GUJARAT TECHNOLOGICAL UNIVERSITY

DI - SEMESTER – OLD PAPER – W23 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Fundamentals of Artificial Intelligence- 4350705

Unit 1: Introduction to Artificial Intelligence

Repeated Questions:

1. **Define Artificial Intelligence (AI).**
    - Appeared in: SUM24 (Q1a, 03 marks), WIN23 (Q1a, 03 marks), WIN24 (Q1b, 04 marks), SUM25 (Q1a, 03 marks)
2. **List and discuss AI techniques. / Define AI technique.**
    - Appeared in: SUM24 (Q1a, 03 marks), WIN24 (Q1b, 04 marks), SUM25 (Q1a, 03 marks)
3. **List the applications of AI. / Summarize the applications of AI.**
    - Appeared in: SUM24 (Q2a, 03 marks), WIN23 (Q1b, 03 marks), WIN24 (Q1a, 03 marks), SUM25 (Q1b, 04 marks)
4. **Explain AI problems in detail.**
    - Appeared in: WIN23 (Q1c-OR, 07 marks), WIN24 (Q1c-OR, 07 marks), SUM25 (Q1c, 07 marks)

Other Important Questions:

1. **What are the underlying assumptions of AI?**
    - Appeared in: WIN23 (Q1a, 03 marks)
2. **Apply the AI technique using the example of Tic-Tac-Toe to demonstrate how it works.**
    - Appeared in: WIN23 (Q1d, 04 marks), WIN24 (Q1c, 07 marks)
3. **List AI problem characteristics.**
    - Appeared in: WIN24 (Q2a, 03 marks)
4. **List AI models. Explain all models in detail.**
    - Appeared in: SUM25 (Q1c-OR, 07 marks)

Unit 2: State Space Search and Heuristic Technique

Repeated Questions:

1. **Differentiate between Breadth First Search and Depth First Search.**
    - Appeared in: SUM24 (Q1b, 04 marks), WIN24 (Q3b, 04 marks)
2. **What is a heuristic function? Discuss/Explain with an example.**
    - Appeared in: SUM24 (Q2b, 04 marks), WIN23 (Q2a-OR, 03 marks), WIN24 (Q3b-OR, 04 marks), SUM25 (Q2b-OR, 04 marks)
3. **Explain the State space representation with water jug problem. / Illustrate the state space representation using the water jug problem.**
    - Appeared in: SUM24 (Q1c, 07 marks), WIN23 (Q2e-OR, 07 marks), WIN24 (Q2c, 07 marks)
4. **Describe the state space representation in the context of the 8-puzzle problem.**
    - Appeared in: SUM24 (Q2c-OR, 07 marks), WIN23 (Q2e, 07 marks), WIN24 (Q2c-OR, 07 marks), SUM25 (Q2c-OR, 07 marks)
5. **Discuss limitation of hill-climbing method.**
    - Appeared in: SUM24 (Q2a-OR, 03 marks), WIN23 (Q2a, 03 marks)
6. **Explain/Illustrate Breadth First Search with example.**
    - Appeared in: WIN23 (Q2b, 04 marks), WIN24 (Q2b-OR, 04 marks), SUM25 (Q2a-OR, 03 marks)

Other Important Questions:

1. **Solve the following cryptarithmetic problem using constraint satisfaction. (BASE + BALL = GAMES)**
    - Appeared in: SUM24 (Q2c, 07 marks)
2. **Describe heuristic function for the Travelling Salesman Problem.**
    - Appeared in: SUM24 (Q2b-OR, 04 marks)
3. **Define below keywords for AI problems: State, State space, Search.**
    - Appeared in: WIN24 (Q2a, 03 marks)
4. **Demonstrate how Depth First Search works.**
    - Appeared in: WIN23 (Q2b-OR, 04 marks), WIN24 (Q2b, 04 marks), SUM25 (Q3b-OR, 04 marks)

5. **Write hill-climbing search algorithm method.**
    - Appeared in: SUM25 (Q2a, 03 marks)
6. **What does Production system consist of?**
    - Appeared in: SUM25 (Q2b, 04 marks)
7. **Define and solve the problem as State Space Search by using Water Jug Problem.**
    - Appeared in: SUM25 (Q2c, 07 marks)
8. **Discuss the seven problem characteristics with respect to the travelling salesman problem.**
    - Appeared in: SUM24 (Q1c-OR, 07 marks)

Unit 3: Knowledge Representation

Repeated Questions:

1. **Differentiate between Forward Reasoning and Backward Reasoning.**
   - Appeared in: SUM24 (Q3a, 03 marks), WIN24 (Q3a, 03 marks), SUM25 (Q4a, 03 marks)
2. **Explain the different approaches to knowledge representation.**
   - Appeared in: SUM24 (Q3c, 07 marks), WIN23 (Q3c-OR, 07 marks), WIN24 (Q3c-OR, 07 marks)
3. **Explain the algorithm of resolution in propositional logic.**
   - Appeared in: SUM24 (Q3b-OR, 04 marks)
4. **Explain the algorithm of resolution in predicate logic.**
   - Appeared in: SUM24 (Q3c-OR, 07 marks)
5. **Explain First Order Logic with its syntax in Artificial Intelligence.**
   - Appeared in: SUM25 (Q3c, 07 marks)

Other Important Questions:

1. **Name and explain Quantifiers in Predicate logic.**
   - Appeared in: SUM24 (Q3b, 04 marks), WIN23 (Q3a, 03 marks)
2. **Define: a) Representational Adequacy b) Inferential Adequacy c) Inferential Efficiency.**
   - Appeared in: SUM24 (Q3a-OR, 03 marks)
3. **List the issues in knowledge representation. / Explain the issues in knowledge representation.**
   - Appeared in: WIN23 (Q3c, 07 marks), WIN24 (Q3a-OR, 03 marks)
4. **Write short note on Computable function and predicates.**
   - Appeared in: WIN24 (Q3c, 07 marks)
5. **Write short note on Logic programming.**
   - Appeared in: WIN23 (Q3a-OR, 03 marks), WIN24 (Q4b, 04 marks)
6. **Explain Best First Search.**
   - Appeared in: WIN23 (Q3b-OR, 04 marks)
7. **Define the terms: Data, Information, and Knowledge.**
   - Appeared in: SUM25 (Q3a, 03 marks)
8. **Write advantages of Prolog Programming.**
   - Appeared in: SUM25 (Q3a-OR, 03 marks)
9. **Define Knowledge representation? Explain the issues in knowledge representation.**
   - Appeared in: SUM25 (Q3c-OR, 07 marks)
10. **Illustrate computable functions and predicates with an example.**
    - Appeared in: WIN23 (Q4b-OR, 04 marks), SUM25 (Q5b-OR, 04 marks)

Unit 4: Expert System

Repeated Questions:

1. **Define what an expert system is and its primary purpose in AI.**
    - Appeared in: SUM24 (Q4a, 03 marks), WIN23 (Q4a-OR, 03 marks)
2. **What is an expert system shell? Explain in detail.**
    - Appeared in: SUM24 (Q4c-OR, 07 marks), WIN23 (Q4c, 07 marks), WIN24 (Q4c, 07 marks), SUM25 (Q4c, 07 marks)
3. **Explain Development phases of Expert System.**
    - Appeared in: SUM24 (Q4c, 07 marks), WIN23 (Q4c-OR, 07 marks)
4. **Explain features of Expert System. / List and explain the key features of Expert Systems.**
    - Appeared in: SUM24 (Q4b-OR, 04 marks), WIN23 (Q4a, 03 marks), WIN23 (Q5b, 04 marks)
5. **Explain building blocks of expert system.**
    - Appeared in: SUM24 (Q4b, 04 marks), WIN24 (Q4a-OR, 03 marks), SUM25 (Q4a-OR, 03 marks)

Other Important Questions:

1. **List applications and use cases of expert systems. / List applications of Expert Systems.**
    - Appeared in: SUM24 (Q4a-OR, 03 marks), WIN24 (Q4a, 03 marks)
2. **Briefly explain one of the building blocks of expert systems.**
    - Appeared in: SUM24 (Q4b, 04 marks), WIN23 (Q5b-OR, 04 marks)
3. **Which are the development phases of Expert System? Explain it.**
    - Appeared in: SUM25 (Q4b, 04 marks)
4. **What is the role of knowledge acquisition in AI?**
    - Appeared in: SUM25 (Q4b-OR, 04 marks)
5. **Write advantages and disadvantages of Expert System.**
    - Appeared in: SUM25 (Q4c-OR, 07 marks)
6. **Illustrate expert system in AI with any example.**
    - Appeared in: WIN24 (Q4c-OR, 07 marks)
7. **Illustrate Resolution procedure with an example.**
    - Appeared in: WIN24 (Q4b-OR, 04 marks)

Unit 5: AI Case Studies

Repeated Questions:

1. **Write a short note on Chatbots.**
    - Appeared in: SUM24 (Q5c, 07 marks), WIN23 (Q5c, 07 marks), WIN24 (Q5c, 07 marks)
2. **Write a short note on ChatGPT.**
    - Appeared in: WIN24 (Q5b-OR, 04 marks), SUM25 (Q5b, 04 marks)
3. **List various Virtual Face Filters. Explain anyone.**
    - Appeared in: WIN23 (Q5a-OR, 03 marks), WIN24 (Q5a, 03 marks), SUM25 (Q5a, 03 marks)
4. **List various Digital (Voice) Assistant. Explain anyone.**
    - Appeared in: WIN23 (Q5a, 03 marks), SUM25 (Q5c-OR, 07 marks)
5. **Summarize the workings of Recommendation Algorithms. / Write workings of Recommendation System.**
    - Appeared in: WIN23 (Q5c-OR, 07 marks), WIN24 (Q5c-OR, 07 marks), SUM25 (Q5c, 07 marks)

Other Important Questions:

1. **Discuss the importance of knowledge acquisition for Expert System.**
    - Appeared in: SUM24 (Q5a, 03 marks)
2. **Explain collaborative filtering in recommendation system.**
    - Appeared in: SUM24 (Q5b, 04 marks)
3. **List out industrial fields where Expert System is applicable.**
    - Appeared in: SUM25 (Q5a-OR, 03 marks)
4. **Explain content based filtering in recommendation system.**
    - Appeared in: SUM25 (Q5b-OR, 04 marks)
5. **List various available AI systems in the market today and state their usage.**
    - Appeared in: WIN24 (Q5b, 04 marks)
6. **Prepare Chatbot case studies for customer support Chatbot like Amazon or any other.**
    - Appeared in: SUM25 (Q5a-OR, 03 marks)
7. **Discuss Prolog Programming in detail.**
    - Appeared in: SUM25 (Q5b, 04 marks)

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