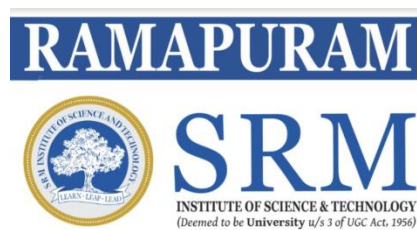


SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

Ramapuram Campus, Bharathi Salai, Ramapuram, Chennai - 600089

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



QUESTION BANK

DEGREE / BRANCH: B.TECH/CSE

VI SEMESTER

21CSC206T – ARTIFICIAL INTELLIGENCE

Regulation – 2021

Academic Year 2024 - 2025

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

UNIT4 & 5 QUESTION BANK

Subject Code: 21CSC206T

Subject Name: ARTIFICIAL INTELLIGENCE

SEM/ YEAR: III/VI

UNIT IV			
PART-A (Multiple Choice Questions)			
Q. No	Questions	Course Outcome	Competence BT Level
1	In a Bayesian Network, nodes represent: a) Physical network nodes b) Random variables c) Data storage units d) Encryption algorithms	CO4	BT1
2	What does the concept of 'conditional independence' imply in a Bayesian Network? a) Independence of variables in network conditions b) Variables are independent given the knowledge of other variables c) The network operates independently under certain conditions d) Data is encrypted conditionally	CO4	BT1
3	'Belief Propagation' in Bayesian Networks is a method for: a) Spreading religious beliefs b) Propagating probabilities throughout the network c) Enhancing network belief systems d) Propagating encrypted beliefs	CO4	BT1
4	The links in a Semantic Network signify: a) Network connections b) Relationships or associations between concepts c) Data encryption pathways d) Data storage links	CO4	BT1
5	In Semantic Networks, 'instance' nodes are: a) Specific examples of a general concept b) The topmost nodes in the hierarchy c) Nodes used for network management d) Nodes representing encrypted data	CO4	BT1
6	The "if" part of a rule in a Rule-Based System is known as the: a) Conclusion b) Predicate c) Antecedent d) Variable	CO4	BT2
7	A major challenge in Rule-Based Systems is: a) Ensuring high-speed data transmission	CO4	BT1

	b) Managing large volumes of rules and potential conflicts c) Encrypting the rule base d) Storing large sets of rules		
8	"Causal links" in Partial Order Planning represent: a) The physical connections between agents b) The relationship between actions and their effects c) The encryption of data between actions d) The network path taken by data packets	CO4	BT4
9	____ is the capability to manipulate the knowledge represented to produce fresh knowledge corresponding to that inferred from the original. A) Inferential Efficiency B) Acquisition Efficiency C) Inferential Adequacy D) Acquired Efficiency	CO4	BT1
10	____ is the process of removing existential quantifiers by elimination. A) Resolution B) Skolemization C) Function D) Unification	CO4	BT1
11	____ networks are an alternative to predicate logic as a form of knowledge representation. A) meta B) node C) Semantic D) Frame	CO4	BT1
12	A ____ is a collection of attributes or slots and associated values that describe some real-world entity. A) frame B) net C) reification D) script	CO4	BT1
13	Propositional logic deals with determining the ____ of the sentence. A) Syntax B) Truth C) Semantics D) Logic	CO4	BT2
13	Which of the following statements is true? 1. Production systems may vary on the expressive power of conditions in production rules. 2. Rule interpreters generally execute backward chaining. 3. The actions of productions are manipulations of working memory. 4. OPS8 may be viewed as a full-fledged programming language for production system programming. A) 1 and 3 B) 1,2 and 4 C) 2 and 4 D) 2 and 3	CO4	BT2
14	____ is a syntactic inference procedure that determines if the set is unsatisfiable when applied to a set of ____. A) Resolution, clauses	CO4	BT4

	B) Logic, clauses C) Logic, clauses D) Interpretation, semantics		
PART B (4 Marks)			
1	Show the various problems that are represented in the knowledge.	CO4	BT3
2	With the help of examples, summarize the various rules used in knowledge representation.	CO4	BT2
3	Examine the algorithm for deciding entailment in propositional logic.	CO4	BT1
4	List the five logical connectivity used to construct the complex sentences and give the formal grammar of propositional logic.	CO4	BT1
5	Write down and explain the unification algorithm in predicate logic.	CO4	BT1
6	Define and compare the atomic sentence and complex sentence.	CO4	BT2
7	Analyze the forward chaining and backward chaining with examples.	CO4	BT4
8	Discuss the syntax and semantics of first order logic.	CO4	BT2
9	Illustrate the rule based deduction systems with examples.	CO4	BT3
10	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. (i) Translate these sentences into formulas in predicate logic. (ii) Convert the formulas of part an into clause form.	CO4	BT5
11	Brief about Propositional Logic, Predicate Logic	CO4	BT2
12	How are frames used in knowledge representation? Give the structure of a general frame.	CO4	BT1
13	Develop and explain a simple semantic network with a small number of facts and relations.	CO4	BT6
14	Analyze in detail about the representing knowledge using rules.	CO4	BT4
15	Infer the rules-based deduction system with examples.	CO4	BT4
16	Examine the concept of frames and inheritance in semantic nets.	CO4	BT1
17	Formulate 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".	CO4	BT6
18	Determine the semantic net representation for the following, (i) Pompeian (Marcus), Blacksmith (Marcus); (8) (ii) Mary gave the green flowered vase to her favorite cousin.	CO4	BT5
19	Assess the following sentences in conceptual dependency representation. (i) "Since smoking can kill you", I stopped. (8) (ii) "Bill threatened John with a broken nose".	CO4	BT5
20	Formulate the use of Rule based production system in both forward and backward production systems.	CO4	BT6
21	Analyze the probabilistic reasoning with suitable examples.	CO4	BT4
22	Discuss the need and structure of Bayesian network.	CO4	BT3
23	Summarize in detail about reasoning with Fuzzy sets quoting some examples.	CO4	BT4

24	Describe in details about Dempster-Shafer theory.	CO4	BT2
25	Assess the need of fuzzy set and fuzzy logic with example.	CO4	BT4
26	Illustrate the need for conditional probability and the important rules related to it.	CO4	BT3
27	Write unification algorithm and explain resolution in predicate logic.	CO4	BT1
28	Explain the resolution procedure in detail.	CO4	BT1
29	Represent the following statements in predicate logic: i) Marcus tried to assassinate Caesar. ii) All Pompeian's were Roman. iii) All Romans were either loyal to Caesar or hated him. iv) Everyone is loyal to someone. v) People only try to assassinate rulers they are no	CO4	BT3
30	Give the steps involved in converting wff predicates into clause form. Give an example in each step.	CO4	BT2
PART C (12 Marks)			
1	Formulate the following sentences to predicate logic, (i) Marcus was a man, (4) (ii) Marcus was a pompeian, (4) (iii) All pompeians were roman, (4) (iv) Caser was a ruler.	CO4	BT6
2	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?	CO4	BT6
3	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.	CO4	BT5
4	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) ;	CO4	BT6
5	Elaborate on Causal and Diagnostic Inference of Bayesian Net with examples.	CO4	BT6
6	Create the structure of a frame with example.	CO4	BT5

7	Interpret the use of semantic networks with example.	CO4	BT2
8	Measure the semantic network notation when compared with FOL.	CO4	BT5
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 is still alive • Sue eats everything bill eats i) Translate these sentences into formulas in predicate logic ii) Prove that john likes peanuts using backward chaining iii) Convert the formulas of a part into clause form iv) Prove that john likes peanuts using resolution	CO4	BT6
10	A medical test is used to determine whether a patient has a disease D. Two independent experts provide their beliefs based on test results: Expert 1's Belief: $\text{Bel}(D)=0.6$ (belief that the patient has the disease) $\text{Bel}(\neg D)=0.2$ (belief that the patient does not have the disease) $\text{Bel}(U)=0.2$ (uncertainty) Expert 2's Belief: $\text{Bel}(D)=0.7, \text{Bel}(\neg D)=0.1, \text{Bel}(U)=0.2$ We use Dempster's Rule of Combination to find the combined belief.	CO4	BT5

UNIT V

Planning- Planning problems, Simple planning agent, Planning languages, Blocks world ,Goal stack planning, Mean Ends Analysis, Non-linear Planning, Conditional planning, Reactive planning.
 Learning-Machine learning, Goals and Challenges of ML, Learning concepts, models, Artificial neural network base learning-Back propogation, Support Vector machines, Reinforcement learning, Adaptive learning, multiagent based learning, Ensemble learning, Learning for decision making, Distributed learning, Speedup learning. Introduction to Expert system - architecture of expert system.

PART-A (Multiple Choice Questions)

Q. No	Questions	Course Outcome	Competence BT Level
1	Incorrect information results in unsatisfied preconditions for actions and plans _____ detects violations of the preconditions for successful completion of the plan. 1. Conditional Plan 2. Conformant Planning 3. Execution monitoring 4. Both Conditional Plan & Execution monitoring	CO5	BT1
2	Standard planning algorithms assumes environment to be 1. Deterministic 2. Fully observable 3. Single agent 4. Stochastic	CO5	BT1
3	Planning problem combines the two major aspects of AI 1. Search & Logic 2. Logic & Knowledge Based Systems 3. FOL & Logic 4. Knowledge Based Systems	CO5	BT1
4	Machine learning is a subset of 1.Deep Learning 2.Data Science 3.Artificial Intelligence 4.Machine Learning		BT1
5	How many types of Artificial Neural Network topologies are present? a.2 b. 3 c. 4 d. 5	CO5	BT1
6	What is used to mitigate overfitting in a test set? a. Overfitting set b. Training set c. Validation dataset d. Evaluation set	CO5	BT2
7	What is perceptron?	CO5	BT1

	a. A single layer feed-forward neural network with pre-processing b. A neural network that contains feedback c. A double layer auto-associative neural network d. An auto-associative neural network		
8	Real-Time decisions, Game AI, Learning Tasks, Skill Acquisition, and Robot Navigation are applications of which of the following a. Supervised Learning: Classification b. Reinforcement Learning c. Unsupervised Learning: Clustering d. Unsupervised Learning: Regression	CO5	BT4
9	Which of the following algorithm is used to obtain the plan directly from the planning graph, instead of using the graph to provide heuristic. 1. BFS/DFS 2. A* 3. Graph-Plan 4. Greedy	CO5	BT1
10	Suppose we want to eliminate the inaccuracy problem in partial-order planning problem or planning problem, then the best data structure to use is the? (A). Stacks (B). Planning Graphs (C). BST (Binary Search Tree) (D). Queue	CO5	BT1
11	What is an Expert System in the context of Artificial Intelligence? a) A system that enhances internet speeds b) A system that manages large databases c) A system designed to emulate human expert decision-making d) A system used for computer hardware improvement	CO5	BT1
12	The knowledge base in an Expert System contains: a) Data about network configurations b) Information and rules about the domain of expertise c) Encrypted data for security purposes d) Algorithms for improving processing speed	CO5	BT1
13	In Expert Systems, the component responsible for drawing conclusions is called the: a) Database Manager b) Inference Engine c) Network Coordinator d) Data Encryption Tool	CO5	BT2
13	"Heuristic rules" in an Expert System refer to: a) Rules for data encryption b) Guidelines based on trial-and-error experience c) Network communication protocols d) Data storage algorithms	CO5	BT2
14	An Expert System developed for medical diagnosis would primarily use: a) Network analysis tools b) Medical knowledge and diagnostic rules c) Data encryption algorithms d) High-speed data processing units	CO5	BT4
15	"MYCIN" is an example of an Expert System developed for: a) Network management b) Medical diagnosis, specifically infectious diseases c) Data encryption d) Financial analysis	CO5	BT2
PART B (4 Marks)			
1	What is meant by Means-Ends Analysis?	CO5	BT1
2	What is planning?	CO5	BT1
3	What are K-Strips?	CO5	BT1
4	What are Strips?	CO5	BT1

5	What is nonlinear planning?	CO5	BT1
6	What are the components of a planning system?	CO5	BT1
7	What is Resilience in Planning?	CO5	BT1
8	Differentiate Search & planning.	CO5	BT1
9	What is contingency planning?	CO5	BT1
10	What are the functions of planning systems?	CO5	BT1
11	What is the need of POP algorithms?	CO5	BT1
12	List out the various planning techniques.	CO5	BT1
13	What is Machine Learning	CO5	BT1
14	Explain the various terms used in reinforcement learning	CO5	BT1
15	What algorithm is used in fraudulent analysis.	CO5	BT4
16	Differentiate adaptive and ensemble learning	CO5	BT2
17	What is Speedup learning?	CO5	BT1
18	Explain the concept of multi agent learning.	CO5	BT1
19	Explain the layers in ANN.	CO5	BT1
20	What is hierarchical planning?	CO5	BT1
21	Analyze the components of Expert systems with neat diagrams.	CO5	BT4
22	Discuss the various components of expert system and their importance in expert system.	CO5	BT2
23	Analyze the need of knowledge engineering, knowledge base and inference engine in expert system.	CO5	BT4
24	List out the problems are addressed by expert systems	CO5	BT2
25	Examine the application of expert system.	CO5	BT2
26	Illustrate a detailed note Rule based system architecture for expert system.	CO5	BT3
27	Write short note on the people involved in expert system.	CO5	BT1
28	Write advantages and disadvantages of expert systems.	CO5	BT1
PART C (12 Marks)			
1	List out the planning terminologies and components of planning	CO5	BT1
2	Explain the basic plan generation in detail?	CO5	BT2
3	Explain in detail the STRIPS?	CO5	BT2
4	Illustrate STRIPS-style operators that corresponds to the following blocks world description. A ON(A,B,S0) ^ B ONTABLE(B,S0) ^ CLEAR(A,S0)	CO5	BT2
5	Summarize on Nonlinear Planning using Constraint Posting	CO5	BT2
6	Construct the problem of changing a flat tire. The goal is to have a good spare tire properly mounted onto the car's axle, where the initial state has a flat tire on the axle and a good spare tire in the trunk. To keep it simple, our version of the problem is an abstract one, with no sticky lug	CO5	BT3

	nuts or other complications. There are just four actions: removing the spare from the trunk, removing the flat tire from the axle, putting the spare on the axle and leaving the car unattended overnight. Write the STRIPS and find out the solution.		
7	Explain about Hierarchical planning method with example?	CO5	BT2
8	Explain detail about the concepts of Artificial Neural Network.	CO5	BT1
9	Explain reinforcement learning with an example.	CO5	BT1
10	What is Machine learning? Explain the types of machine learning.	CO5	BT1
11	Place an agent in any one of the room (0,1,2,3,4) and the goal is to reach outside the building. What learning will you use? Explain briefly.	CO5	BT5
12	What learning method can we use to predict the future sales of a company?	CO5	BT4
13	Explain feedforward neural network.	CO5	BT1
14	What is Ensemble learning. Explain with example	CO5	BT1
15	Explain in detail about STRIPS and write the components of STRIPS for the given scenario: “Consider a flight journey in a luxurious flight from India to US”	CO5	BT2
16	Evaluate in detail about MYCIN Expert systems and its functions.	CO5	BT5
17	Design an expert system for travel recommendation and discuss its roles.	CO5	BT6
18	Classify the XOON and DART in detail and write its applications.	CO5	BT4

Note:

1. BT Level – Blooms Taxonomy Level

2. CO – Course Outcomes

BT1 – Remember BT2 – Understand BT3 – Apply BT4 – Analyze BT5 – Evaluate BT6 – Create