SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur - 603 203

Common to

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

DEPARTMENT OF ELECTRONICS COMMUNICATION & ENGINEERING

QUESTION BANK

VI SEMESTER

1904006 – ARTIFICIAL INTELLIGENCE

Regulation – 2019

Academic Year 2024– 2025 (EVEN)

Prepared by

Mrs. W.V Sherlin Sherly, Assistant Professor (O.G)/AI&DS

Mr.G. Sathish Kumar (Sel. G)/ECE

UNIT I - INTRODUCTION

Introduction – Foundation and History of AI – AI Problems and Techniques – AI Programming Languages – Introduction to LISP and PROLOG – Problem Spaces and Searches - Blind Search Strategies; Breadth First - Depth First – Heuristic Search Techniques – Hill Climbing – Best First – A* Algorithm – AO* Algorithm – Game Trees Minimax Algorithm – Game Playing – Alpha Beta Pruning.

PART – A

Q. No	Questions	BT Level	Competence
1.	Define Artificial Intelligence (AI).	BTL 1	Remembering
2.	Give four components to define a problem. Define them.	BTL 2	Understanding
3.	What is AI capable of today?	BTL 1	Remembering
4.	List four approaches that are followed in AI.	BTL 1	Remembering
5.	Who is considered the father of Artificial Intelligence?	BTL 1	Remembering
6.	What is the Turing Test?	BTL 1	Remembering
7.	Explain the significance of the Dartmouth Conference?	BTL 2	Understanding
8.	Explain the concept of "pattern recognition."?	BTL 1	Remembering
9.	Define the term "intelligent agent."?	BTL 2	Understanding
10.	Differentiate AI and connectionist AI in terms of their approaches?	BTL 2	Understanding
11.	Distinguish between LISP and PROLOG.	BTL 2	Understanding
12.	List the basic types of search strategies.	BTL 2	Understanding
13.	Write situations where hill climbing fails to find a solution.	BTL 2	Understanding
14.	What is the difference between a "state" and an "operator"?	BTL 2	Understanding
15.	What is a "problem space" in AI?	BTL 1	Remembering
16.	Write the advantages of heuristic function?	BTL 2	Understanding
17.	How does Hill Climbing work?	BTL 2	Understanding
18.	What is a game tree?	BTL 1	Remembering
19.	Define the Minimax algorithm?	BTL 2	Understanding
20.	List the difference between A* and AO* Search Algorithms.	BTL 2	Understanding
21.	Identify the different types of Intelligent Agents.	BTL 2	Understanding
22.	Show some of the real-world problems that can be solved using AI.	BTL 2	Understanding
23.	What is the purpose of Alpha-Beta pruning?	BTL 1	Remembering
24.	What is the primary use of PROLOG in AI applications?	BTL 2	Understanding

PART - B

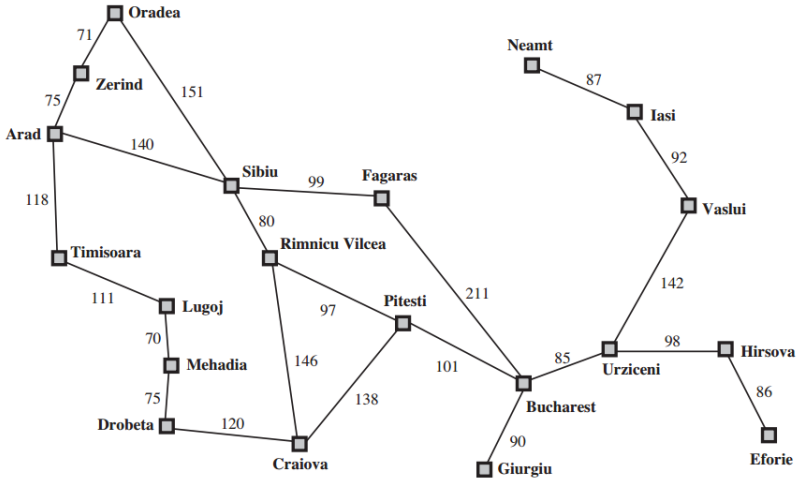
1.	Explain in details about the four approaches that are followed in AI.	(13)	BTL 4	Analyzing
2.	Summarize the various disciplines that contributed the ideas, viewpoints and techniques to AI.	(13)	BTL 4	Analyzing
3.	Illustrate in detail the structure of prolog programming with an example.	(13)	BTL 3	Applying
4.	(i) Describe the brief history of artificial intelligence.	(6)	BTL 3	Applying
	(ii) List and explain about the Foundations of Artificial Intelligence.	(7)		
5.	(i) Explain in detail about Turing Test Approach and Cognitive Modeling Approach.	(6)	BTL 4	Analyzing

	(ii) Discuss how Python libraries like TensorFlow, PyTorch, and scikit-learn enhance AI development?	(7)		
6.	Using an example, illustrate how a problem can be formulated as a state-space search problem and solved using a specific search algorithm?	(13)	BTL 3	Applying
7.	How LISP and PROLOG can help you in regard of developing artificial intelligence? Explain in detail with features.	(13)	BTL 4	Analyzing
8.	(i) How to minimize total estimated cost using A* search with an example.	(8)	BTL 4	Analyzing,
	(ii) Write the proof of optimality of A*.	(5)		
9.	Demonstrate the AO* algorithm with a suitable example.	(13)	BTL 3	Applying
10.	Draw the state space graph of Hill climbing search. What are the draw backs of this algorithm? Also discuss about time space complexity of this algorithm.	(13)	BTL 3	Applying
11.	(i) Develop an algorithm to implement alpha–beta pruning with an example.	(6)	BTL6	Creating
	(ii) Develop the concept of game tree with illustration.	(7)		
12.	(i) Discuss the differences between blind search strategies (Breadth-First Search and Depth-First Search) and heuristic search strategies (Best-First Search and A* algorithm) in terms of efficiency and application?	(6)	BTL 4,5	Analyzing, Evaluating
	(ii) Evaluate the advantages and limitations of the A* algorithm in solving real-world problems compared to other heuristic techniques.	(7)		
13.	(i) Differentiate between Uninformed and Informed Search technique.	(6)	BTL 5	Evaluating
	(ii) Construct the State Transition Diagram for Vacuum World Problem with Sensors.	(7)		
14.	Interpret the Blind search strategies with necessary examples.	(13)	BTL 3	Applying
15.	Evaluate Greedy Best First Search with an example.(Refer the Map, Table in Q.No:5, Part-C)	(13)	BTL 5	Evaluating
16.	Construct a simple game tree for a two-player game like tic-tac-toe, demonstrate the Minimax algorithm, and explain its decision-making process?	(13)	BTL 3	Applying
17.	Discuss the min-max algorithm in game playing theory with tic-tac-toe example.	(13)	BTL 3	Applying

PART -C				
1.	Evaluate alpha-beta pruning algorithm and the Min-max game playing algorithm with example.	(15)	BTL 5	Evaluating

2.	(i)Write a program in LISP to solve a basic problem (e.g., factorial or list processing) and a simple query in PROLOG to demonstrate rule-based reasoning? (ii)Compare and contrast the effectiveness of problem-solving strategies using state-space representation, operators, and search techniques?	(15)	BTL 6	Creating

3.	Explain the working of Hill Climbing, Best-First Search, and A* algorithm, including their evaluation functions and limitations?	(15)	BTL 5	Evaluating
4.	What is the Future Scope of Artificial Intelligence? Mention some application areas in which AI may be used extensively. Also discuss about any three use cases in which AI algorithms are used.	(15)	BTL 6	Creating
5.	Formulate A* Search to find the minimum cost to reach the Goal State Bucharest from the Initial State Arad using the given map and Straight Line Distance Heuristics h_{SLD}.	(15)	BTL 5	Evaluating



Arad	366	Mehadia	241
Bucharest	0	Neamt	234
Craiova	160	Oradea	380
Drobeta	242	Petesti	100
Eforic	161	Rimnicu Vilcea	193
Fagaras	176	Sibiu	253
Giurgiu	77	Timisoara	329
Hirsova	151	Urziceni	80
Iasi	226	Vaslui	199
Lugoj	244	Zerind	374

Values of h_{SLD} - Straight Line Distance to Bucharest.

UNIT II - KNOWLEDGE REPRESENTATION			
Knowledge Representation Issues – Predicate Logic – Logic Programming – Sematic Nets – Frames and Inheritance – Constraint Propagation – Representing Knowledge Using Rules –Rules Based Deduction System.			
PART - A			
Q. No	**Questions**	**BT Level**	**Competence**
1.	What is knowledge representation in AI? List two challenges in knowledge representation?	BTL 1	Remembering
2.	Name two common methods of knowledge representation?	BTL 1	Remembering
3.	Write the drawbacks of using propositional logic to represent the knowledge base?	BTL 2	Understanding
4.	Express the resolution in propositional logic?	BTL 2	Understanding
5.	Differentiate procedural knowledge and declarative knowledge.	BTL 2	Understanding
6.	Name the issues involved in knowledge representation	BTL 1	Remembering
7.	What is propositional logic? Write the properties of Knowledge Representation?	BTL 1	Remembering
8.	Distinguish between propositional versus first order predicate logic.	BTL 2	Understanding
9.	What is a semantic net? Define the terms "node" and "arc" in semantic nets?	BTL 1	Remembering
10.	Define a predicate in predicate logic?	BTL 1	Remembering
11.	Convert the Sentence “All Children likes sweets” in to FOL.	BTL 2	Understanding
12.	Define the generalized modus ponens rule.	BTL 1	Remembering
13.	List the types of knowledge.	BTL 1	Remembering
14.	What is logic programming? Name one language commonly used for logic programming?	BTL1	Remembering
15.	Interpret the use of semantic networks.	BTL 2	Understanding
16.	Write a simple semantic net for "Birds can fly, and penguins are birds but cannot fly."?	BTL2	Understanding
17.	What are frames in AI? Define inheritance in the context of frames?	BTL 2	Understanding
18.	Write the advantages of using recursion in logic programming?	BTL 2	Understanding
19.	Why is consistency important in knowledge representation?	BTL 2	Understanding
20.	What is the difference between universal and existential quantifiers?	BTL 1	Remembering
21.	Explain how inheritance works in a frame hierarchy?	BTL 2	Understanding
22.	What is constraint propagation? Name one example of a problem that can be solved using constraint propagation?	BTL 2	Understanding

23.	What is a constraint in AI? Name one application of constraint propagation?	BTL 1	Remembering
24.	Write the advantages of using recursion in logic programming?	BTL 2	Understanding

PART – B				
1.	Explain the importance of knowledge representation in AI and discuss the different approaches used in representing knowledge?	(13)	BTL 3	Applying
2.	With the help of examples, summarize the various rules used in knowledge representation?	(13)	BTL3	Applying
3.	(i) Demonstrate how predicate logic can be used to model real-world knowledge. Represent the relationships "All humans are mortal," "Socrates is a human," and deduce that "Socrates is mortal."?	(7)	BTL 4	Analyzing
	(ii) Compare predicate logic with propositional logic, highlighting their advantages and limitations in knowledge representation.?	(6)		
4.	Analyze the working principles of logic programming and describe its role in solving AI problems with an example?	(13)	BTL 4	Analyzing
5.	(i)Analyze and compare the atomic sentence and complex Sentence?	(7)	BTL 4	Analyzing
	(ii) Differentiate forward chaining and backward chaining.	(6)		
6.	Demonstrate the syntax and semantics of first order logic.	(13)	BTL 3	Applying
7.	Analyze the forward chaining and backward chaining with examples.	(13)	BTL 4	Analyzing
8.	Illustrate the rule-based deduction systems with examples.	(13)	BTL 3	Applying
9.	Consider the following sentences: John likes all kinds of food; Apples are food; Chicken is food; Anything anyone eats and isn't killed by is food; Bill eats peanuts and still is alive; Sue eats everything Bill eats.		BTL 5	Evaluating
	(i) Translate these sentences into formulas in predicate logic.	(7)		
	(ii) Convert the formulas of part an into clause form.	(6)		
10.	Demonstrate about (i) Propositional Logic	(6)	BTL 3	Applying
	(ii) Predicate Logic	(7)		
11.	How are frames used in knowledge representation? Give the structure of a general frame.	(13)	BTL 3	Applying
12.	Design a frame-based representation for a vehicle hierarchy, including attributes such as "type," "fuel," and "speed." Show how inheritance is used in this hierarchy?	(13)	BTL3	Applying
13.	Demonstrate how constraint propagation can be used to solve a Sudoku puzzle or a crossword puzzle. Explain the steps involved in the process?	(13)	BTL 3	Applying
14.	Using a rule-based deduction system, design a decision-making process for a simple medical diagnosis system. Explain the rules and the inference process?	(13)	BTL 3	Applying

15.	How Inference can be made through the process of Forward and Backward Chaining? Explain with suitable examples.	(13)	BTL 3	Applying
16.	Summarize the various issues faced while representing Knowledge in Artificial Intelligence.	(13)	BTL 5	Evaluating
17.	Apply the concept of frames and inheritance in semantic nets.	(13)	BTL 3	Applying

PART - C				
1.	Consider the following facts: 1. Marcus was a man. 2. Marcus was a Pompeian. 3. All Pompeians were Romans. 4. Caesar was a ruler. 5. All Pompeians were either loyal to Caesar or hated him. 6. Everyone is loyal to someone. 7. People only try to assassinate rulers they are not loyal to. 8. Marcus tried to assassinate Caesar.		BTL6	Creating
	(i) Translate these sentences into formulas in predicate logic	(5)		
	(ii) Convert all the formulas into clause form(CNF)	(5)		
	(iii) Prove that "Marcus hated Caesar" using resolution proof.	(5)		
2.	Explain Conjunctive Normal Form for First order Logic for the following problem and Prove West is criminal using First order logic. "The law says that it is a crime for an American to sell weapons to hostile nations. The country Nono, an enemy has some missiles, and all of its missiles were sold to itby Colonel West, who is American".	(15)	BTL6	Creating
3.	Determine the semantic net representation for the following,		BTL 5	Evaluating
	(i) Profession(Bob,Professor), Faculty(Bob,Computer Engineering), Married(Bob,Sandy), Father-of(Bob,Sue,Joe), Drives(Bob,Buick), Owns(Bob,House), Subset-of(Computer Engineering, College of Engineering), Subset-of(College of Engineering, State University)	(8)		
	(ii) "Tweety is a kind of Bird", "Tweety has Wings", "Tweety can Fly", "Tweety Colour is Yellow".	(7)		
4.	Assess the following sentences in conceptual dependency representation.		BTL 5	Evaluating
	(i) "Since smoking can kill you", I stopped.	(8)		
	(ii) "Bill threatened John with a broken nose".	(7)		
5.	Formulate the use of Rule based production system in both forward and backward production systems.	(13)	BTL 5	Evaluating

UNIT III - REASONING UNDER UNCERTAINTY			
Introduction to uncertain knowledge review of probability – Baye's Probabilistic inferences and Dempster Shafer theory –Heuristic methods – Symbolic reasoning under uncertainty- Statistical reasoning – Fuzzy reasoning – Temporal reasoning- Non monotonic reasoning.			
PART - A			
Q. No	**Questions**	**BT Level**	**Competence**

1.	What you mean by probabilistic reasoning?	BTL 1	Remembering
2.	What is Bayes' Theorem? Write its formula?	BTL 2	Understanding
3.	What is symbolic reasoning in AI?	BTL1	Remembering
4.	What is Fuzzy Logic? What is its use?	BTL 2	Understanding
5.	Define Dempster-Shafer theory.	BTL 1	Remembering
6.	What is fuzzy reasoning? Explain how fuzzy reasoning differs from traditional Boolean logic?	BTL 2	Understanding
7.	What is uncertain knowledge in the context of AI?	BTL 1	Remembering
8.	Explain the role of probability in handling uncertain knowledge?	BTL 1	Remembering
9.	State the applications of hybrid Bayesian network?	BTL 2	Understanding
10.	Given that P(A)=0.3, P (A |B) =0.4 and P(B)=0.5, compute P(B|A).	BTL 2	Understanding
11.	Generalize the full specification of Bayesian network.	BTL2	Understanding
12.	Infer about uncertainty.	BTL 2	Understanding
13.	Define Probability and Conditional probability.	BTL 1	Remembering
14.	Distinguish between Causal Inference and Diagnostic Inference of Bayesian Network.	BTL 2	Understanding
15.	How would you represent a coin toss using probability to model uncertainty?	BTL 2	Understanding
16.	What is temporal reasoning in AI? Explain the importance of temporal reasoning in scheduling and planning?	BTL 1	Remembering
17.	What is meant by "informed search" in heuristic-based techniques?	BTL 2	Understanding
18.	What is symbolic reasoning in AI?	BTL 2	Understanding
19.	Explain the role of heuristics in problem-solving?	BTL 2	Understanding
20.	Define heuristic methods in AI?	BTL 1	Remembering
21.	Infer about Non monotonic reasoning with example. Provide an example of non-monotonic reasoning in a real-world scenario, like changing beliefs about weather forecasts?	BTL 2	Understanding
22.	What is statistical reasoning in AI?	BTL 1	Remembering
23.	Assess the need of symbolic reasoning? Propose a symbolic reasoning model for diagnosing car issues based on symptoms?	BTL 2	Understanding
24.	Differentiate on statistical reasoning and fuzzy reasoning?	BTL 2	Understanding

PART - B				
1.	(i) Derive Baye's theorem probability.	(7)	BTL 3	Applying
	(ii) Illustrate with suitable example, Baye's theorem use in expert system?	(6)		
2.	Explain the probabilistic reasoning with suitable examples.	(13)	BTL 4	Analyzing
3.	Demonstrate the need and structure of Bayesian network. List down the applications of Bayesian network.?	(13)	BTL 3	Applying
4.	Demonstrate in detail about reasoning with Fuzzy sets quoting some examples?	(13)	BTL 3	Applying
5.	(i) How can you use Bayesian inference and explain the components of Bayes' Theorem with examples.?	(7)	BTL 3	Applying
	(ii) Discuss forward – backward algorithm in detail.	(6)		

6.	(i)Evaluate the effectiveness of probabilistic methods in real-world AI systems like weather forecasting or fraud detection?	(7)	BTL 5	Evaluating
	(ii) Explain the basic principles of probability in managing uncertainty. How is it applied in AI systems?	(6)		
7.	Demonstrate in detail about Dempster-Shafer theory?	(13)	BTL 3	Applying
8.	(i)Demonstrate uncertain knowledge, prior probability and conditional probability.	(7)	BTL 3	Applying
	(ii) Examine belief networks briefly.	(6)		
9.	What is fuzzy reasoning? Explain its significance in AI. Describe how fuzzy reasoning handles imprecise or vague data compared to classical logic?	(13)	BTL 5	Evaluating
10.	Demonstrate heuristic methods. List examples of common heuristics used in AI problem-solving?	(13)	BTL 3	Applying
11.	Analyze the different reasoning system as to how reasoning is done under uncertain conditions?	(13)	BTL 4	Analyzing
12.	Examine,		BTL 4	Analyzing
	(i) Symbolic reasoning under uncertainty,	(7)		
	(ii) Statistical reasoning.	(6)		
13.	Elaborate the concept of the following,		BTL6	Creating
	(i) Define Temporal reasoning? Explain how temporal reasoning helps in scheduling and planning tasks.	(7)		
	(ii) Non monotonic reasoning.	(6)		
14.	What is symbolic reasoning? Explain its role in handling uncertainty in AI? Discuss the advantages of symbolic reasoning over statistical methods in certain AI applications?	(13)	BTL 5	Evaluating
15.	Evaluate the role of heuristics in AI algorithms like A* and hill-climbing. Discuss their strengths and limitations?	(13)	BTL 5	Evaluating
16.	Demonstrate with example Reasoning under uncertainty?	(13)	BTL 3	Applying
17.	Illustrate the need for conditional probability and the important rules related to it?	(13)	BTL 3	Applying

PART - C				
1.	Marie's marriage is tomorrow. In recent years, each year it has rained only 5 days. The weatherman has predicted rain for tomorrow. When it actually rains, the weatherman correctly forecasts rain 90% of the time. When it doesn't rain, the weatherman incorrectly forecasts rain 10% of the time. The question: What is the probability that it will rain on the day of Marie's wedding?	(15)	BTL 6	Creating

2.	A student is preparing for an exam. The following probabilities are given: • If the student studies, the probability of passing the exam is 0.9. • If the student does not study, the probability of passing is 0.3. • The probability that the student studies is 0.7. Let SSS represent whether the student studies (S=1S = 1S=1) or not (S=0S = 0S=0), and PPP represent whether the student passes the exam (P=1P = 1P=1) or not (P=0P = 0P=0). Using a Bayesian network: 1. What is the overall probability that the student passes the exam (P(P=1)P(P = 1)P(P=1))? 2. If the student passes the exam, what is the probability that they studied (P(S=1|P=1)P(S = 1|P = 1)P(S=1|P=1))?	(15)	BTL 5	Evaluating
3.	In a clinic, the probability of the patients having HIV virus is **0.15**. A blood test done on patients: If patient has virus, then the test is **+ve** with probability **0.95**. If the patient does not have the virus, then the test is **+ve** with probability **0.02.** Assign labels to events: H= patient has virus, P=test +ve Given: P(H)= 0.15, P(P/H) =0.95, P (P/ ┐ H) =0.02 Find: If the test is **+ve** what are the probabilities that the patient i) has the virus ie **P(H|P)** ; ii) does not have virus ie **P(¬H|P);** If the test is **-ve** what are the probabilities that the patient iii) has the virus ie **P(H|¬P);** iv) does not have virus ie **P(¬H|¬P)**;	(15)	BTL 6	Creating
4.	(i)With an example, how do you deal with uncertain knowledge?	(8)	BTL 5	Evaluating
	(ii) How should knowledge be represented in a domain that is uncertain?	(7)		
5.	Elaborate on Causal and Diagnostic Inference of Bayesian Net with examples.	(15)	BTL 6	Create

UNIT IV - PLANNING AND LEARNING

Planning - Introduction, Planning in situational calculus - Representation for planning – Partial order planning algorithm- Learning from examples- Discovery as learning – Learning by analogy – Explanation based learning –Introduction to Neural nets – Genetic Algorithms.

PART - A

Q.No	Questions	BT Level	Competence
1.	What does planning involve?	BTL 1	Remembering

2.	Express the basic idea of situational calculus.	BTL 2	Understanding
3.	What does Generalization and overfitting mean?	BTL 2	Understanding
4.	Define Explicit state representation.	BTL 1	Remembering
5.	How will you represent planning? give an example.	BTL 1	Remembering
6.	State the rule for partial order planning.	BTL 2	Understanding
7.	Define learning in Artificial intelligence.	BTL 1	Remembering
8.	Write the components of learning agent.	BTL 2	Understanding
9.	List learning types.	BTL 1	Remembering
10.	Define explanation-based learning.	BTL 1	Remembering
11.	Write the basic approach for the problem of concept formation in Winston's program.	BTL 1	Remembering
12.	Point out the problems in decision tree.	BTL 2	Understanding
13.	What does "discovery as learning" mean in AI?	BTL 1	Remembering
14.	Explain about Transformational Analogy.	BTL 2	Understanding
15.	Discuss about Derivational Analogy.	BTL 2	Understanding
16.	What are the applications of explanation-based learning in AI?	BTL 2	Understanding
17.	Illustrate and define Neuron and perceptron.	BTL 2	Understanding
18.	Define Decision tree with example.	BTL 1	Remembering
19.	Draw the Architecture of Neural Network.	BTL 1	Remembering
20.	Mention the advantages of genetic algorithms in AI?	BTL 2	Understanding
21.	Explain the difference between a biological neuron and an artificial neuron.	BTL 2	Understanding
22.	Demonstrate partial order planning.	BTL 2	Understanding
23.	What is the purpose of using **genetic algorithms** in AI?	BTL 1	Remembering
24.	Define Genetic Algorithm and steps involved.	BTL 1	Remembering

PART - B				
1.	Demonstrate about planning with certainty and represent state, action and goal.	(13)	BTL 3	Applying
2.	Illustrate partial order planning algorithm with an example.	(13)	BTL 3	Applying
3.	Examine,		BTL 4	Analyze
	(i) Situational Calculus with blocks world example.	(7)		
	(ii) Representing states , actions and goals.	(6)		
4.	Demonstrate in detail any one of the learning with examples.	(13)	BTL 3	Applying
5.	Inspect the decision tree learning algorithm with an example and illustrate the concept.	(13)	BTL 4	Analyzing
6.	(i) What is explanation-based learning?	(3)	BTL 4	Analyzing
	(ii) Examine steps involved in explanation-based learning.	(10)		

7.	Analyze the concept on learning using decision trees with suitable example.	(13)	BTL 4	Analyzing
8.	(i)Demonstrate Discovery and discuss about Theory – DrivenDiscovery.	(7)	BTL 3	Applying
	(ii) Data driven Discovery.	(6)		
9.	(i)How genetic algorithm works in AI? Explain with examples.	(7)	BTL 3	Applying
	(ii) List the advantages and disadvantages of genetic algorithm	(6)		
10.	Demonstrate how explanation-based learning can generalize the concept of "vehicles" from a single example of a car?	(13)	BTL 3	Applying
11.	Generalize the various types machine learning with examples.	(13)	BTL 6	Creating
12.	Summarize about different discovery learning techniques with examples.	(13)	BTL 2	Understanding
13.	Illustrate about the,		BTL 3	Applying
	(i) Transformational Analogy	(7)		
	(ii) Derivational Analogy.	(6)		
14.	Apply the concept of AI planning to design a simple plan for a robot navigating from one room to another in an office environment.	(13)	BTL 3	Applying
15.	Illustrate the neural network architecture and represent the early learning models of neural nets.	(13)	BTL 3	Applying
16.	Discuss in detail about Genetic algorithm with example and suitable illustration.	(13)	BTL 2	Understanding
17.	Demonstrate how a partial-order planning algorithm resolves conflicts in a plan for cooking a meal.	(13)	BTL 3	Applying

PART - C				
1.	Create a machine-learning model that learns to recommend movies based on user preferences using example-based learning.	(15)	BTL 6	Creating
2.	What is meant by inductive logic programming? How does top-down inductive learning methods and inductive learning with inverse deduction work? Explain.	(15)	BTL 5	Evaluating
3.	Consider a simple domain: waiting at a traffic light. Give an example of decision tree for this domain.		BTL 6	Creating
	(i) Create a list of relevant variables,	(5)		
	(ii) How the concept of information or expected information gain can be used to determine which variable to choose for a maximally compact decision tree.	(10)		
4.	In the case of learning to play cricket. Formulate whether this is supervised or reinforcement learning and explain.	(15)	BTL 6	Creating
5.	Apply the concept of a neural network to predict housing prices based on input features like location, size, and age.	(15)	BTL 3	Applying

UNIT V - APPLICATIONS			
Principles of Natural Language Processing, Rule Based Systems Architecture - Expert systems- Knowledge Acquisition concepts – AI application to robotics – Current trends in Intelligent Systems.			
PART - A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define Natural Language Processing (NLP) and Applications?	BTL 1	Remembering
2.	What is the difference between syntax and semantics in NLP?.	BTL 2	Understanding
3.	Explain the role of tokenization in NLP?	BTL 1	Remembering
4.	List the components of the NLP pipeline.	BTL 2	Remembering
5.	Define expert systems.	BTL 1	Remembering
6.	List some of the early expert systems.	BTL 1	Remembering
7.	What is a knowledge base in an expert system?	BTL 1	Remembering
8.	Express the basic characteristics of expert systems.	BTL 2	Understanding
9.	How AI is applied in Robotics.	BTL 2	Understanding
10.	Draw schematic diagram showing various components of expert system.	BTL 1	Remembering
11.	Why is part-of-speech (POS) tagging important in NLP?	BTL 2	Understanding
12.	What is a rule-based system? Name the two main components of a rule-based system?	BTL 1	Remembering
13.	Define the role of the user interface in an expert system?	BTL 1	Remembering
14.	What is an intelligent system? Name two current trends in intelligent systems.	BTL 2	Understanding
15.	List two types of sensors commonly used in robots? What is an actuator in robotics?	BTL 2	Understanding
16.	What is knowledge acquisition in AI? Explain the difference between explicit and tacit knowledge.	BTL 2	Understanding
17.	Differentiate Robots and Robotics.	BTL 2	Understanding
18.	Write the use of cybernetics in AI.	BTL 2	Understanding
19.	Will artificial intelligence replace human?	BTL 1	Remembering
20.	List the new trends in Artificial intelligence.	BTL 2	Understanding
21.	Infer why NLP is difficult?	BTL 2	Understanding
22.	How does a rule-based system differ from a machine learning model?	BTL 2	Understanding
23.	Draw the Architecture of expert system.	BTL 1	Remembering
24.	Write the techniques used in NLP.	BTL 1	Remembering

PART – B				
1.	Express in detail the various steps of natural language understanding process.	(13)	BTL 2	Understanding

2.	Summarize about the following NLP process (i) Syntactic analysis (ii) Semantic analysis.	(13)	BTL 2	Understanding
3.	Write short notes on,		BTL 3	Applying
	(i) Explain the difference between stemming and lemmatization with an example?	(7)		
	(ii) Why is sentiment analysis important in natural language processing applications?	(6)		
4.	Analyze the components of Expert systems with neat diagrams.	(13)	BTL 4	Analyzing
5.	Explain with necessary illustrations for the term, Knowledge acquisition process.	(13)	BTL 3	Applying
6.	Demonstrate the various components of expert system and their importance in expert system?	(13)	BTL 3	Applying
7.	Analyze the need of knowledge engineering, knowledge base and inference engine in expert system.	(13)	BTL 4	Analyzing
8.	(i) List out the problems are addressed by expert systems.	(7)	BTL 1	Remembering
	(ii) Examine the application of expert system.	(6)		
9.	Illustrate a detailed note Rule based system architecture for expert system.	(13)	BTL 3	Applying
10.	(i) Evaluate the impact of expert systems in reducing human error in decision-making processes in healthcare.	(7)	BTL 5	Evaluating
	(ii) Write advantages and disadvantages of expert systems.	(6)		
11.	Explain how perception is essential for robotic systems to interact with the environment? Describe the role of sensors in AI-based robotic systems?	(13)	BTL 3	Applying
12.	Compare the early development of Intelligent systems to those being developed today.	(13)	BTL 4	Analyzing
13.	Assess the importance of knowledge Acquisition with example.	(13)	BTL 5	Evaluating
14.	Elaborate any five current trends in artificial intelligence.	(13)	BTL 6	Creating
15.	Illustrate the rule-based architecture of an expert system with neat diagram? Analyze the limitations of rule-based systems when applied to large-scale, dynamic environments?	(13)	BTL 3	Applying
16.	Infer the use of robotics in the following field (i) Behavior based robotics (ii) Cognitive model.	 (6) (7)	BTL 3	Understanding
17.	Summarize about the current trends in the field of machine learning in AI.	(13)	BTL 5	Evaluating

PART - C				
1.	Evaluate in detail about MYCIN Expert systems and its functions.	(15)	BTL 5	Evaluating
2.	Assess the role and use of any one chat bot available in the current market to demonstrate the concept of NLP in Artificial Intelligence.	(15)	BTL 5	Evaluating

3.	Design an expert system for travel recommendation and discuss its roles.	(15)	BTL 6	Creating
4.	Elaborate the use of Robotics in the field of (i) Agriculture (ii) Automobiles	 (8) (7)	BTL 6	Creating
5.	Develop an example as to how AI and robotics are used in the healthcare industry.	(15)	BTL 6	Creating