**Introduction to Artificial Intelligence**

**Module 1 Question Bank**

1. Describe the cognitive modelling approach. Explain its significance and how it is applied in artificial intelligence.
2. Explain the concept of the rational agent approach. Discuss its principles and how rationality is measured in AI systems.
3. Write a short note on agents and environments. Define both terms and explain their relationship in AI.
4. Create a table representing the percept sequence and corresponding actions for a vacuum cleaner operating in a 2-square environment.
5. Analyze a given situation and identify the PEAS (Performance measure, Environment, Actuators, Sensors) description of the environment.
6. Determine the nature of a given environment based on the following characteristics:

Fully observable vs. Partially observable

Single-agent vs. Multi-agent

Deterministic vs. Stochastic

Episodic vs. Sequential

Static vs. Dynamic

Discrete vs. Continuous

Known vs. Unknown

1. Explain the structure of an agent in detail. Discuss the following types of agents with suitable examples:

Simple reflex agent

Model-based reflex agent

Goal-based agent

Utility-based agent

Learning agent

1. How do the components of a structured agent function? Explain whether they are atomic, factored, or structured representations.
2. Differentiate between tree search and graph search algorithms. Highlight their key differences with examples.
3. Discuss uninformed search strategies in detail. Provide explanations and comparisons of the following strategies:

Breadth-First Search (BFS)

Uniform-Cost Search

Depth-First Search (DFS)

Depth-Limited Search

Iterative Deepening Search

Bidirectional Search

1. Discuss informed search strategies in detail. Explain the following strategies and their applications:

Greedy Best-First Search

A\* Search

Heuristic conditions

Memory-bounded heuristic search

1. Construct a heuristic function for solving the 8-puzzle problem. Explain its significance in search algorithms.
2. Explain the function of a pattern database. Discuss how it is used to improve heuristic search efficiency.

Disclaimer: The questions listed above are **not compulsory** or **guaranteed** to appear in the exam. They are provided as a reference to help you understand the pattern and structure of question preparation. Use them as a study guide to enhance your understanding of the subject.