AI IMP TOPICS

PYQ Topic List by Unit (End Term Exams: 2024, 2019, 2018, 2017)

UNIT 1: Introduction to Artificial Intelligence & Problem Solving

- **Problem Solving in AI (General Concept)** `[PYQ 2019, 2017]`
- **AI Techniques (General Concept)** `[PYQ 2017]`
- **PEAS Specify for Aerospace System** `[PYQ 2017]`
- **Constraint Satisfaction Problem (CSP)** `[PYQ 2024, 2019, 2017]`
  - Cryptarithmetic Puzzles (as CSP) `[PYQ 2019, 2017]`
- **Hill Climb Search** `[PYQ 2017]`
  - Role of Plateau and Ridge in Hill Climbing `[PYQ 2017]`
- **Search Algorithms (General Request to Explain)** `[PYQ 2018]`
  - Depth First Search (DFS) `[PYQ 2019, 2018]`
  - AO* Search `[PYQ 2018]`
- *A Algorithm** `[PYQ 2024, 2019]`
  - Application of A* to a search space (graph given) `[PYQ 2019]`
  - Prove Optimality of A* `[PYQ 2019]`
- **Uninformed Search Strategies (Listing nodes generated/expanded for BFS, DFS, IDS, UCS for a given tree)** `[PYQ 2019]`
  - Breadth-First Search (BFS) Performance (compared to DFS, considering evaluation criteria) `[PYQ 2019]`
  - Depth-First Search (DFS) Performance `[PYQ 2019]`
  - Iterative Deepening Search (IDS)
  - Uniform Cost Search (UCS)
- **Turing Test (Explain)** `[PYQ 2019]`
- **State Space Description**
  - For 8 Puzzle Program `[PYQ 2019]`
  - For Water Jug Problem `[PYQ 2019]`
- **Water Jug Problem (as problem solving, develop state space description)** `[PYQ 2019]`
- **"AI is a science and a field of engineering" - Justify** `[PYQ 2018]`
- **Tic-Tac-Toe problem (Explain)** `[PYQ 2018]`
- **Static Evaluation Function in Game Tree** `[PYQ 2018]`

- **Local Minima Problem (in search/optimization context, possibly related to Hill Climbing)** `[PYQ 2018]`
- **Genetic Learning (What is it?)** `[PYQ 2018]`
- **State Space Search (What is it? Give example of a Game)** `[PYQ 2024]`
- **Blind Search vs. Heuristic Search (Compare and Discuss with example)** `[PYQ 2024]`
- **Explain A'*' algorithm in AI** `[PYQ 2024]`
- **How AI solves problems for which practically no feasible algorithm exists** `[PYQ 2024]`
- **Define AI. Discuss the area in which application of AI are used.** `[PYQ 2024]`

UNIT 2: Knowledge Representation and Reasoning

- **Forward Chaining vs. Backward Chaining (Compare)** `[PYQ 2019, 2017]`
  - Proof using Backward Chaining (Marcus loyal to Caesar example) `[PYQ 2017]`
- **Resolution (General concept)** `[PYQ 2017]`
  - Unification used in Resolution (Explain with example) `[PYQ 2017]`
  - Resolution to prove "Ram is neither hardworking nor intelligent" (from given facts) `[PYQ 2017]`
- **Representing Facts as Predicates (Marcus was a man, etc.)** `[PYQ 2017]`
- **Order-Logic to Represent Knowledge (Illustrate use)** `[PYQ 2018]`
- **Mapping between Facts and Representation (Describe)** `[PYQ 2018]`
- **Inheritable Knowledge vs. Inferential Knowledge (Differentiate)** `[PYQ 2018]`
- **Inherited Knowledge (Different techniques to represent)** `[PYQ 2018]`
- **Applying Inheritable Knowledge to Real-World Application** `[PYQ 2018]`
- **Unification Algorithm (Explain, given sentences)** `[PYQ 2019]`
- **Converting English Sentences to FOL** `[PYQ 2019]`
- **Converting FOL to Clause Form and Proving by Resolution** `[PYQ 2019]` (Conclusion: "If Mary does not own a grocery store, she will not date John")
- **Proving Logical Equivalence ($(p \rightarrow r) \vee (q \rightarrow r) \equiv (p \wedge q) \rightarrow r$)** `[PYQ 2019]`
- **Difference between Knowledge Representation and Knowledge Acquisition** `[PYQ 2024]`
- **Converting Sentences into First Order Predicate Logic** `[PYQ 2024]`
- **Resolution Proof (Gurpreet buys a ticket example)** `[PYQ 2024]`
- **Difference between Monotonic and Non-Monotonic Reasoning in AI. Future of Non-Monotonic Reasoning.** `[PYQ 2024]`
- **Writing short notes on handling uncertainty using probabilistic reasoning** `[PYQ 2024]`

UNIT 3: Learning, Game Playing, and NLP

- **Expert Systems**
  - Architecture of Expert Systems `[PYQ 2017]`

    - Explain MYCIN in brief `[PYQ 2019, 2017]`
    - What is an Expert System? `[PYQ 2019]`
    - Describe main parts of an Expert System and how they interact `[PYQ 2018]`
    - Explain concept of Decision Tree with example use in Expert Systems `[PYQ 2018]`
    - How is an Expert System different from other softwares like DBMS? `[PYQ 2024]`
- **Theorem Proving (Different methods)** `[PYQ 2019, 2017]`
- **Chomsky Hierarchy of Languages** `[PYQ 2017]`
- **Generate Parse Tree (for "Jatin went to movie with Beena")** `[PYQ 2017]`
- **Syntactic Processing (Explain)** `[PYQ 2018]`
- **Differentiate between Syntactic Process and Semantic Processing** `[PYQ 2018]`
- **Explanation Based Learning (EBL) (Write short note)** `[PYQ 2024, 2019, 2018]`
- **Alpha-Beta Cut-off (What is it? Procedure in Game Tree)** `[PYQ 2018]`
- **Decision Support Systems (Advantages)** `[PYQ 2018]`
- **Alpha-Beta Pruning Technique (Detailed description with game tree example)** `[PYQ 2024, 2019, 2018]`
- **Natural Language Processing (NLP)**
    - Application of AI in domain of NLP (What is AI? part) `[PYQ 2018]`
    - Different task that must be performed for natural language understanding `[PYQ 2018]`
    - Applications of NLP in AI `[PYQ 2019]`
    - Various applications of NLP and its important challenges `[PYQ 2024]`
- **Statistical Reasoning (Short note)** `[PYQ 2018]`
- **Neural Nets (Short note)** `[PYQ 2018]`
- **Inductive Learning vs. Deductive Learning (How different?)** `[PYQ 2019]`
- **Learning Decision Tree (Explain)** `[PYQ 2019]`
- **Applications of AI in Different Fields** `[PYQ 2019]`
- **Genetic Algorithm in Game Playing (Design a flowchart)** `[PYQ 2024]`
- **Differences between Learning by Analogy, Inductive Learning and Explanation Based Learning** `[PYQ 2024]`

UNIT 4: Advanced Topics (Uncertainty, Fuzzy Logic, ML)

- **Fuzzy Logic (Write short notes)** `[PYQ 2024]`
- **Machine Learning (What is it? Discuss issues and steps for selecting right ML algorithm)** `[PYQ 2024]`
- **Bayesian Networks in AI (What are they and how to solve them?)** `[PYQ 2024]`
- **K-Means Clustering and challenges associated with it** `[PYQ 2024]`

- **(Note: Heuristic Search was also a general question in 2018, often covered conceptually with informed search in Unit 1 but important for understanding ML/advanced topics too)** `[PYQ 2018]`

This list should be a very helpful guide for focusing on the most frequently tested concepts from your End Term exams.