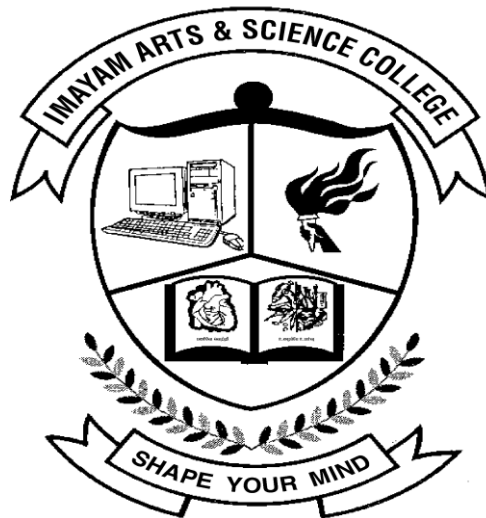# IMAYAM ARTS AND SCIENCE COLLEGE

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ARTIFICIAL INTELLIGENCE (THEORY)

(P16CSE2B)

QUESTION BANK

SUBJECT HANDLED BY:

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ANSWER THE FOLLOWING (2 MARKS)

UNIT - I

1. **What is Artificial intelligence?**

   Artificial Intelligence is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think. A machine with the ability to perform cognitive functions such as perceiving, learning, reasoning and solve problems are deemed to hold an artificial intelligence.

2. **What is AI Techniques?**

   AI Technique is a manner to organize and use the knowledge efficiently in such a way that −

   - It should be perceivable by the people who provide it.
   - It should be easily modifiable to correct errors.
   - It should be useful in many situations though it is incomplete or inaccurate.

   AI techniques elevate the speed of execution of the complex program it is equipped with.

3. **What is production system?**

   The production system is a model of computation that can be applied to implement search algorithms and model human problem solving. Such problem solving knowledge can be packed up in the form of little quanta called productions. A production is a rule consisting of a situation recognition part and an action part.

4. **What is Heuristic search?**

   A Heuristic is a technique to solve a problem faster than classic methods, or to find an approximate solution when classic methods cannot. This is a kind of a shortcut as we often trade one of optimality, completeness, accuracy, or precision for speed. A Heuristic (or a heuristic function) takes a look at search algorithms. At each branching step, it evaluates the available information and makes a decision on which branch to follow. It does so by ranking alternatives. The Heuristic is any device that is often effective but will not guarantee work in every case.

5. **What is Hill climbing?**

   Hill Climbing is mostly used when a good heuristic is available. Hill climbing algorithm is a local search algorithm which continuously moves in the direction of increasing elevation/value to find the peak of the mountain or best solution to the problem. It terminates when it reaches a peak value where no neighbor has a higher value. Hill climbing algorithm is a technique which is used for optimizing the mathematical problems.

6. **What is best-first?**

   Best-first search algorithm always selects the path which appears best at that moment. It is the combination of depth-first search and breadth-first search algorithms. It uses the heuristic function and search. Best-first search allows us to take the advantages of both algorithms. With the help of best-first search, at each step, we can choose the most promising node.

7. **What is means-end analysis?**

   Means-Ends Analysis is problem-solving techniques used in Artificial intelligence for limiting search in AI programs. It is a mixture of Backward and forward search technique. Such a mixed strategy, make it possible that first to solve the major part of a problem and then go back and solve the small problems arise during combining the big parts of the problem. Such a technique is called **Means-Ends Analysis**.

8. **What is frame problems?**

   A frame is a record like structure which consists of a collection of attributes and its values to describe an entity in the world. Frames are the AI data structure which divides knowledge into substructures by representing stereotypes situations. It consists of a collection of slots and slot values. These slots may be of any type and sizes. Slots have names and values which are called facts.

9. **What is knowledge representation?**

Knowledge Representation in AI describes the representation of knowledge. Basically, it is a study of how the **beliefs, intentions**, and **judgments** of an **intelligent agent** can be expressed suitably for automated reasoning. One of the primary purposes of Knowledge Representation includes modeling intelligent behavior for an agent. Knowledge to solve **complex real-life problems** like communicating with human beings in natural language. Knowledge representation in AI is not just about storing data in a database, it allows a machine to learn from that knowledge and behave intelligently like a human being.

10. **What are the types in knowledge representation?**

There are 5 types of Knowledge such as:
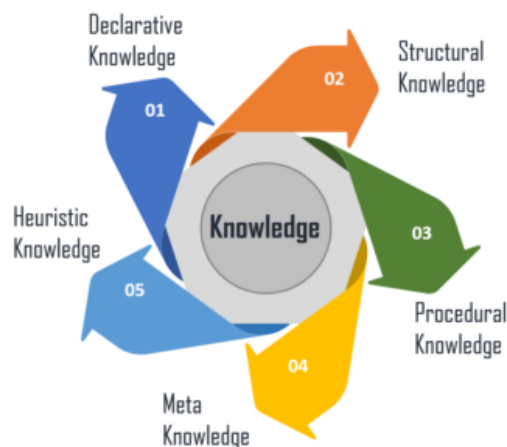
Declarative Knowledge – It includes concepts, facts, and objects and expressed in a declarative sentence.

Structural Knowledge – It is a basic problem-solving knowledge that describes the relationship between concepts and objects.

Procedural Knowledge – This is responsible for knowing how to do something and includes rules, strategies, procedures, etc.

Meta Knowledge – Meta Knowledge defines knowledge about other types of Knowledge.

Heuristic Knowledge – This represents some expert knowledge in the field or subject.

11. What is representation and mapping?

In order to solve complex problems encountered in artificial intelligence, one needs both a large amount of knowledge and some mechanism for manipulating that knowledge to create solutions.

UNIT – III

12. What is predicate logic?

A **predicate** is a function that tests for some condition involving its arguments and returns nil if the condition is false, or some non-nil value if the condition is true. One may think of a **predicate** as producing a Boolean value, where nil stands for false and anything else stands for true.

13. Why are representations so important in artificial intelligence?

It is also a way which describes how we can represent knowledge in artificial intelligence. Knowledge representation is not just storing data into some database, but it also enables an intelligent machine to learn from that knowledge and experiences so that it can behave intelligently like a human.

14. What is resolution method in AI?

Resolution method is an inference rule which is used in both Propositional as well as First-order Predicate Logic in different ways. This method is basically used for proving the satisfiability of a sentence. In resolution method, we use **Proof by Refutation** technique to prove the given statement.

UNIT – IV

15. What is matching in AI?

Intelligent matching is a type of data management technique in which data is searched, indexed and retrieved from a database through a series of artificial-intelligence-based data sorting and matching algorithms. Intelligent matching makes it possible to find data based on the principles of semantics, where human-like searching and inference techniques are applied to each query.

16. What is control knowledge in AI?

The goal is to analyze the training set to extract **control knowledge** that can be used to more effectively solve new problems from the domain. Ideally, the **control knowledge** allows for the solutions of large, difficult problems that could not be solved within a reasonable time limit before learning.

17. What is NPL in AI?

Natural Language Processing (NLP) refers to AI method of communicating with an intelligent systems using a natural language such as English. Processing of Natural Language is required when you want an intelligent system like robot to perform as per your instructions, when you want to hear decision from a dialogue based clinical expert system, etc. The field of NLP involves making computers to perform useful tasks with the natural languages humans use. The input and output of an NLP system can be −

- Speech
- Written Text

UNIT - V

18. What is game playing in AI?

Game Playing is an important domain of artificial intelligence. Games don't require much knowledge; the only knowledge we need to provide is the rules, legal moves and the conditions of winning or losing the game. Searching techniques like BFS(Breadth

First Search) are not accurate for this as the branching factor is very high, so searching will take a lot of time. So, we need another search procedures that improve –

- ✓ **Generate procedure** so that only good moves are generated.
- ✓ **Test procedure** so that the best move can be explored first.

19. What is MIN-MAX search?

Min-Max algorithm is mostly used for game playing in AI. Such as Chess, Checkers, tic-tac-toe, go, and various tow-players game. This Algorithm computes the minimax decision for the current state. Mini-Max algorithm uses recursion to search through the game-tree. In this algorithm two players play the game, one is called MAX and other is called MIN.

20. What is Expert system?

The expert systems are the computer applications developed to solve complex problems in a particular domain, at the level of extra-ordinary human intelligence and expertise. **Expert system = knowledge + problem-solving methods. ...** A knowledge base that captures the domain-specific knowledge and an inference engine that consists of algorithms for manipulating the knowledge represented in the knowledge base to solve a problem presented to the system.

21. What is perception and action in AI?

Perception is a process to interpret, acquire, select and then organize the sensory information that is captured from the real world.

For example: Human beings have sensory receptors such as touch, taste, smell, sight and hearing. So, the information received from these receptors is transmitted to human brain to organize the received information.

FIVE MARK QUESTIONS

UNIT - I

1. Explain about AI techniques?

2. Explain about problem, problem space and search?

3. Explain production System in AI?

UNIT - II

4. Explain about generate and test in AI?

5. Explain best-first search?

6. Explain means-end analysis?

7. Explain the issues in knowledge representation?

8. Explain about frame problem?

9. Explain knowledge representation in AI?

UNIT - III

10. Explain Representing Instance and Is a relationships?

11. Explain Computable functions and predicates in AI?

12. Explain about Resolution?

UNIT - IV

13. Explain Procedural Vs Declarative knowledge?

14. Explain logic programming?

15. Explain about control knowledge?

16. Explain about matching?

UNIT - V

17. Explain about game playing?

18. Explain expert system?

19. Explain about perception and Action?

TEN MARK QUESTION

UNIT - I

1. Briefly explain about state space search in artificial intelligence?
2. Explain briefly about Heuristic Search techniques?

UNIT - II

3. Explain briefly about hill climbing in AI?
4. Briefly explain about representation and mapping in AI?

UNIT - III

5. Briefly explain about representing simple facts in logic?
6. Explain briefly about Computable functions and predicates?

UNIT - IV

7. Explain briefly about Forward Vs Backward reasoning with example?
8. Briefly explain about matching in representing knowledge?

UNIT - V

9. Briefly explain about minimax search procedure?
10. Briefly explain about expert system?
11. Explain about Perception and Action?

ANSWER THE FOLLOWING (ONE MARK)

1. Strong Artificial Intelligence is _____

    a) **the embodiment of human intellectual capabilities within a computer**
    b) **a set of computer programs that produce output that would be considered to reflect intelligence if it were generated by humans**
    c) **the study of mental faculties through the use of mental models implemented on a computer**
    d) **all of the mentioned**

    Answer: a

2. In which of the following situations might a blind search be acceptable?

    a) **real-life situation**

    b) **complex game**

    c) **small search space**

    d) **all of the mentioned**

    Answer: c

3. What is Artificial intelligence?

    a) **Putting your intelligence into Computer**

    b) **Programming with your own intelligence**

    c) **Making a Machine intelligent**

    d) **Playing a Game**

    Answer: c

4. Which search method takes less memory?

    a) **Depth-First Search**

    b) **Breadth-First search**

    c) **Optimal search**

    d) **Linear Search**

    Answer: a

5. A heuristic is a way of trying _____

a) **To discover something or an idea embedded in a program**

b) **To search and measure how far a node in a search tree seems to be from a goal**

c) **To compare two nodes in a search tree to see if one is better than the other is**

d) **All of the mentioned**

Answer: d

6. Which of the following, is a component of an expert system?

a) **inference engine**

b) **knowledge base**

c) **user interface**

d) **all of the mentioned**

Answer: d

7. A computer vision technique that relies on image templates is _____

a) **edge detection**

b) **binocular vision**

c) **model-based vision**

d) **robot vision**

Answer: c

8. A process that is repeated, evaluated, and refined is called _____

a) **diagnostic**

b) **descriptive**

c) **interpretive**

d) **iterative**

Answer: d

9. What is Machine learning?

a) **The autonomous acquisition of knowledge through the use of computer programs**

b) **The autonomous acquisition of knowledge through the use of manual programs**

c) **The selective acquisition of knowledge through the use of computer programs**

d) **The selective acquisition of knowledge through the use of manual programs**

Answer: a

10. Which of the factors affect the performance of learner system does not include?

a) **Representation scheme used**

b) **Training scenario**

c) **Type of feedback**

d) **Good data structures**

Answer: d

11. What is the main task of a problem-solving agent?

a) **Solve the given problem and reach to goal**

b) **To find out which sequence of action will get it to the goal state**

c) **All of the mentioned**

d) **None of the mentioned**

Answer: c

12. What is state space?

a) **The whole problem**

b) **Your Definition to a problem**

c) **Problem you design**

d) **Representing your problem with variable and parameter**

Answer: d

13. A search algorithm takes _____ as an input and returns _____ as an output.

a) **Input, output**

b) **Problem, solution**

c) **Solution, problem**

d) **Parameters, sequence of actions**

Answer: b

14. A problem in a search space is defined by one of these state.

a) **Initial state**

b) **Last state**

c) **Intermediate state**

d) **All of the mentioned**

Answer: a

15. The Set of actions for a problem in a state space is formulated by a _____

a) **Intermediate states**

b) **Initial state**

c) **Successor function, which takes current action and returns next immediate state**

d) **None of the mentioned**

Answer: c

16. The process of removing detail from a given state representation is called _____

a) **Extraction**

b) **Abstraction**

c) **Information Retrieval**

d) **Mining of data**

Answer: b

17. A problem solving approach works well for _____

a) **8-Puzzle problem**

b) **8-queen problem**

c) **Finding a optimal path from a given source to a destination**

d) **Mars Hover (Robot Navigation)**

Answer: d

18. Which search method takes less memory?
- a) **Depth-First Search**
- b) **Breadth-First search**
- c) **Linear Search**
- d) **Optimal search**

Answer: a

19. Which is the best way to go for Game playing problem?
- a) **Linear approach**
- b) **Heuristic approach (Some knowledge is stored)**
- c) **Random approach**
- d) **An Optimal approach**

Answer: b

20. Which is a refutation complete inference procedure for propositional logic?
- a) **Clauses**
- b) **Variables**
- c) **Propositional resolution**
- d) **Proposition**

Answer: c

21. Which can be converted to inferred equivalent CNF sentence?
- a) **Every sentence of propositional logic**
- b) **Every sentence of inference**
- c) **Every sentence of first-order logic**
- d) **All of the mentioned**

Answer: c

22. Which rule is equal to the resolution rule of first-order clauses?

a) **Propositional resolution rule**

b) **Inference rule**

c) **Resolution rule**

d) **None of the mentioned**

Answer: a

23. What is the frame?

a) **A way of representing knowledge**

b) **Data Structure**

c) **Data Type**

d) **None of the mentioned**

Answer: a

24. Which of the following elements constitutes the frame structure?

a) **Facts or Data**

b) **Procedures and default values**

c) **Frame names**

d) **Frame reference in hierarchy**

Answer: a

25. Choose from the following that are Decision Tree nodes?

a) **Decision Nodes**

b) **End Nodes**

c) **Chance Nodes**

d) **All of the mentioned**

Answer: d

26. Decision Nodes are represented by _____

a) **Disks**

b) **Squares**

c) **Circles**

d) **Triangles**

Answer: b

27. End Nodes are represented by _____

a) **Disks**

b) **Squares**

c) **Circles**

d) **Triangles**

Answer: d