Department of Computer Science and Engineering

Unit wise Question Bank

UNIT-1

S.No	Questions	BT	CO
	Part – A(Short Answer Questions)		
1	What is Artificial Intelligence?	L1	CO1
2	Define an intelligent agent.	L4	CO1
3	What is a problem-solving agent?	L1	CO1
4	What is a state space in search problems?	L1	CO1
5	Which uninformed search strategy expands the shallowest node first?	L1	CO1
6	What does UCS (Uniform Cost Search) aim to minimize?	L1	CO1
7	Which search strategy uses a stack data structure?	L1	CO1
8	What is a heuristic function?	L1	CO1
9	Name the search algorithm that uses evaluation function ***f(n) = h(n)***.	L1	CO1
10	What is simulated annealing?	L3	CO1
	Part – B (Long Answer Questions)		
11	Explain the concept of Artificial Intelligence (AI) and discuss various applications of AI in real-world domains.	L1	CO1
12	Define Intelligent Agents. Explain the structure of intelligent agents and describe the different types of agents with examples.		
13	Describe the functioning of a Problem-Solving Agent. Explain the components of problem formulation and illustrate with an example.	L1	CO1
14	Explain Breadth-First Search (BFS) and Uniform Cost Search (UCS). Compare their completeness, optimality, time and space complexity.	L1	CO1
15	What is Depth-First Search (DFS)? Explain its advantages and disadvantages. Discuss Iterative Deepening Depth-First Search (IDDFS) and justify why it is useful.	L1	CO1
16	Explain Bidirectional Search in detail. Describe how it works, its advantages, limitations, and complexity analysis.	L1	CO1
17	Define heuristics and heuristic functions. Explain the role of heuristics in informed search strategies with suitable examples.	L1	CO1
18	Discuss Greedy Best-First Search and A Search Algorithm. Compare both strategies based on performance and optimality.*	L2	CO1
19	Explain Hill-Climbing Search. Discuss different variants of hill-climbing and the problems encountered such as local maxima, ridges, and plateaus.	L3	CO1
20	Write a detailed note on Simulated Annealing Search and Local	L1	CO1

	Search in Continuous Spaces. Explain where such algorithms are useful.		

UNIT–II :

S. No	Questions	BT	CO
	Part – A (Short Answer Questions)		
1	What is an adversarial search?	L4	CO2
2	Define the term utility in game-playing agents.	L3	CO2
3	What is Alpha–Beta pruning?	L3	CO2
4	What is meant by imperfect real-time decision making in games?	L1	CO2
5	What is a Constraint Satisfaction Problem (CSP)?	L1	CO2
6	Define constraint propagation.	L1	CO2
7	What is backtracking search in CSPs?	L1	CO2
8	What is a propositional logic sentence?	L1	CO2
9	Define Horn clause.	L1	CO2
10	What is forward chaining?	L1	CO2
	Part – B (Long Answer Questions)		
11	Explain Adversarial Search in AI. Describe the Minimax algorithm and how optimal decisions are made in two-player games.	L1	CO2
12	What is Alpha–Beta Pruning? Explain how it improves minimax performance with suitable examples and diagrams.	L1	CO2
13	Discuss imperfect real-time decision-making in games. Explain approaches used when the search tree cannot be explored fully.	L1	CO2
14	Define Constraint Satisfaction Problems (CSPs). Explain the components of a CSP with examples and discuss the importance of domain, constraints, and variables.	L2	CO2
15	Explain Constraint Propagation in CSPs. Describe arc consistency (AC-3), node consistency, and path consistency with examples.	L1	CO2
16	Describe Backtracking Search for CSPs. Explain techniques such as MRV (Minimum Remaining Value), degree heuristic, forward checking, and constraint propagation that improve its efficiency.	L1	CO2
17	What is Local Search for CSPs? Explain algorithms like Min-Conflicts and discuss their effectiveness in large-scale constraint problems.	L1	CO2
18	Describe Propositional Logic in detail. Explain syntax, semantics, and how knowledge is represented using propositional logic with examples.	L1	CO2
19	Explain Propositional Theorem Proving. Discuss inference and proof by resolution, including conversion to CNF (Conjunctive Normal Form).	L1	CO2

UNIT–III

S.No	Questions	BT	CO
	Part – A (Short AnswerQuestions)		
1	What is First-Order Logic (FOL)?	L1	CO3
2	Define predicate in First-Order Logic.	L1	CO3
3	What are constants in FOL?	L1	CO3
4	What is the difference between syntax and semantics in logic?	L2	CO3
5	What is unification in First-Order Logic?	L1	CO3
6	Define Knowledge Engineering.	L1	CO3
7	What is forward chaining?	L1	CO3
8	What is backward chaining?	L1	CO3
9	What is a substitution in FOL?	L1	CO3
10	What is resolution in First-Order Logic?	L1	CO3
	Part – B (Long AnswerQuestions)		
11	Explain First-Order Logic (FOL) in detail. Describe its syntax and semantics with suitable examples.	L1	CO3
12	Discuss how First-Order Logic is used for knowledge representation. Explain the role of objects, predicates, functions, and quantifiers.	L1	CO3
13	Explain the process of Knowledge Engineering in First-Order Logic. Describe the steps involved with an example knowledge base.	L1	CO3
14	Compare Propositional Logic and First-Order Logic. Explain how FOL is more expressive and discuss limitations of propositional logic.	L3	CO3
15	What is Unification? Explain the unification algorithm with examples and discuss the concept of lifting in inference.	L1	CO3
16	Describe Forward Chaining in First-Order Logic. Explain how it works, its completeness, and applications.	L1	CO3
17	Explain Backward Chaining in First-Order Logic. Discuss its working procedure and advantages in goal-directed reasoning.	L1	CO3
18	What is Resolution in First-Order Logic? Explain the steps involved: standardization, skolemization, CNF conversion, and resolution rule.	L3	CO3
19	Describe the process of inference in First-Order Logic. Explain different inference rules and show how they are applied to derive conclusions.	L1	CO3
20	Write short notes on the following: (a) Universal and Existential Quantifiers (b) Ground and Non-ground sentences (c) Substitution in FOL (d) Limitations of FOL inference algorithms	L1	CO3

UNIT–IV :

S.No	Questions	BT	CO
	Part – A (Short Answer Questions)		
1	What is an ontology in AI?	L1	CO4
2	Define category in knowledge representation.	L1	CO4
3	What is a mental event?	L1	CO4
4	Give one example of default reasoning.	L1	CO4
5	What is classical planning?	L1	CO4
6	Define STRIPS.	L1	CO4
7	What is a planning graph?	L3	CO4
8	What is a state-space search?	L1	CO4
9	Write one difference between forward and backward planning.	L3	CO4
10	What is an operator in planning?	L1	CO4
	Part – B (Long Answer Questions)		
11	Explain Ontological Engineering in knowledge representation. Discuss the role of ontologies in structuring knowledge with suitable examples.	L1	CO4
12	Describe how categories and objects are represented in AI. Explain reasoning systems for categories with examples.	L1	CO4
13	What are events and mental events? Explain how mental objects and mental states are represented in knowledge-based systems.	L1	CO4
14	Discuss reasoning with default information. Explain default logic and its applications in real-world reasoning.	L1	CO4
15	Define Classical Planning. Explain the components of a classical planning problem with examples.	L1	CO4
16	Explain algorithms for planning with state-space search. Discuss forward state-space search and backward state-space search in detail.	L1	CO4
17	Describe Planning Graphs in detail. Explain how GraphPlan works with an example.	L3	CO4
18	Explain different classical planning approaches such as STRIPS, partial-order planning, and hierarchical planning.	L1	CO4
19	Describe the representation of actions, goals, states, and operators in classical planning. Explain how planning problems are formulated.	L3	CO4
20	Analyze the performance of classical planning algorithms. Explain factors affecting complexity and efficiency in planning systems.	L1	CO4

UNIT–V:

S.No	Questions	BT	CO
	Part – A (Short Answer Questions)		
1	What is uncertainty in AI?	L1	CO5
2	What is a probability distribution?	L1	CO5
3	Define conditional probability.	L1	CO5
4	What is Bayes' Rule?	L2	CO5
5	What is independence in probability?	L2	CO5
6	What is a Bayesian Network?	L1	CO5
7	What is a Conditional Probability Table (CPT)?	L2	CO5
8	What is approximate inference?	L2	CO5
9	Name one algorithm used for approximate inference.	L4	CO5
10	What is Dempster–Shafer theory?	L1	CO5
	Part – B (Long Answer Questions)		
11	Explain the concept of uncertainty in AI. Describe how agents act under uncertainty with suitable real-world examples.	L1	CO5
12	Describe basic probability notation. Explain prior, posterior, conditional probability, marginal probability, and joint probability with examples.	L1	CO5
13	Explain inference using full joint probability distributions. Discuss why full joint distribution is computationally expensive.	L1	CO5
14	What is independence in probability theory? Explain conditional and unconditional independence with examples.	L2	CO5
15	State and explain Bayes' Rule. Discuss its applications in AI for decision-making under uncertainty.	L2	CO5
16	Explain probabilistic reasoning in uncertain domains. Describe how uncertain knowledge is represented in probabilistic models.	L1	CO5
17	Describe Bayesian Networks. Explain their semantics, structure, and use in representing uncertain knowledge with examples.	L1	CO5
18	Explain efficient representation of conditional probability distributions in Bayesian Networks. Discuss CPTs, noisy-OR, and parameter sharing.	L3	CO5
19	Discuss approximate inference in Bayesian Networks. Explain algorithms such as sampling, MCMC, likelihood weighting, and particle filtering.	L2	CO5

20	Write short notes on: a) Relational and first-order probability (b) Dempster–Shafer theory (c) Other approaches to uncertain reasoning (a) Relational and first-order probability (b) Dempster–Shafer theory (c) Other approaches to uncertain reasoning	L1	CO5