

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur - 603 203

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

QUESTION BANK



VI SEMESTER

1904006 – ARTIFICIAL INTELLIGENCE

Regulation – 2019

Academic Year 2022 – 2023 (EVEN)

Prepared by

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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

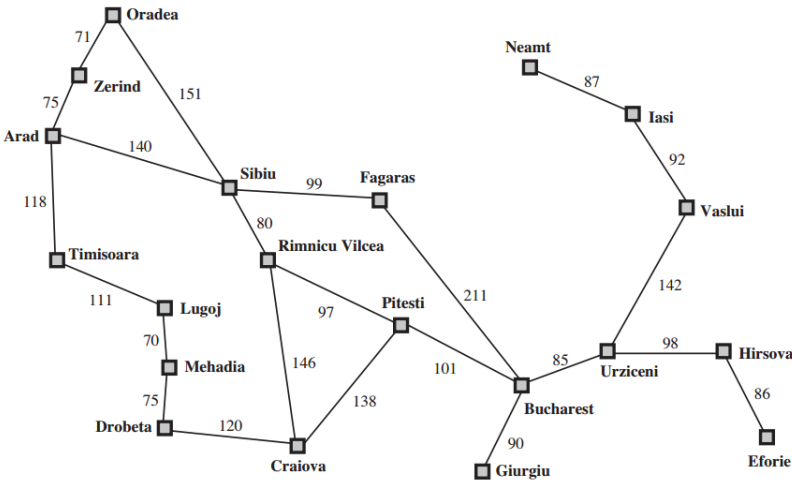
Q.No	Questions	BT Level	Competence
1.	Define Artificial Intelligence (AI).	BTL 1	Remembering
2.	Give four components to define a problem. Define them.	BTL 2	Understanding
3.	What is AI capable of today?	BTL 1	Remembering
4.	List four approaches that are followed in AI.	BTL 1	Remembering
5.	Identify the properties of task Environments in AI.	BTL 1	Remembering
6.	Define Agent and Environment. Give Examples.	BTL 1	Remembering
7.	Compare between Informed and Uninformed Search strategies.	BTL 2	Understanding
8.	Mention the application areas where AI can be used.	BTL 1	Remembering
9.	Summarize the major components of AI.	BTL 2	Understanding
10.	Infer a list of the qualities of an artificially intelligent agent.	BTL 4	Analyzing
11.	Distinguish between LISP and PROLOG.	BTL 2	Understanding
12.	Select the two basic types of search strategies.	BTL 3	Applying
13.	Inspect the situations where hill climbing fails to find a solution.	BTL 4	Analyzing
14.	Show the criteria to measure the performance of search strategies.	BTL 3	Applying
15.	Can you formulate why heuristic search techniques are considered to be powerful than the traditional search techniques?	BTL 6	Creating
16.	Assess the advantages of heuristic function.	BTL 5	Evaluating
17.	Interpret the reason when hill climbing often gets stuck.	BTL 5	Evaluating
18.	Create a partial game tree for the game of tic-tac-toe.	BTL 6	Creating
19.	How would you demonstrate that alpha–beta pruning outperforms the minimax search algorithm?	BTL 3	Applying
20.	Analyze the difference between A* and AO* Search Algorithms.	BTL 4	Analyzing
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 3	Applying
23.	Infer the ways in which the Problems can be formulated in AI.	BTL 4	Analyzing
24.	Formulate GPS: General Problem Solver.	BTL 5	Evaluating

PART - B

1.	Explain in detail 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 2	Understanding
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 1	Remembering
	(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) Infer the effect of “Laws of thought” approach and Rational agent approach.	(7)		
6.	Discuss in detail about the structure of different intelligent agents.	(13)	BTL 2	Understanding
7.	How LISP and PROLOG can help you in regard of developing artificial intelligence? Explain in detail with features.	(13)	BTL 1	Remembering
8.	(i) How to minimize total estimated cost using A* search with an example.	(8)	BTL 1	Remembering
	(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 1	Remembering
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) Infer the working of Simple Reflex Agent and Model Based Reflex agent.	(6)	BTL 4	Analyzing
	(ii) Draw the architecture of Learning Agent. Explain how it is better than Utility Based Agents and Goal Based Agents.	(7)		
13.	(i) Differentiate between Uninformed and Informed Search techniques.	(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 2	Understanding
15.	Evaluate Greedy Best First Search with an example.(Refer the Map, Table in Q.No:5, Part-C)	(13)	BTL 5	Evaluating
16.	Identify the various types of task environments and state its properties.	(13)	BTL 3	Applying
17.	Discuss the min-max algorithm in game playing theory with tic-tac-toe example.	(13)	BTL 2	Understanding

PART -C				
1.	Evaluate alpha-beta pruning algorithm and the Min-max game playing algorithm with example.	(15)	BTL 5	Evaluating
2.	Consider the given problem. Formulate the operator involved in it. Consider the water jug problem: You are given two jugs, a 4-gallon one and 3-gallon one. Neither has any measuring marker on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water from the 4-gallon jug? Explicit Assumptions: A jug can be filled from the pump, water can be poured out of a jug on to the ground, water can be poured from one jug to another and that there are no other measuring devices available.	(15)	BTL 6	Creating

3.	Compare Blind search and heuristic search by sighting any two example for each strategies.	(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.	<p>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}.</p>  <table border="1" data-bbox="332 940 1042 1323"> <tbody> <tr> <td>Arad</td> <td>366</td> <td>Mehadia</td> <td>241</td> </tr> <tr> <td>Bucharest</td> <td>0</td> <td>Neamt</td> <td>234</td> </tr> <tr> <td>Craiova</td> <td>160</td> <td>Oradea</td> <td>380</td> </tr> <tr> <td>Drobeta</td> <td>242</td> <td>Petesti</td> <td>100</td> </tr> <tr> <td>Eforie</td> <td>161</td> <td>Rimnicu Vilcea</td> <td>193</td> </tr> <tr> <td>Fagaras</td> <td>176</td> <td>Sibiu</td> <td>253</td> </tr> <tr> <td>Giurgiu</td> <td>77</td> <td>Timisoara</td> <td>329</td> </tr> <tr> <td>Hirsova</td> <td>151</td> <td>Urziceni</td> <td>80</td> </tr> <tr> <td>Iasi</td> <td>226</td> <td>Vaslui</td> <td>199</td> </tr> <tr> <td>Lugoj</td> <td>244</td> <td>Zerind</td> <td>374</td> </tr> </tbody> </table> <p>Values of h_{SLD} - Straight Line Distance to Bucharest.</p>	Arad	366	Mehadia	241	Bucharest	0	Neamt	234	Craiova	160	Oradea	380	Drobeta	242	Petesti	100	Eforie	161	Rimnicu Vilcea	193	Fagaras	176	Sibiu	253	Giurgiu	77	Timisoara	329	Hirsova	151	Urziceni	80	Iasi	226	Vaslui	199	Lugoj	244	Zerind	374	(15)	BTL 5	Evaluating
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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 do you mean when you say knowledge representation?	BTL 1	Remembering
2.	What is propositional logic?	BTL 1	Remembering
3.	Determine the drawbacks of using propositional logic to represent the knowledge base.	BTL 5	Evaluating
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.	State about the use of Slot and Slot value in Frames.	BTL 1	Remembering
8.	Distinguish between propositional versus first order predicate logic.	BTL 2	Understanding
9.	Analyze the factors justify whether the reasoning should be done forward or backward?	BTL 4	Analyzing
10.	What are Associative Networks? Give an example.	BTL 1	Remembering
11.	Convert the Sentence “All Children likes sweets” in to FOL.	BTL 3	Applying
12.	Evaluate the generalized modus ponens rule.	BTL 5	Evaluating
13.	List the types of knowledge.	BTL 1	Remembering
14.	Mention the characteristics of logic programming.	BTL6	Creating
15.	Interpret the use of semantic networks.	BTL 2	Understanding
16.	Create the structure of a frame.	BTL6	Creating
17.	Pointout the conjunctive normal form of a rule.	BTL 4	Analyzing
18.	Express the steps to convert first order logic sentence to normal form?	BTL 3	Applying
19.	Find the advantages of Semantic Nets.	BTL 3	Applying
20.	Compare propositional logic with FOL.	BTL 4	Analyzing
21.	Express the issues that arise while using knowledge representation in Artificial Intelligence.	BTL 2	Understanding
22.	Demonstrate Constraint Propagation.	BTL 3	Applying
23.	Evaluate the need for Rule based deduction system.	BTL 5	Evaluating
24.	Analyze Logic programming and state one example.	BTL 4	Analyzing

PART – B

1.	Prove that "Fido will die" from the following statements that "Fido is a dog. All dogs are animals. All animals will die."	(13)	BTL 3	Applying
2.	With the help of examples, summarize the various rules used in knowledge representation.	(13)	BTL 2	Understanding
3.	(i) Examine the algorithm for deciding entailment in propositional logic.	(7)	BTL 1	Remembering

	(ii) List the five logical connectivity used to construct the complex sentences and give the formal grammar of propositional logic.	(6)		
4.	Write down and explain the unification algorithm in predicate logic.	(13)	BTL 1	Remembering
5.	(i) Define and compare the atomic sentence and complex sentence.	(7)	BTL 2	Understanding
	(ii) Differentiate forward chaining and backward chaining.	(6)		
6.	Discuss the syntax and semantics of first order logic.	(13)	BTL 2	Understanding
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.	Brief about		BTL 2	Understanding
	(i) Propositional Logic	(6)		
	(ii) Predicate Logic	(7)		
11.	How are frames used in knowledge representation? Give the structure of a general frame.	(13)	BTL 1	Remembering
12.	Develop and explain a simple semantic network with a small number of facts and relations.	(13)	BTL6	Creating
13.	Explain in detail about the representing knowledge using rules.	(13)	BTL 4	Analyzing
14.	Infer the rules-based deduction system with examples.	(13)	BTL 4	Analyzing
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.	Examine the concept of frames and inheritance in semantic nets.	(13)	BTL 1	Remembering

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 it by 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.	Express the Baye’s theorem.	BTL 2	Understanding
3.	Draw the fuzzy curve for tall, short, very tall.	BTL6	Creating
4.	What is Fuzzy Logic? What is its use?	BTL 2	Understanding
5.	Define Dempster-Shafer theory.	BTL 1	Remembering
6.	Evaluate the role of fuzzy reasoning.	BTL 5	Evaluating
7.	Examine the concept of prior probability.	BTL 4	Analyzing
8.	Enlist the main causes of uncertainty.	BTL 1	Remembering
9.	State the applications Bayesian network.	BTL 3	Applying
10.	Given that $P(A)=0.3, P(A B)=0.4$ and $P(B)=0.5$, compute $P(B A)$.	BTL 4	Analyzing
11.	Generalize the full specification of Bayesian network.	BTL6	Creating
12.	Infer about uncertainty.	BTL 4	Analyzing
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 do Agents handle uncertainty?	BTL 3	Applying
16.	What is temporal reasoning?	BTL 1	Remembering
17.	Summarize Joint Probability Distribution.	BTL 5	Evaluating
18.	How would you gain access to fuzzy's performance?	BTL 3	Applying
19.	Identify the heuristic function.	BTL 1	Remembering
20.	Demonstrate the basic inference task in temporal models.	BTL 3	Applying

21.	Infer about Non monotonic reasoning with example.	BTL 2	Understanding
22.	Point out the necessity Statistical reasoning.	BTL 4	Analyzing
23.	Assess the need of symbolic reasoning.	BTL 5	Evaluating
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.	Discuss the need and structure of Bayesian network.	(13)	BTL 2 Understanding
4.	Summarize in detail about reasoning with Fuzzy sets quoting some examples.	(13)	BTL 2 Understanding
5.	(i) List down the applications of Bayesian network.	(7)	BTL 1 Remembering
	(ii) Discuss forward – backward algorithm in detail.	(6)	
6.	(i) Interpret variable elimination algorithm for answering queries in Bayesian network.	(7)	BTL 2 Understanding
	(ii) How is the Bayesian network used in representing the uncertainty about the knowledge.	(6)	
7.	Describe in details about Dempster-Shafer theory.	(13)	BTL 1 Remembering
8.	(i) Define uncertain knowledge, prior probability and conditional probability.	(7)	BTL 1 Remembering
	(ii) Examine belief networks briefly.	(6)	
9.	Assess the need of fuzzy set and fuzzy logic with example.	(13)	BTL 5 Evaluating
10.	Illustrate the different methods of heuristic with examples.	(13)	BTL 3 Applying
11.	Analyze the different reasoning system as to how reasoning is done under uncertain conditions.	(13)	BTL 4 Analyzing
12.	Write a short note on,		BTL 1 Remembering
	(i) Symbolic reasoning under uncertainty,	(7)	
	(ii) Statistical reasoning.	(6)	
13.	Elaborate the concept of the following,		BTL6 Creating
	(i) Temporal reasoning,	(7)	
	(ii) Non monotonic reasoning.	(6)	
14.	Evaluate on computing Conditional probabilities for a Bayesian network in the "Home Domain" usecase.	(13)	BTL 5 Evaluating
15.	Analyze the algorithm to construct Bayesian Net and compute joint probability distribution.	(13)	BTL 4 Analyzing
16.	Discuss with example Reasoning under uncertainty.	(13)	BTL 2 Understanding
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.	Consider the following facts: (i) I saw my cat in the living room 3 hours ago, (ii) 2 hours ago my door blew open, (iii) Three quarters of the time my door blows open, my cat runs outside the door, (iv) One hour ago I thought I heard a cat noise in my living room. Assume I was half certain, (v) In one hour period the probability that cat will leave the room is 0.2. There is also 0.2 probability that he may enter the room. What is the uncertainty that the cat is in the living room? Use Bayesian networks to evaluate this.	(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: $P(H) = 0.15$, $P(P/H) = 0.95$, $P(P/\neg H) = 0.02$ 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 $P(\neg H P)$; If the test is -ve what are the probabilities that the patient iii) has the virus ie $P(H \neg P)$; iv) does not have virus ie $P(\neg H \neg P)$;	(15)	BTL 6	Creating
4.	(i) With an example, how do you deal with uncertain knowledge? (ii) How should knowledge be represented in a domain that is uncertain?	(8) (7)	BTL 5	Evaluating
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.	Select the components of learning agent.	BTL 3	Applying
9.	Classify the different forms of learning.	BTL 4	Analyzing
10.	Analyze explanation based learning.	BTL 4	Analyzing
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 4	Analyzing
13.	Assess the major issues that affect the design of a learning element.	BTL 5	Evaluating
14.	Generalize about Transformational Analogy.	BTL 6	Creating
15.	Discuss about Derivational Analogy.	BTL 2	Understanding
16.	Formulate the three factors involved in the analysis of efficiency gains from explanation-based learning.	BTL 6	Creating
17.	Illustrate and define Neuron and perceptron.	BTL 3	Applying
18.	Define Decision tree with example.	BTL 1	Remembering
19.	Draw the architecture of Neural Network.	BTL 5	Evaluating
20.	Mention the advantages of genetic algorithms in AI?	BTL 3	Applying
21.	Illustrate Neural Network Architecture.	BTL 3	Applying
22.	Demonstrate partial order planning.	BTL 2	Understanding
23.	Point out the components for learning from Observation.	BTL 4	Analyzing
24.	Summarize Genetic Algorithm and steps involved.	BTL 5	Evaluating

PART - B

1.	Examine about planning with certainty and represent state, action and goal .	(13)	BTL 1	Remembering
2.	Illustrate partial order planning algorithm with an example.	(13)	BTL 3	Applying
3.	Write short notes on,		BTL 1	Remembering
	(i) Situational Calculus with blocks world example.	(7)		
	(ii) Representing states , actions and goals.	(6)		
4.	Discuss in detail any one of the learning from examples.	(13)	BTL 2	Understanding

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 1	Remembering
	(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) Define Discovery and discuss about Theory –Driven Discovery.	(7)	BTL 2	Understanding
	(ii) Data driven Discovery.	(6)		
9.	(i) How genetic algorithm works in AI? Explain with examples.	(7)	BTL 1	Remembering
	(ii) List the advantages and disadvantages of genetic algorithm	(6)		
10.	Discuss about Analogy and the two methods of Analogical problem solving.	(13)	BTL 5	Evaluating
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.	Infer the ideas of situational calculus in Blocks world example and illustrate it.	(13)	BTL 4	Analyzing
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.	Evaluate the working of partial order planner and illustrate the algorithm involved in it.	(13)	BTL 5	Evaluating

PART - C				
1.	Assess the use of planning graph in providing better heuristic estimation with suitable example.	(15)	BTL 5	Evaluating
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.	Suppose you had a neural network with linear activation functions. That is, for each unit the output is some constant c times the weighted sum of the inputs. a. Assume that the network has one hidden layer. For a given assignment to the weights w , write down equations for the value of the units in the output layer as a function of w and the input layer x , without any explicit mention of the output of the hidden layer	(15)	BTL 6	Creating
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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.	What are the two important task of language processing problem?	BTL 1	Remembering
2.	Differentiate morphology Analysis an syntactic analysis.	BTL 2	Understanding
3.	Write the applications of natural language processing.	BTL 1	Remembering
4.	Show the steps involved in natural language understanding process.	BTL 3	Applying
5.	Define expert systems.	BTL 1	Remembering
6.	List some of the early expert systems.	BTL 1	Remembering
7.	Find the various components of expert systems.	BTL 3	Applying
8.	Express the basic characteristics of expert systems.	BTL 2	Understanding
9.	How AI is applied in Robotics.	BTL 3	Applying
10.	Draw schematic diagram showing various components of expert system.	BTL 1	Remembering
11.	Evaluate the role of intelligent systems in computer vision.	BTL 5	Evaluating
12.	Classify the knowledge based on Expert system.	BTL 4	Analyzing
13.	Point out the use of inference engine in rule based expert system.	BTL 6	Creating
14.	State the knowledge Acquisition process.	BTL 2	Understanding
15.	Assess how knowledge is a crucial aspect of expert systems?	BTL 5	Evaluating
16.	List the guideline considered while planning knowledge acquisition.	BTL 2	Understanding
17.	Generalize Robots and Robotics.	BTL 6	Creating
18.	Infer the use of cybernetics in AI.	BTL 4	Analyzing
19.	Will artificial intelligence replace human?	BTL 1	Remembering
20.	Summarize the new trends in intelligence.	BTL 5	Evaluating
21.	Infer why NLP is difficult?	BTL 2	Understanding
22.	Categorize the elements of rule-based expert systems.	BTL 4	Analyzing
23.	Illustrate the Architecture of expert system.	BTL 3	Applying
24.	Analyze the techniques used in NLP.	BTL 4	Analyzing

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, (i) Morphological Analysis. (ii) Discourse Integration & Pragmatic Analysis	(7) (6)	BTL 1	Remembering
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.	Discuss the various components of expert system and their importance in expert system.	(13)	BTL 2	Understanding
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. (ii) Examine the application of expert system.	(7) (6)	BTL 1	Remembering
9.	Illustrate a detailed note Rule based system architecture for expert system.	(13)	BTL 3	Applying
10.	(i) Write short note on the people involved in expert system. (ii) Write advantages and disadvantages of expert systems.	(7) (6)	BTL 1	Remembering
11.	What was one of the earliest implementations of a self-driving vehicle, and Which AI method was used?	(13)	BTL 1	Remembering
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.	(13)	BTL 3	Applying
16.	Infer the use of robotics in the following field (i) Behavior based robotics (ii) Cognitive model.	(6) (7)	BTL 2	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