steps adapted to solve it. 	**[L3,CO2]**	**[10M]**
11	**a)**	Discuss with an example how Optimal Decision Making in Multiplayer Games are performed?	**[L2,CO2]**	**[5M]**
	b)	How do we design good evaluation functions? Explain in detail.	**[L5,CO2]**	**[5M]**

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UNIT III
Representation of Knowledge

1	**a)**	State AI? Identify the categories in which AI definitions are organized.	**[L1,CO1]**	**[2M]**
	b)	Define intelligent agent.	**[L1,CO1]**	**[2M]**
	c)	Name the key factors that determine the rationality of an agent at any given time?	**[L1,CO1]**	**[2M]**
	d)	Discuss and Classify the PEAS for Medical diagnosis system.	**[L1,CO1]**	**[2M]**
	e)	Classify the different types of problems in AI	**[L2,CO1]**	**[2M]**
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4		Justify the major milestones in the history of artificial intelligence	**[L5,CO1]**	**[10M]**
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	b)	Analyze in what ways can an agent's rational behavior be influenced by its performance measure, prior knowledge, actions, and percept sequence?	**[L4,CO1]**	**[5M]**
6	**a)**	How do the properties of task environments influence the design and performance of intelligent agents in various applications?	**[L4,CO1]**	**[5M]**
	b)	What is the PEAS framework, and what are its components? Discuss with an example	**[L2,CO1]**	**[5M]**
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9	**a)**	What are the four conceptual components of a learning agent, and how do they contribute to the agent's ability to improve its performance in unknown environments? Describe in detail.	**[L4,CO1]**	**[5M]**
	b)	Illustrate the list of sequence done by the intelligent agent to maximize the performance measure.	**[L3,CO1]**	**[5M]**
10	**a)**	Discuss the four components used to define a problem formally.	**[L2,CO1]**	**[5M]**
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UNIT III
Representation of Knowledge

1	**a)**	List the types of knowledge that need to be represented in AI systems.	**L1,CO3**	**2M**
	b)	State the concept of knowledge and list its types.	**L1,CO3**	**2M**
	c)	State the techniques used for knowledge representation.	**L1,CO3**	**2M**
	d)	State the concept of uncertainty in Artificial Intelligence.	**L1,CO4**	**2M**
	e)	List the AI methods used for decision-making under uncertainty.	**L1,CO4**	**2M**
2	**a)**	Describe knowledge representation and its types in Artificial Intelligence.	**L2,CO3**	**6M**
	b)	Explain the types of knowledge that need to be represented in AI systems.	**L2,CO3**	**4M**
3	**a)**	Illustrate the AI knowledge cycle with a neat diagram.	**L3,CO3**	**5M**
	b)	Explain the relationship between knowledge and intelligence, and list the requirements of a knowledge representation system.	**L2,CO3**	**5M**
4		Analyze the different approaches to knowledge representation.	**L4,CO3**	**10M**
5		Discuss the key issues associated with knowledge representation in Artificial Intelligence.	**L4,CO3**	**10M**
6		Describe the techniques of knowledge representation along with their advantages and disadvantages.	**L2,CO3**	**10M**
7	**a)**	Explain the representation of logical connectives in propositional logic.	**L2,CO3**	**5M**
	b)	Discuss predicate logic and its applications in Artificial Intelligence.	**L2,CO3**	**5M**
8	**a)**	Describe the concept of a frame in knowledge representation and explain its role in organizing knowledge.	**L2,CO3**	**5M**
	b)	Describe the use of inheritance mechanisms in knowledge representation.	**L2,CO3**	**5M**
9	**a)**	Explain constraint propagation in Artificial Intelligence and describe its working process.	**L1,CO3**	**5M**
	b)	Describe expert systems and illustrate rule-based knowledge representation in Artificial Intelligence with a suitable example.	**L3,CO3**	**5M**
10	**a)**	Discuss the following in detail:i) Rule-Based Deduction Systemsii) Reasoning under Uncertainty	**L2,CO4**	**5M**
	b)	Explain probabilistic reasoning in Artificial Intelligence and summarize its significance in AI applications.	**L5,CO4**	**5M**
11	**a)**	Explain Bayesian probabilistic inference with a suitable example.	**L3,CO4**	**5M**
	b)	Explain Dempster–Shafer Theory with a suitable example.	**L2,CO4**	**5M**

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UNIT IV
Logic concepts

1	**a)**	What is FOL?	**[L1,CO5]**	**[2M]**
	b)	State binary Resolution rule.	**[L1,CO5]**	**[2M]**
	c)	List the four major factors on which the component of an agent can be improved by learning from data.	**[L1,CO5]**	**[2M]**
	d)	Give the difference between Propositional vs. First-Order Logic Inferences	**[L4,CO5]**	**[2M]**
	e)	State difference between Reinforcement Learning and Supervised Learning	**[L,CO5]**	**[2M]**
2		Explain in detail about Syntax and Semantics of First-Order Logic with examples.	**[L2,CO5]**	**[10M]**
3	**a)**	State few key applications, challenges and limitations of FOL in AI.	**[L1,CO5]**	**[5M]**
	b)	Discuss in detail Inference in first-order logic	**[L2,CO5]**	**[5M]**
4		Illustrate the knowledge-engineering process with a real time example in detail.	**[L3,CO5]**	**[10M]**
5	**a)**	What is Unification? Discuss its algorithm and implementation procedure.	**[L2,CO5]**	**[5M]**
	b)	Analyze the difference between forward chaining and backward chaining	**[L4,CO5]**	**[5M]**
6		Explain the two modes in which an inference engine commonly operates. Provide examples of how each mode works in an intelligent system.	**[L2,CO5]**	**[10M]**
7	**a)**	What is Resolution in FOL? Illustrate the step involved with example.	**[L3,CO5]**	**[5M]**
	b)	Discuss the various forms of learning in detail.	**[L2,CO5]**	**[5M]**
8	**a)**	Describe the process of implementing the Inductive Learning Algorithm to generate classification rules. Include an example to demonstrate how the algorithm works.	**[L2,CO5]**	**[5M]**
	b)	State Bayes' theorem. Describe in detail how it is utilized for statistical learning methods in AI.	**[L2,CO5]**	**[5M]**
9		Explain decision tree in detail with example. Discuss how identification of attribute is performed in decision tree.	**[L2,CO5]**	**[10M]**
10		Discuss Explanation-based learning? Illustrate its working with neat architecture diagram and example.	**[L2,CO5]**	**[10M]**
11		What is Reinforcement Learning in artificial intelligence? Explain its main types and the techniques used within each type.	**[L2,CO5]**	**[10M]**

UNIT V
Expert Systems

1	**a)**	Draw the block diagram illustrating the working of an expert system.	**L3, CO5**	**2M**
	b)	State the concept of knowledge acquisition.	**L1, CO5**	**2M**
	c)	State the concept of meta-knowledge and heuristics.	**L1, CO6**	**2M**
	d)	List the advantages and disadvantages of knowledge acquisition.	**L1, CO6**	**2M**
	e)	State the concept of meta-knowledge and list its different levels.	**L1, CO6**	**2M**
2		Describe the concept of an expert system, discuss its need, and explain its major components with a neat diagram.	**L2, CO6**	**10M**
3		Discuss the following aspects of Expert Systems: a) Characteristics b) Advantages c) Limitations d) Capabilities e) Applications	**L2, CO6**	**10M**
4	**a)**	Analyze the different types of expert systems used in Artificial Intelligence.	**L4, CO6**	**5M**
	b)	Describe the architecture of expert systems in detail with a neat diagram.	**L2, CO6**	**5M**
5	**a)**	Justify the roles of expert systems in relation to their capabilities.	**L5, CO6**	**5M**
	b)	Describe knowledge acquisition, its methods, and the challenges involved in the knowledge acquisition process.	**L2, CO6**	**5M**
6	**a)**	Explain the goals and role of knowledge acquisition in AI with suitable real-time examples.	**L2, CO6**	**5M**
	b)	Discuss metaheuristics and their classification in detail.	**L2, CO6**	**5M**
7	**b)**	Describe MYCIN with respect to its development, key features, and impact.	**L2, CO6**	**10M**
8		Discuss DART with respect to its key capabilities, architecture, real-world applications, advantages, and limitations.	**L2, CO6**	**10M**
9		Explain XCON with respect to its functions, key features, architectural components, benefits, and challenges.	**L2, CO6**	**10M**
10		Illustrate an Expert System Shell in AI along with its components, types, benefits, challenges, and applications.	**L3, CO6**	**10M**

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