



AI MCQ - noo

Artificial Intelligence (SRM Institute of Science and Technology)



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SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

Ramapuram Campus, Bharathi Salai, Ramapuram, Chennai-600089

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

SUBJECT : 18CSC305J – ARTIFICIAL INTELLIGENCE

SEM/YEAR : VI/III

Course Outcomes

- CO1: Formulate a problem and build intelligent agents
- CO2: Apply appropriate searching techniques to solve a real world problem
- CO3: Analyze the problem and infer new knowledge using suitable knowledge representation schemes
- CO4: Develop planning and apply learning algorithms on real world problems
- CO5: Design an expert system and implement natural language processing techniques
- CO6: Implement advance techniques in Artificial Intelligence

UNIT I

Introduction to AI-AI techniques, Problem solving with AI, AI Models, Data acquisition and learning aspects in AI, Problem solving- Problem solving process, Formulating problems, Problem types and characteristics, Problem space and search, Intelligent agent, Rationality and Rational agent with performance measures, Flexibility and Intelligent agents, Task environment and its properties, Types of agents, Other aspects of agents, Constraint satisfaction problems(CSP), Crypto arithmetic puzzles, CSP as a search problem-constraints and representation, CSP-Backtracking, Role of heuristic, CSP-Forward checking and constraint, propagation,CSP-Intelligent backtracking.

PART-A (Multiple Choice Questions)

Q. No	Questions	Course Outcome	Competence BT Level
1	A technique that was developed to determine whether a machine could or could not demonstrate the artificial intelligence known as the _____ a) Boolean Algebra b) Turing Test c) Logarithm d) Algorithm Answer: b)Turing Test	CO1	1
2	What Model deal with the computer knowledge based model for Artificial Intelligence? a) Logistic b) Linear c) Cognitive d) Learning Vector Answer: c)Cognitive	CO1	1
3	Identify the person who insisted and made AI topic for conference at Dartmouth in 1956 a) Allan Turing b) Zuse c) Aristotle d) John McCarthy Answer: d)John McCarthy	CO1	1
4	To solve the Decision Problems, AI can be defined in Broad Categorization (i) Machines can think and have capability to react like humans (ii) Systems that not respond intelligently in the same way as the humans do (iii) Computational models to solve various complex decision making problems (iv) Study of intelligent agents. a) Statement (i),(ii),(iii) are correct b) Statement (i),(iii),(iv) are correct c) Statement (ii),(iii),(iv) are correct d) Statement (i),(ii),(iii),(iv) are correct	CO1	2

	Answer: b) Statement (i),(iii),(iv) are correct		
5	Identify the problems that yield a right answer when an appropriate algorithm is applied. a)Structured b)Well Structured c)ill-Structured d) Unstructured Answer: b)Well Structured	CO1	1
6	Identify the problem that has the possibility of more than one answer and even a particular situation decides the correctness of the answer. a)Structured b)Well Structured c)ill-Structured d) Unstructured Answer: c)ill-Structured	CO1	1
7	The following problems are right inference when we can choose the well-structured algorithm is given below (i) Calculating the path of trajectory when a missile is fired (ii) Solving a quadratic equation to find out the value of X (iii)Network flow analysis problem (iv) Identifying the security threats in big social gathering a) Statement (i),(ii),(iii) are correct b) Statement (ii),(iii),(iv) are correct c) Statement (i),(ii),(iv) are correct d) Statement (i),(ii),(iv) are correct Answer: a) Statement (i),(ii),(iii) are correct	CO1	2
8	Which Models are based on sign processes or signification and communication? a)Syntactic b)Semantic c)Semiotic d)Statistical Answer: c)Semiotic	CO1	1
9	The different types of problems can be categorized that can be used in problem solving is given below (i) Deterministic (ii) Formulating Problems (iii) Unknown state space (iv) Non Deterministic a) Statement (i),(ii),(iii) are correct b) Statement (ii),(iii),(iv) are correct c) Statement (i),(iii),(iv) are correct d) Statement (i),(ii),(iv) are correct Answer: c) Statement (i),(iii),(iv) are correct	CO1	2
10	The extraction of meaningful information that is previously unknown and can be very useful potential ahead is known as _____ a)Knowledge Discovery b)Machine Learning c)Learning Theory d)Neural Computation Answer: a)Knowledge Discovery	CO1	1
11	Select the one which finds its application from the telecom domain to the financial decision making with optimization as the base criterion. a)Mining b)Neural c)Evolutionary d)Discovery Answer: c)Evolutionary	CO1	1
12	An _____ is the one which is flexible in terms to get the desired outcome. a)Intelligent agent b)Multi-agent c)Multi-Perspective agent d)Decision-Making agent Answer: a)Intelligent agent	CO1	1
13	Which Process consists of sequence of well-defined method that can	CO1	1

	<p>handle doubts, uncertainty, ambiguity and help in achieving the desired goal?</p> <p>a)Problem-solving b)Problem-Understanding c)Problem Representation d)Problem Formulation</p> <p>Answer: a)Problem-solving</p>		
14	<p>The steps to be followed for finding the formulating problems</p> <p>(i) Problem Identification and problem definition (ii) Problem space (iii) Task Knowledge and State Space (iv) Problem Analysis</p> <p>a) Statement (i),(ii),(iii) are correct b) Statement (ii),(iii),(iv) are correct c) Statement (i),(iii),(iv) are correct d) Statement (i),(ii),(iv) are correct</p> <p>Answer: a) Statement (i),(ii),(iii) are correct</p>	CO1	2
15	<p>Problem _____ precisely tells us what the achievable goal is and what the information is to be used during the solution process.</p> <p>a)Definition b)Identification c)Analysis d)Representation</p> <p>Answer: b)Identification</p>	CO1	1
16	<p>Which State is fully observable and it goes to one definite after any action.</p> <p>a)Deterministic b)Non-Observable c) Partially Observable d)Unknown State Space</p> <p>Answer: a)Deterministic</p>	CO1	1
17	<p>Name the State that has a solution which is based on searching the tree and finding out the path for solution.</p> <p>a)Deterministic b)Non-Observable c) Partially Observable d)Unknown State Space</p> <p>Answer: c) Partially Observable</p>	CO1	1
18	<p>The following issues are observed while designing the search problem</p> <p>(i) Rule Selection (ii) State Representation and Identifying Relationships among the states (iii) Proper Selection of forward and backward moment to find the goal state (iv) The goal of state space search is clearly indicated.</p> <p>a) Statement (i),(ii),(iii) are correct b) Statement (ii),(iii),(iv) are correct c) Statement (i),(iii),(iv) are correct d) Statement (i),(ii),(iv) are correct</p> <p>Answer: a) Statement (i),(ii),(iii) are correct</p>	CO1	2
19	<p>Which problem analysis that deals the reasoning with the representation efficiency?</p> <p>a)Compactness b)Utility c)Completeness d)Transparency</p> <p>Answer: d)Transparency</p>	CO1	1
20	<p>A general approach for solving a large and complex problem is to decompose it into some smaller problems is known as _____</p> <p>a)Problem Analysis b)Problem Identification c)Problem Representation d)Problem Reduction</p> <p>Answer: d)Problem Reduction</p>	CO1	1

21	Which problem are the ones which definitely have a solution and there will not be any solution. a)Structured b)Well Structured c)Linear d) Non-Linear Answer: c)Linear	CO1	1
22	Identify problem analysis that must be able to restrict and define boundaries clearly? a)Compactness b)Utility c)Completeness d)Transparency Answer: a)Compactness	CO1	1
23	Select the method which is applicable to a wide variety of problems and its means-ends analysis. a) Register purpose b)Planning purpose c)Special purpose d)General purpose Answer: d)General purpose	CO1	1
24	Which one may become very difficult in all the problems and also there is very little commonality among different problems. a)Generalisation b)Localization c)Patronization d)Modularization Answer: a)Generalisation	CO1	1
25	Which Model employs probabilistic approaches and typically a collection of probability density functions and distribution functions. a)Syntactic b)Semantic c)Semiotic d)Statistical Answer: d)Statistical	CO1	1

PART B (4 Marks)

1	Describe various AI models	CO1	4
2	List milestones in AI evolution	CO1	2
3	What are the statistical models?	CO1	1
4	Give example of one ill structured problem with description and elaborate the method for solving that problem.	CO1	3
5	Explain the model building concept in AI.	CO1	2
6	List various equipments in day to day life where AI is used.	CO1	2
7	Differentiate between the semiotic model and statistical model.	CO1	3
8	Can forward checking and back jumping go together for a same problem? Discuss.	CO1	3
9	Explain about problem solving process with neat diagram.	CO1	2
10	Discuss the local search in CSP with examples.	CO1	3

PART C (12 Marks)

1	Write a program and explain about simple intelligent system for Tic-Tac-Toe	CO1	6
2	With suitable diagrams explain in detail about types of agents.	CO1	2
3	Discuss the forward checking and constraint propagation technique with an example.	CO1	4
4	Develop a program to solve the N queen puzzle using forward checking. Show in steps how the constraints are handled.	CO1	6
5	Describe the problem formulation steps with example.	CO1	4

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#	Question	Answer
1	Which search is implemented with an empty first-in-first-out queue? A. Depth-first search B. Breadth-first search C. Bidirectional search	B

	D. None of the mentioned	
2	What is the other name of informed search strategy? A. Simple search B. Heuristic search C. Online search D. None of the mentioned	B
3	A* algorithm is based on ____ A. Breadth-First-Search B. Depth-First-Search C. Uniform Cost Search D. Best-First-Search	D
4	Strategies that know whether one non-goal state is “more promising” than another are called A. Informed & Uninformed Search B. Uninformed Search C. Heuristic & Uninformed Search D. Informed & Heuristic Search	D

	Which of the following algorithms keeps track of 'k' states instead of just one?	
5	A. Hill-Climbing search B. Local Beam search C. Stochastic hill-climbing search D. Random restart hill-climbing search E. None of these	B
6	A common assumption about the players in a game is that A. Neither player knows the payoff matrix. B. The players have different information about the payoff matrix. C. Only one of the players pursues a rational strategy. D. The specific identity of the players is irrelevant to the play of the game.	D
7	Which search implements stack operation for searching the states? A. Depth-limited search B. Depth-first search C. Breadth-first search D. None of the mentioned	B
8	Though local search algorithms are not systematic, key advantages would include _____ A. Less memory B. More time C. Finds a solution in large infinite space D. Less memory & Finds a solution in large infinite space	D

9	<p>Uninformed search strategies are better than informed search strategies.</p> <p>A. True</p> <p>B. False</p>	A
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	The _____ is a touring problem in which each city must be visited exactly once. The aim is to find the shortest tour.	
10	A. Finding shortest path between a source and a destination B. Travelling Salesman problem C. Map coloring problem D. Depth first search traversal on a given map represented as a graph	B
11	When is breadth-first search optimal? A. When there is less number of nodes B. When all step costs are equal C. When all step costs are unequal D. Both a & c	B
12	When will Hill-Climbing algorithm terminate? A. Stopping criterion met B. Global Min/Max is achieved C. No neighbor has higher value D. All of the above	C
13	Is optimality and completeness exists in bidirectional search algorithm? A. Yes, Yes B. No, Yes C. Yes, No D. No, No	A

14	<p>Best-First search is a type of informed search, which uses _____ to choose the best next node for expansion.</p> <p>A. Evaluation function returning lowest evaluation B. Evaluation function returning highest evaluation C. Evaluation function returning lowest & highest evaluation D. None of them is applicable</p>	A
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	Which search is equal to minimax search but eliminates the branches that can't influence the final decision?	
15	A. Depth-first search B. Breadth-first search C. Alpha-beta pruning D. None of the above	C
16	Which values are independent in minimax search algorithm? A. Pruned leaves x and y B. Every states are dependent C. Root is independent D. None of the above	A
17	For general graph, how one can get rid of repeated states? A. By maintaining a list of visited vertices B. By maintaining a list of traversed edges C. By maintaining a list of non-visited vertices D. By maintaining a list of non-traversed edges	A
18	DFS is _____ efficient and BFS is _____ efficient. A. Space, Time B. Time, Space C. Time, Time D. Space, Space	A

19	<p>Which of the following are the two key characteristics of the Genetic Algorithm?</p> <p>A. Crossover techniques and Fitness function B. Random mutation and Crossover techniques C. Random mutation and Individuals among the population D. Random mutation and Fitness function E. None of these</p>	A
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	Hill-Climbing technique stuck for which of the following reasons?	
20	A. Local maxima B. Ridges C. Plateaux D. All of these E. None of these	D
21	How many successors are generated in backtracking search? A. 1 B. 2 C. 3 D. 4	A
22	Which value is assigned to alpha and beta in the alpha-beta pruning? A. alpha = max B. alpha = min C. beta = min D. Both A and C	D
23	Which of the mentioned properties of heuristic search differentiates it from other searches? A. It provides solution in a reasonable time frame B. It provides the reasonably accurate direction to a goal C. It considers both actual costs that it took to reach the current state and approximate cost it would take to reach the goal from the current state D. All of the above	D

24	<p>What is most important to be concerned with in the evolution of repetitive problems?</p> <p>A. Do multiple runs until a good solution is found B. Execute one run until the solution is good enough C. Get a reasonably good solution every time D. Get a very good result just once</p>	C
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	General algorithm applied on game tree for making decision on win/lose is	
25	A. DFS/BFS search algorithm B. Heuristic search algorithm C. Greedy search algorithm D. Minmax algorithm	D
26	Which one of the following is a part of every game theory model? A. Players. B. Payoffs C. Probabilities D. Strategies	D
27	Which of the following describes Nash equilibrium? A. A firm chooses its dominant strategy, if one exists. B. Every competing firm in an industry chooses a strategy that is optimal given the choices of every other firm. C. Market price results in neither a surplus nor a shortage. D. All firms in an industry are earning zero economic profits.	B
28	A prisoners' dilemma is a game with all of the following characteristics except one. A. Players cooperate in arriving at their strategies. B. Both players have a dominant strategy. C. Both players would be better off if neither chose their dominant strategy. D. The payoff from a strategy depends on the choice made by the other player.	A

29	<p>The heuristic path algorithm is a best-first search in which the evaluation function is $f(n) = (2 - w)g(n) + wh(n)$. What kind of search does this perform for $w = 1$?</p> <p>A. Uniform cost search B. A* search C. Greedy best-first search</p>	B
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	D. None of the above	
30	A genetic algorithm (or GA) is a variant of stochastic beam search in which successor states are generated by combining two parent states, rather than by modifying a single state. A. True B. False	A
31	Adversarial search problems uses _____ a) Competitive Environment b) Cooperative Environment c) Neither Competitive nor Cooperative Environment d) Only Competitive and Cooperative Environment	Answer : a
32	Zero sum game has to be a _____ game. a) Single player b) Two player c) Multiplayer d) Three player	c
33	General algorithm applied on game tree for making decision of win/lose is _____ a) DFS/BFS Search Algorithms b) Heuristic Search Algorithms c) Greedy Search Algorithms d) MIN/MAX Algorithms	d
34	What is the complexity of minimax algorithm? a) Same as of DFS b) Space – b^m and time – b^m c) Time – b^m and space – b^m d) Same as BFS	a

35	Which of the following for the game can be defined by the initial state and the legal moves for each side? (A). Search Tree (B). Forest (C). State Space Search (D). Game Tree (E). Goal State	D
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Sample Part-B Questions

1. Write the heuristic estimation function for A* search?
2. State the advantages of the local search algorithm.
3. Define Heuristic function, $h(n)$.
4. When will Hill-Climbing algorithm terminate?
5. How a game formulated as a search problem?
6. List any two memory bounded algorithms.
7. Differentiate online search and offline search.
8. List some of the variants of hill-climbing.
9. Draw the State Space diagram for Hill Climbing search problem. Identify the problems in different regions in Hill climbing. Give reason.
10. State the difference between heuristic and adversarial search
11. Differentiate Blind Search and Heuristic Search.
12. What are the disadvantages of Hill climbing Algorithm and how can you overcome it ?
13. What do you understand by adversarial search ?
14. What is pruning ?
15. Brief the elements of game playing search.
16. Define Maximin Strategy.
17. List the limitations of Minmax algorithm

Sample Part-C Questions

1. Explain Uniform Cost Search Algorithm with an example.

Brief Generate and Test Strategy.
2. Explain Travelling Salesman Problem with an example
3. Brief the parameters for evaluating Search Algorithms .

4. Illustrate any local search algorithm.
5. Solve the following mixed strategy game.

	Y1	Y2
X1	4	2
X2	0	10

6. A professional athlete , Biff Rhino , and his agent , Jim Fence , are renegotiating Biff's contract with the general manager of the Texas Buffaloes , Harry Sligo . The various outcomes of this game situation is organized into a payoff table as shown below.

		General Manager Strategy		
Athlete/Agent Strategy		A	B	C
1		\$50,000	\$35,000	\$30,000
2	60,000	40,000	20,000	

The athlete and agent want to maximize the athlete's contract , and the general manager hopes to minimize the athlete's contract . Using maximin and minimax strategies work out the optimal strategy for athlete as well as the general manager . Does this game situation have a saddle point ? Substantiate your answers with appropriate reasoning .

7. The Coloroid Camera Company (referred to as company I) is going to introduce a new camera into its product line and hopes to capture as large an increase in its market share as possible. In contrast, the Camco Camera Company (referred to as company II) hopes to minimize Coloroid's market share increase. Coloroid and Camco dominate the camera market, and any gain in market share for Coloroid will result in a subsequent identical loss in market share for Camco. The strategies for each company are based on their promotional campaigns, packaging, and cosmetic differences between the products. The payoff table, which includes the strategies

and outcomes for each company (I Coloroid and II Camco), is shown below. The values in the table are the percentage increases or decreases in market share for company I.

Company I Strategy	Company II Strategy		
	A	B	C
1	9	7	2
2	11	8	4
3	4	1	7

Apply Maximin decision criteria and Minimax criteria and check whether the two strategies result in an equilibrium point . Identify dominant strategies and eliminate them

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Unit III

QUESTION BANK

PART A

1. A Knowledge based agent ‘s environment is based on
 - a. percept
 - b. action
 - c. percept and action
 - d. action and percept.
2. The operator → in propositional logic represents
 - a. not
 - b. and
 - c. or
 - d. if ..then
3. A sentence is true if it is true in all models is a
 - a. contradiction
 - b. tautology
 - c. unsatisfiability
 - d. refutation
4. The existential quantification (\exists) $xP(x)$ is read as
 - a. There is at least one x such that $P(x)$
 - b. For all x in $P(x)$
 - c. $P(x)$ for all values of x in domain
 - d. $P(x)$ for no values of x in the domain.”
5. Analogical reasoning is the process of reasoning
 - a. From one particular object to another
 - b. with different assumptions
 - c. with facts of life
 - d. with our own ideas.
6. Forward chaining reasoning method proceeds from
 - a. Facts to conclusions
 - b. Conclusion to facts
 - c. Facts to problems
 - d. Conclusion to data
7. Translate the following statement into FOL.
“Every dog is clever”
 - a) $\forall a \text{ clever(dog)}$
 - b) $\exists a \text{ clever(a)}$
 - c) $\forall a \text{ dog(a)}$
 - d) $\exists a \text{ dog(a)}$
8. Propositional logic is representation of ----- sentence
 - a) exclamatory
 - b) interrogative
 - c) declarative
 - d) descriptive
9. A sentence is true if it is true in all models is a
 - a) contradiction
 - b) tautology

- c) satisfiability
- d) refutation

10. Basic rules applied in order to derive conclusions to get the outcome is called as

- a) inference
- b) reference
- c) logic
- d) semantics

11.. Process of reasoning from one particular object to another is called as

- a.) analogical reasoning
- b.) hypothetical reasoning
- c.) commonsense reasoning
- d) crucial reasoning

12. Which is created by using single propositional symbol?

- a. Complex sentence
- b. **Atomic sentence**
- c. Composition sentence
- d. Connective sentence

13. Semantic network is

- a. **A way of representing knowledge**
- b. Data type
- c. A data structure
- d. Association of attributes

14. Forward chaining reasoning method proceeds from

- a. **Facts to conclusions**
- b. Conclusion to facts
- c. Facts to problems
- d. Conclusion to data

15. Rule based system defines the problem domain and aims to find a solution from

- a. **A set of production rules**
- b. A set of production examples
- c. A set of axioms
- d. Positive & negative examples

16. ----- transforms system inputs, which are crisp numbers into fuzzy sets

- a. Inference
- b. Fuzzifier
- c. Defuzzifier
- d. Rules

17. Translate the following statement into FOL.

“For every a, if a is a philosopher, then a is a scholar”

- a. **$\forall a \text{ philosopher}(a) \text{ scholar}(a)$**
- b. $\exists a \text{ philosopher}(a) \text{ scholar}(a)$
- c . $\forall a \text{ philosopher}(a)$
- d. $\text{scholar}(a)$

18. Which is used to construct the complex sentences in propositional logic?

- a. Symbols
- b. Connectives
- c. Logics
- d. description

19. How many logical connectives are there in artificial intelligence?

- a. 2
- b. 3
- c. 4
- d. 5

20. Which algorithm will work backward from the goal to solve a problem?

- a. Simulated Annealing
- b. Forward chaining
- c. Hill climbing
- d. Backward Chaining

21. Fuzzy is of the form _____.
a. Two valued logic b. Crisp Set Logic
c. Many Valued Logic d. Binary Set Logic

22. Wumpus World is a classic problem, best example of _____.
a) Single player Game b) Two player Game
c) Reasoning with Knowledge d) Knowledge based Game

23. ' $\alpha \models \beta$ ' (to mean that the sentence α entails the sentence β) if and only if, in every model in which α is _____ β is also _____
a) True, true b) True, false
c) False, true d) False, false

24. Uncertainty arises in the wumpus world because the agent's sensors give only _____
a) Full & Global information b) Partial & Global Information
c) Partial & local Information d) Full & local information

25. Logic reasoning is the process of drawing conclusions from

- (A) Symbolic Rules
- (B) Inference Rules
- (C) Logic Rules
- (d) resolution

26. Suppose you are creating a bayesian network. Which of the following is the outcome between a node and its predecessors?
(A). Conditionally independent (B). Dependant
(C). Functionally dependent (D). Both Conditionally dependant & Dependant

27. Bayes rule can be used in?
(A). Solving queries (B). Answering probabilistic query
(C). Decreasing complexity (D). Increasing complexity

28. Which of the following is desired to build probabilistic systems feasible in the world?

- (A). Reliability (B). Feasibility
(C). Crucial robustness c) simplicity

29. What will be returned by backward chaining AI Algorithm?

- (A). Additional statements (B). Logical statement
(C). Substitutes matching the query (d). Crucial robustness

PART – B (4 Marks)

1. Define logic. How Wumpus world logic is constructed for all possible models.
2. Explain the BNF representation of predicate logic.
3. Write short notes on frames.
4. Consider the following sentence for constructing CFG and a parse tree.
“Raji received a wonderful gift.”
5. List few issues associated with the representation of knowledge structure.
6. Write done the condition for entailment in logic with a suitable example.
7. How can this English sentence be translated into a logical expression? “Everyone likes someone”.
8. What is meant by the term Inference? Explain the difference types of Inference with examples.
9. What is necessity of a Semantic Network? Explain Partitioned Semantic Network with an appropriate example.
10. *Convert the following FOPL to English*

- i. $\forall x \text{ IsABunny}(x) \Rightarrow \text{IsCute}(x)$
- ii. $\forall x \text{ IsAStudent}(x) \wedge \text{IsTakingAI}(x) \Rightarrow \text{IsCool}(x)$

11. Write short notes on frames.
12. Define tautology and entailment.
- 13.. How can this English sentence be translated into a logical expression?
“You cannot ride the roller coaster if you are under 4 feet tall unless you are older than 16 years old.

14. .) Show that $\neg(p \rightarrow q)$ and $p \wedge \neg q$ are logically equivalent using truth table

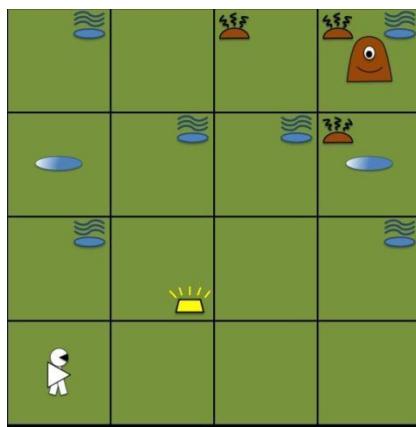
15. Derive the conclusion using predicate logic.

1. “All lions are fierce.”
2. “Some lions do not drink coffee.”
3. “Some fierce creatures do not drink coffee.”

16. What do you mean by fuzzification?
17. Define Bayes theorem.
18. Define certainty factor.
19. What does dampster theory specify?
20. Brief bayseian belief network.
21. Write about Recognize-Act Cycle
22. Brief the process of matching in Production systems
23. What is conflict resolution?
24. State Modus ponens rule.
25. Differentiate between Propositional logic and Predicate logic.
26. Define Inductive inference.
27. State the advantages and disadvantages of forward chaining and backward chaining.
28. What is a Fuzzy set?
29. Mention the reasons for which Bayes' theorem is intractable.
30. From a standard deck of playing cards, a single card is drawn. The probability that the card is king is $4/52$, then calculate posterior probability $P(\text{King}|\text{Face})$, which means the drawn face card is a king card.

PART C

1. Explain Wumpus World Problem in detail. Create a traditional environment to understand an intelligent agent system in which it progresses to acquire gold from the mine.



- 2.. Elaborate the process of unification with an algorithm and show how it is lifted from propositional logic to First order logic
3. Convert the following sentences in the propositional logic to clausal form. (6)

$P \Leftrightarrow (Q \wedge \neg R)$.

$W \Rightarrow P$.

$R \Leftrightarrow S$.

$S \Rightarrow P$.

$P \Rightarrow (\neg Q \vee W) \vee S$.

4 Convert to CNF

$\forall X (q(X) \vee r(X) \Rightarrow s(X))$

5. Using Resolution solve (6)

dog(fido)

$\forall(x)(\text{dog}(X) \rightarrow \text{animal}(X))$

$\forall(Y)(\text{animal}(Y) \rightarrow \text{die}(Y))$

Conclusion

die(fido)

6. Explain Unification and Lifting in detail with supporting examples.

7. With appropriate examples clearly explain the difference between Propositional and Predicate Logics.

8. Explain Forward and Backward Chaining in detail with appropriate examples.

9. Explain semantic networks and what are the types of reasoning in knowledge representation?

10. Explain the process of knowledge representation using rules by highlighting the control strategies.

11. What is a Bayesian network? How is the Bayesian network used in representing uncertain knowledge? Explain the method of performing inference in Bayesian network

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FACULTY OF ENGINEERING AND TECHNOLOGY

**DEPARTMENT OF
COMPUTER SCIENCE AND
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QUESTION BANK

DEGREE / BRANCH: _____

____ SEMESTER

SUB CODE – SUBJECT NAME

Regulation – _____

Academic Year _____

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

Subject Code: 18CSC305J

Subject Name: ARTIFICIAL INTELLIGENCE

SEM/ YEAR: III/VI

Course Outcomes

CO1: Formulate a problem and build intelligent agents

CO2: Gain Knowledge in problem and building intelligent agents

CO3: Understand the search technique procedures applied to real world problems

CO4: Acquire knowledge in planning and learning algorithms

CO5: Gain Knowledge in AI Applications and advances in Artificial Intelligence

UNIT IV

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 propagation, Support Vector machines, Reinforcement learning, Adaptive learning, multiagent based learning, Ensemble learning, Learning for decision making, Distributed learning, Speedup learning.

PART-A (Multiple Choice Questions)

Q. No	Questions	Course Outcome	Competence BT Level
1	Block world problem is also known as _____ 1. STRIPS 2. Linear Planning 3. Non-Linear Planning 4. Susan Anomaly	CO4	BT1
2	Standard planning algorithms assumes environment to be 1. Deterministic 2. Fully observable 3. Single agent 4. Stochastic	CO4	BT1
3	Planning problem combines the two major aspects of AI 1. Search & Logic 2. Logic & Knowledge Based Systems 3. FOL & Logic	CO4	BT1

	4. Knowledge Based Systems		
4	Machine learning is a subset of 1.Deep Learning 2.Data Science 3.Artificial Intelligence 4.All the above	CO4	BT1
5	Which type of learning best describes the problem of learning to ride a bicycle? 1.Supervised 2.Unsupervised 3.Reinforcement 4.Inductive	CO4	BT4
6	What is used to mitigate overfitting in a test set? 1.Overfitting set 2.Training set 3.Validation dataset 4.Evaluation set	CO4	BT2
7	What is perceptron? 1. A single layer feed-forward neural network with pre-processing 2.A neural network that contains feedback 3.A double layer auto-associative neural network 4.An auto-associative neural network	CO4	BT1
8	Real-Time decisions, Game AI, Learning Tasks, Skill Acquisition, and Robot Navigation are applications of which of the following 1.Supervised Learning: Classification 2.Reinforcement Learning 3.Unsupervised Learning: Clustering 4.Unsupervised Learning: Regression	CO4	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	CO4	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? 1.Stacks 2.Planning Graphs 3.BST (Binary Search Tree)	CO4	BT1

	4.Queue		
PART B (4 Marks)			
1	What is meant by Means-Ends Analysis?	CO4	BT1
2	What is planning?	CO4	BT1
3	What are K-Strips?	CO4	BT1
4	What are Strips?	CO4	BT1
5	What is nonlinear planning?	CO4	BT1
6	What are the components of a planning system?	CO4	BT1
7	What is Resilience in Planning?	CO4	BT1
8	Differentiate Search & planning.	CO4	BT1
9	What is contingency planning?	CO4	BT1
10	What are the functions of planning systems?	CO4	BT1
11	What is the need of POP algorithms?	CO4	BT1
12	List out the various planning techniques.	CO4	BT1
13	What is Machine Learning	CO4	BT1
14	Explain the various terms used in reinforcement learning	CO4	BT1
15	What algorithm is used in fraudulent analysis.	CO4	BT4
16	Differentiate adaptive and ensemble learning	CO4	BT2
17	What is Speedup learning?	CO4	BT1
18	Explain the concept of multi agent learning.	CO4	BT1
19	Explain the layers in ANN.	CO4	BT1
20	What is hierarchical planning?	CO4	BT1
PART C (12 Marks)			
1	List out the planning terminologies and components of planning	CO4	BT1
2	Explain the basic plan generation in detail?	CO4	BT2
3	Explain in detail the STRIPS?	CO4	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)	CO4	BT2
5	Summarize on Nonlinear Planning using Constraint Posting	CO4	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 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	CO4	BT3

	axle and leaving the car unattended overnight. Write the STRIPS and find out the solution.		
7	Explain about Hierarchical planning method with example?	CO4	BT2
8	In computers, in many cases, rote learning is used. Give five such examples of rote learning.	CO4	BT1
9	Explain reinforcement learning with an example.	CO4	BT1
10	What is Machine learning? Explain the types of machine learning.	CO4	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.	CO4	BT5
12	What learning method can we use to predict the future sales of a company?	CO4	BT4
13	Explain feedforward neural network.	CO4	BT1
14	Using the concept of Ensemble learning, describe the learning by kids.	CO4	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"	CO4	BT2

Note:

1. **BT Level** – Blooms Taxonomy Level

2. **CO – Course Outcomes**

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

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FACULTY OF ENGINEERING AND TECHNOLOGY

**DEPARTMENT OF COMPUTER SCIENCE AND
ENGINEERING**



QUESTION BANK

**DEGREE / BRANCH: B.TECH/CSE
VII SEMESTER**

18CSE358T– PATTERN RECOGNITION TECHNIQUES

Regulation – 2018

Academic Year 2021-22

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Ramapuram Campus, BharathiSalai, Ramapuram, Chennai-600089

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

SUBJECTCODE/NAME : 18CSC305J–Artificial Intelligence

SEM/ YEAR: VI/III

UNIT V			
Expert system-Architecture- Pros and Cons of expert system- Rule based systems- Frame based expert system- Natural language processing-Levels of NLP- Syntactic and Semantic Analysis- Information retrieval- Information Extraction- Machine translation- NLP Applications- Advance topics in Artificial Intelligence-Cloud Computing and intelligent agent- Business intelligence and analytics- Sentiment Analysis- Deep learning Algorithms- Planning and logic in intelligent agents			
Q. No	Questions	Course Outcom e	Competen ce BT Level
1	MYCIN falls under the category of a) Shell b) Rule-based expert system c) Frame based expert system d) None of these	5	1
2	The core part of decision making for the expert system lies in the a) Knowledge base b) Explanations c) Inference mechanism d) Facts	5	1
3	A rule of ‘If you are wearing a cardigan, then it is cold’ falls under the semantics of a) Recommendation b) Heuristic c) Relation d) Directive	5	1
4	A when needed method is invoked in frame based expert system a) By an event when changed b) In the decision making, as required c) By any action that need some data d) All of the above	5	1
5	The interpreters in expert systems are termed as a) Frames b) Explanations c) Shells	5	1

	d) None of the above		
6	The process of coding the knowledge in expert system is a) Knowledge base b) Knowledge engineering c) Knowledge acquisition d) None of the above	5	1
7	In fuzzy expert system, conversion is crisp value is done by a) Inference mechanism b) Defuzzification c) Composition d) Fuzzification	5	1
8	Semantic analysis is based on a) Transitive networks b) Context sensitive grammars c) Any grammars d) Knowledge representation	5	1
9	Which of the following checks the correctness of the sentence grammatically? a) ATN b) RTN c) Indexing d) Wrappers	5	1
10	In case grammar, the agent case is always a compulsory case with any verb. a) It is to be with dative b) The above statement is true c) The case grammar can have instrumental case too d) It depends on the verb	5	1
11	In which of the following, the context and the relations among the sentences are important? a) Conceptual dependency b) Case grammars c) Discourse and pragmatic processing d) None of the above	5	1
12	Suppose we want to identify fraud transactions in bank, under this scenario, we would look up on a) High precision b) High Recall c) Precision and recall = 1 value d) None of the above	5	1
13	Which of the text pre processing task would return 'learn' if the input word is 'learnt'? a) Text standardisation b) Term stripping c) Stemming d) None of the above	5	1
14	Which of the following does not exist in the Boolean model? a) Ranking	5	1

	b) Weighting c) Indexing d) All of these		
15	Pattern analytics intends to a) Hide the meaningful patterns for processing b) Select the useful patterns and study them c) Discover the meaningful patterns d) All the above	5	1
16	Sentiment analysis is not about a) Finding the opinion about the person on some product b) Determining the polarity from the text c) Feature based sentiment classification d) Finding sentiments in the text	5	1
17	Which of the statement is not true about big data? a) It discovers hidden patterns from a variety of data b) Analytics of big data helps in better business decisions c) Hadoop, NoSQL and MapReduce are the technologies associated with it d) Social media activity, web logs are data sources for big data i)	5	1
18	Which of the following includes major tasks of NLP? a) Automatic summarization b) Discourse analysis c) Machine translation d) All the above	5	1
19	What is meant by compositional semantics? a) Determining the meaning b) Logical connectives c) Semantics d) None of the above	5	1
20	What is meant by quasi logical form? a) Sits between syntactic and logical form b) Logical connectives c) All the above d) None of the above	5	1
21	Among the given options, which search algorithm requires less memory? a) Optimal search b) Depth first search c) Breadth first search d) Linear search	5	1
22	Which algorithm is used in the game tree to make decision of win/Lose? a) Heuristic search algorithm b) DFS/BFS algorithm c) Greedy search Algorithm d) Min/Max algorithm	5	1
23	The component of an expert system is	5	1

	a) Knowledge base b) Inference engine c) User interface d) All the above		
24	Which rule is applied for the simple reflex agent? a) Simple action rule b) Simple and condition action rule c) Condition action rule d) None of the above	5	1
25	Which agent deals with happy and unhappy states? a) simple reflex agent b) model based agent c) learning agent d) utility based agent	5	1

PART-B(4 MARKS)

1	Discuss the expert system frame work?	5	1
2	What are shells and explanations?	5	1
3	What are frame based expert systems?	5	1
4	List out the possible advantages of using semantic grammar	5	1
5	What is pattern analytics? Explain with an example?	5	1
6	Explain the factors than an intelligent agent needs to handle in concurrent engineering	5	1
7	What are frame based expert systems?	5	1
8	Can parsing be related to a search problem? Discuss	5	1
9	List out the benefits of expert systems?	5	1
10	Why is there a need to have efficient knowledge acquisition systems?	5	1

PART-C (12 MARKS)

1	Develop an expert system for library that would recommend book for its project work. Assume suitable data.	5	2
2	Write a program to associate different news in newspaper and prioritise them with reference to your context.	5	3
3	Develop the retrieval system using indexing technique for some set of text documents.	5	2
4	Explain the different levels of natural language processing.	5	3
5	With a neat sketch, explain the architecture, characteristic features and roles of expert system.	5	3
6	Write in detail about the process of information extraction and Machine translation	5	3
7	Compare the convolutional neural networks, recurrent neural networks and summarize their pros and cons.	5	3

Note:

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