



MARWADI UNIVERSITY

Faculty of **Engineering**[ **CE - AI** ]SEM: **V** MU FINAL EXAM/ MU FINAL REMEDIAL[ **Artificial Intelligence** ]**DEC: 2022**Subject: - (**Artificial Intelligence**) (**01AI0502**)

Date:-

Total Marks:-100

Time: -

**Instructions:**

1. All Questions are Compulsory.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

**Question: 1.**

- (a) Objective MCQ [10]
1. What is Artificial intelligence?
    - (a) Making a Machine intelligent
    - (b) Putting your intelligence into Computer
    - (c) Programming with your own intelligence
    - (d) putting more memory into Computer
  2. Which of the following is not a goal of AI?
    - (a) Thinking humanly
    - (b) Adapting to the environment and situations
    - (c) To rule over humans
    - (d) Real Life Problem Solving
  3. Which of the following definitions correctly defines the State-space in an AI system?
    - (a) A state space can be defined as the collection of all the problem states
    - (b) A state space is a state which exists in environment which is in outer space
    - (c) A state space is the total space available for the agent in the state
    - (d) All of the above
  4. DFS is \_\_\_\_\_ efficient and BFS is \_\_\_\_\_ efficient.
    - (a) Space, Time
    - (b) Time, Space
    - (c) Time, Time
    - (d) Space, Space
  5. What are the main cons of hill-climbing search?
    - (a) Terminates at local optimum & Does not find optimum solution
    - (b) Terminates at global optimum & Does not find optimum solution
    - (c) Does not find optimum solution & Fail to find a solution
    - (d) Fail to find a solution

6. Which algorithm will work backward from the goal to solve a problem?
  - (a) Forward chaining
  - (b) Backward chaining
  - (c) Hill-climb algorithm
  - (d) None of the mentioned
7. Translate the following statement into FOL.  
 “For every a, if a is a philosopher, then a is a scholar”
  - (a)  $\forall a \text{ philosopher}(a) \rightarrow \text{scholar}(a)$
  - (b)  $\exists a \text{ philosopher}(a) \rightarrow \text{scholar}(a)$
  - (c) All of the mentioned
  - (d) None of the mentioned
8. The initial state and the legal moves for each side define the \_\_\_\_\_ for the game.
  - (a) Search Tree
  - (b) Game Tree
  - (c) State Space Search
  - (d) Forest
9. What is the use of 'is' in prolog programming?
  - (a) unification
  - (b) arithmetic evaluation
  - (c) reduction
  - (d) None of above
10. Why Do We Use Prolog Programming Language?
  - (a) SWI-Prolog is free, open-source, and very well maintained.
  - (b) It's much much easier to distribute SWI-Prolog applications than Java ones
  - (c) Prolog is much less verbose, which is helpful when during development.
  - (d) all of the above

(b) Short Que. [10]

1. List any 2 AI techniques
2. Define Depth bounded search(DBDFS)
3. Define Heuristic search
4. Define Local Maxima in hill climbing
5. List Problem characteristic in AI (any 2) Complexity, Uncertainty, Incompleteness
6. Define board games Board games in AI involve deterministic rules, perfect information, complex search spaces, heuristic evaluation, and adversarial competition, challenging AI agents.
7. Define First Order Logic
8. Give variable types in prolog (any 2) Anonymous var ( \_ ) & named var ( \_<> )
9. Define LISP as AI programming language
10. What is Zero sum game A zero-sum game is a competitive situation where one player's gain or loss is exactly balanced by the other's.

**Question: 2.**

- (a) Explain DFS and BFS with example [08]
- (b) Explain A\* algorithm with example [08]

**OR**

- (b) Explain AO\* algorithm with example [08]

**Question: 3.**

- (a) Explain Min-Max theorem with example [08]
- (b) Define criteria for success in AI [04]
- (c) Explain about branch and bound with diagram [04]

**OR**

- (a) Write a note on alpha-beta cut off in minimax with example [08]
- (b) Write a note on models of AI [04]
- (c) Explain best first search with diagram [04]

**Question: 4.**

- (a) Write a note on blocks world with example [08]
- (b) Explain any 4 list manipulation function in prolog with example [08]

**OR**

- (a) Write a note on Game playing algorithm with example [08]
- (b) Explain any 3 numeric function in prolog with example [08]

**Question: 5.**

- (a) Write a note on traveling salesman problem in searching mechanism [06]
- (b) Write a prolog program to display elements of given list [06]
- (c) Explain resolution by refutation [04]

**OR**

- (a) Write a note on Ant colony optimization [06]
- (b) Write a prolog program to check if given value is character or number [06]
- (c) Explain Propositional logic with examples [04]

**Question: 6.**

- (a) Consider the following facts:
  - a. Raghu likes all kinds of food.
  - b. Mangoes are fruit.
  - c. Cabbage is not fruit.
  - d. All fruits are food.Represent the above facts using Predicate Logic and use Resolution to prove that “Raghu likes Mangoes” [08]
- (b) Discuss Simulated Annealing search method. Compare it with hill climbing method. [04]
- (c) Discuss variable neighborhood method [04]

**OR**

- (a) Consider the following sentences:
  - a. Tennis is a game. Chess is a game.
  - b. John and Steve are students.
  - c. John plays Tennis.
  - d. Steve plays everything that John plays.
  - e. Students who play Tennis, do not play Chess.
  - i. Translate the above sentences into formulas in Predicate logic
  - ii. Prove using resolution that “Steve does not play Chess” [08]
- (b) Discuss beam search and tabu search [04]
- (c) Discuss Depth first iterative deepening (DFID) [04]

**---Best of Luck---**

## – Bloom's Taxonomy Report –

**Sub: Cloud Computing****Sem. : VII****Branch: C.E / I.T****Que. Paper weightage as per Bloom's Taxonomy**

LEVEL	% of weightage	Question No.	Marks of Que.
Remember/Knowledge		1 - a , 2 -a , 5 -a	24
Understand		1 - b , 2-b , 5-b	24
Apply		3-c , 4-b ,5-c	16
Analyze		3-b , 4 -a , 6-b , 6-c	20
Evaluate		3-a , 6 -a	16
Higher order Thinking/ Creative			

**Chart/Graph of Bloom's Taxonomy**