SR22

St. Peter's Engineering College (Autonomous) Dullapally (P) , Medchal, Hyderabad–500100. QUESTIONBANK								
					Dept.	:	CSE(AI&ML)	
					Academic year 2024-25			
Subject Code	:	AS22-66PC01	Subject	:	INTRODUCTION TO ARTIFICIAL INTELLIGENCE			
Class/Section	:	B.Tech.	Year	:	II	Semester	:	II

BLOOMSLEVEL					
Remember	L1	Understand	L2	Apply	L3
Analyze	L4	Evaluate	L5	Create	L6

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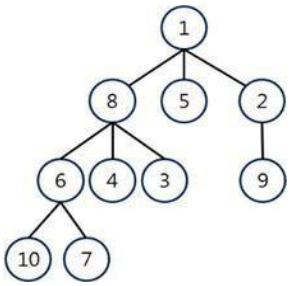
Q. No	Question(s)	Marks	BL	CO
	UNIT–I			
1	**a.** What are the types of Agents?	**1M**	L1	C221.1
	b. What is the space complexity of BFS Algorithm?	**1M**	L1	C221.1
	c . Write down the properties name of Search Algorithm.	**1M**	L2	C221.1
	d. What is the time complexity of DFS algorithm?	**1M**	L1	C221.1
	e. Define problem solving agent.	**1M**	L1	C221.1
2	**a.** Explain Iterative deepening depth-first Search.	**3M**	L2	C221.1
	b. Explain about different Environment Types in AI.	**3M**	L2	C221.1
	c. Name the Search Algorithm Terminologies and explain them.	**3M**	L2	C221.1
	d. Explain BFS with suitable example.	**3M**	L2	C221.1
	e. Explain Problem Solving Agents in brief.	**3M**	L2	C221.1
3	**a.** Explain DFS with suitable example.	**5M**	L2	C221.1
	b. Explain about A* search algorithm.	**5M**	L2	C221.1
	c. What are the types of AI agent? Explain them with neat diagram.	**5M**	L1	C221.1
	d. Write a short note on State Space Algorithm.	**5M**	L2	C221.2
	e. Write about Greedy Search Algorithm.	**5M**	L2	C221.2
4	**a.** Discuss the following search Technique with the help of a given tree. Also discuss the benefits and Application of each. i. Breadth First Search. ii. Depth First Search	**10M (5+5)**	L6	C221.1

				
	b. Define heuristic search? Explain different types of heuristic search with suitable examples.	**10M (2+8)**	L1	C221.1
	c. Briefly explain Hill Climbing search and Simulated annealing algorithm with suitable example.	**10M (5+5)**	L2	C221.1

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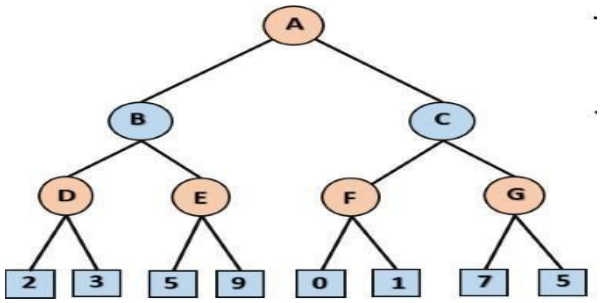
Q. No	Question(s)	Marks	BL	CO
	UNIT– II			
1	**a.** Define Minimax Algorithm.	**1M**	L1	C221.2
	b. What are the Challenges in Optimal Decision-Making?	**1M**	L1	C221.2
	c. Define Alpha and Beta.	**1M**	L1	C221.2
	d. What are types of Constraint Satisfaction Problems?	**1M**	L1	C221.2
	e. State De Morgan's Laws.	**1M**	L2	C221.2
2	**a.** Write a short note on Minimax algorithm with example.	**3M**	L2	C221.2
	b. Discuss about Constraint Satisfaction Problems (CSP).	**3M**	L6	C221.2
	c. With a neat diagram explain about the architecture of knowledge-based agent.	**3M**	L2	C221.2
	d. Explain logical connectives with truth table in propositional logic?	**3M**	L2	C221.2
	e. Describe the Properties of Operators in Propositional Logic.	**3M**	L1	C221.2
3	**a.** Explain Alpha Beta Pruning Algorithm with an Example.	**5M**	L2	C221.2
	b. Explain about Propositional logic.	**5M**	L2	C221.2
	c. Explain Propositional theorem proving.	**5M**	L2	C221.2
	d. Explain constraint satisfaction problem with graph coloring as example. 	**5M**	L2	C221.2
	e. Explain the Horn Clauses and Definite Clauses in detail.	**5M**	L2	C221.2
4	**a.** Write short note on the following Algorithm: i. Backtracking Algorithm ii. Forward-Checking Algorithm iii. Constraint Propagation Algorithm	**10M (3+3+4)**	L1	C221.2
	b. What is knowledge-based agent in artificial intelligence? Why we use a knowledge base? What are the various levels of knowledge-based agent? Write any two approaches to designing a knowledge-based agent?	**10M (3+1+2+2)**	L1	C221.2

	c. Analyze alpha-beta pruning algorithm and the Min -max game playing algorithm for a given tree. 	**10M (5+5)**	L4	C221.4

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Q. No	Question(s)	Marks	BL	CO
	UNIT– III			
1	a. Specify the syntax of First-order logic in BNF form.	**1M**	L1	C221.3
	b. What is quantifier?	**1M**	L1	C221.3
	c. Define Wumpus world?	**1M**	L1	C221.3
	d. Evaluate the given sentence "**All Pompions were Romans**" write a well- formed formula in predicate logic.	**1M**	L5	C221.3
	e. What is unification?	**1M**	L1	C221.3
2	a. Explain inference rules for quantifiers?	**3M**	L2	C221.3
	b. Illustrate the syntax and semantics of first order logic.	**3M**	L2	C221.3
	c. Explain backward chaining process?	**3M**	L2	C221.3
	d. Discuss diagnostic rules and causal rules in FOL?	**3M**	L6	C221.3
	e. Explain Numbers, sets, and lists in FOL.	**3M**	L2	C221.3
3	a. Difference between backward chaining and forward chaining	**5M**	L4	C221.3
	b. Explain resolution in predicate logic with suitable example.	**5M**	L2	C221.3
	c. Explain knowledge engineering process in FOL?	**5M**	L1	C221.3
	d. Define Ontological Engineering? Explain with the diagram the upper ontology of the world.	**5M**	L1	C221.3
	e. Write short notes on universal and existential quantification in FOL?	**5M**	L1	C221.3
4	a. Explain the forward chaining process and efficient forward Chaining in detail with example. What is the need of incremental forward chaining?	**10M**	L2	C221.3
	b. Consider the following sentences: • **John likes all kinds of food** • **Apples are food** • **Chicken is food** • **Anything any one eats and isn't killed by is food** • **Bill eats peanuts and is still alive** • **Sue eats everything Bill eats** i. Translate the sentences into formulas in predicate logic ii. Prove that john likes peanuts using backward chaining iii. Convert the formulas of apart into clause form iv. Prove that john likes peanuts using resolution	**10M**	L3	C221.3
	c. What is backward chaining? Explain with an example**.**	**10M**	L1	C221.3

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Q. No	Question(s)	Marks	BL	CO
	UNIT– IV			
1	a. Define state-space search in planning.	**1M**	L1	C221.4
	b. What is a planning graph?	**1M**	L1	C221.4
	c. What is hierarchical planning?	**1M**	L1	C221.4
	d. What is the primary difference between forward and backward state-space search?	**1M**	L1	C221.4
	e. what does STRIPS stand for?	**1M**	L1	C221.4
2	a. What is classical planning with example?	**3M**	L1	C221.4
	b. Explain the Perform an analysis of different planning approaches in terms of complexity and effectiveness.	**3M**	L2	C221.4
	c. Explain how planning graphs work in classical planning	**3M**	L2	C221.4
	d. Explain STRIPS representation and its role in automated planning.	**3M**	L2	C221.4
	e. Describe the Graph Plan Algorithm and its significance in planning	**3M**	L6	C221.4
3	a. Write any four Key points about planning in artificial intelligence**?**	**5M**	L1	C221.4
	b. Explain the concept of classical planning with an example.	**5M**	L2	C221.4
	c. Describe the forward and backward state-space search algorithms with a comparison.	**5M**	L6	C221.4
	d. Discuss various classical planning approaches with their advantages and limitations	**5M**	L6	C221.4
	e. How does hierarchical planning improve efficiency in planning?	**5M**	L1	C221.4
4	a. Explain the Comparison of Classical Planning and Hierarchical Planning	**10M**	L2	C221.4
	b. What is the knowledge representation on Internet Shopping world?	**10M**	L1	C221.4
	c. Explain Planning and Acting Nondeterministic Domains in artificial intelligences	**10M**	L2	C221.4

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<table>
<tr><th>Q. No</th><th>Question(s)</th><th>Marks</th><th>BL</th><th>CO</th></tr>
<tr><td colspan="5">UNIT– V</td></tr>
<tr><td>1</td><td>a) What does Bayes' Rule help compute in probabilistic reasoning?</td><td>1M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>b) Define a Bayesian Network.</td><td>1M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>c) What is the primary goal of approximate inference in Bayesian Networks?</td><td>1M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>d) What is the primary difference between deterministic and probabilistic reasoning?</td><td>1M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>e) What does a conditional probability represent?</td><td>1M</td><td>L1</td><td>C221.5</td></tr>
<tr><td>2</td><td>a) Define Name one real-world application of Bayesian Networks.</td><td>3M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>b) What is the role of prior probability in Bayes’ Theorem?</td><td>3M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>c) Define approximate inference in the context of Bayesian Networks.</td><td>3M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>d) What is the main challenge of exact inference in Bayesian Networks?</td><td>3M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>e) How does relational probability differ from traditional probability?</td><td>3M</td><td>L1</td><td>C221.5</td></tr>
<tr><td>3</td><td>a) Explain the concept of probabilistic reasoning and its importance in decision-making under uncertainty.</td><td>5M</td><td>L2</td><td>C221.5</td></tr>
<tr><td></td><td>b) Derive Bayes’ Rule and explain its significance with an example.</td><td>5M</td><td>L2</td><td>C221.5</td></tr>
<tr><td></td><td>c) How is knowledge represented in an uncertain domain using probabilistic methods?</td><td>5M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>d) Describe the semantics of Bayesian Networks with an example.</td><td>5M</td><td>L6</td><td>C221.5</td></tr>
<tr><td></td><td>e) What are the advantages of using Bayesian Networks for reasoning under uncertainty?</td><td>5M</td><td>L1</td><td>C221.5</td></tr>
<tr><td>4</td><td>a) How does relational and first-order probability extend Bayesian Networks?</td><td>10M</td><td>L1</td><td>C221.5</td></tr>
<tr><td></td><td>b) Explain how probabilistic reasoning is applied in real-world scenarios, such as medical diagnosis or artificial intelligence.</td><td>10M</td><td>L2</td><td>C221.6</td></tr>
<tr><td></td><td>c) Calculate the P (F=True | Fe=True, C=True) using Bayesian Networks for the given probability information
1. Prior Probability Table
<table>
<tr><td>Flu (F)</td><td>Probability P(F)</td></tr>
<tr><td>True</td><td>0.1</td></tr>
<tr><td>False</td><td>0.9</td></tr>
</table>
2. Conditional Probability Table for Fever (Fe) given Flu (F)
<table>
<tr><td>Flu (F)</td><td>Fever (Fe = True)</td><td>Fever (Fe = False)</td></tr>
<tr><td>True</td><td>0.8</td><td>0.2</td></tr>
</table></td><td>10M</td><td>L3</td><td>C221.6</td></tr>
</table>

	False	0.2	0.8				
	3. Conditional Probability Table for Cough (C) given Flu (F)						
	Flu (F)	Cough (C = True)	Cough (C = False)				
	True	0.7	0.3				
	False	0.1	0.9				