ARTIFICIAL INTELLIGENCE

1) What is "Artificial Intelligence and Artificial Intelligence Technique"? Briefly explain how AI Technique can be represented and list out some of the task domain of AI.

2) What is an Agent ? Discuss different types of agents and the properties of agent's environment with example.

3) What is production system? Explain it with an example. Discuss the Characteristics of a production system.

4) Define the following problems. What types of control strategy is used in the following problem.

I. Classical Water jug Problem

II. The 3 Missionaries and 3 cannibals problems

III. 8-puzzle problem

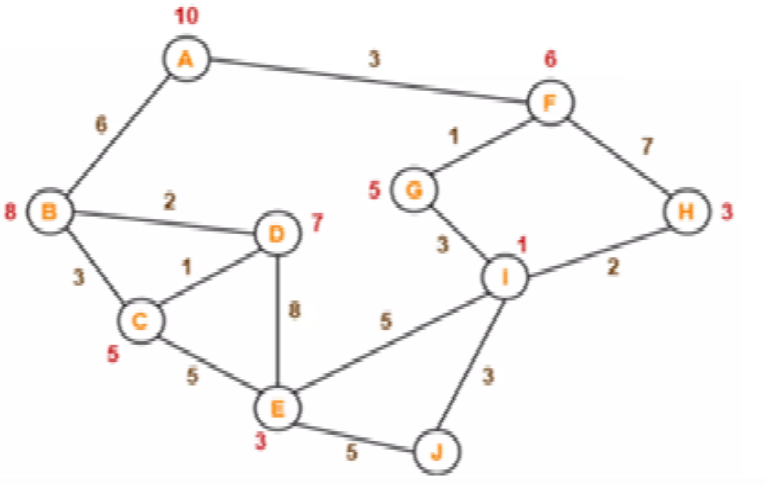
III. The Tower of Hanoi

6) Discuss the following search Technique with the help of an example. Also discuss the benefits and shortcoming of each.

I. Breadth First Search.

II. Depth First Search.

7) Determine what is the minimal cost of moving from start node (A) to goal node (J) as given in the following Figure using A* search algorithm. Why is A* search algorithm is better than B Best-First search?



8) Define the heuristic search. Explain how the heuristic function helps during search procedure. Discuss benefits and short comings.

9) consider the following sentences

• John likes all kinds of food

• Apples are food

• Chicken is food

• Anything anyone eats and isn't killed by is food

• Bill eats peanuts and is still alive • Sue eats everything bill eats

i) Translate these sentences into formulas in predicate logic

ii) Prove that john likes peanuts using backward chaining

iii) Convert the formulas of a part into clause form

iv) Prove that "john likes peanuts" using resolution

10) Discuss any four from the following heuristic search techniques. Explain the algorithm with the help of an example.

i. Hill Climbing : Steepest Ascent.

ii. Best First Search : The A* Algorithms

iii. Problem Reduction : The Ao* Algorithms

iv. Constraints Satisfaction

v. Generate and Test.

vi. Means–End–Analysis.

11) Solve the following Crypt arithmetic problem using constraints satisfaction search procedure.

a) CROSS + ROADS = DANGER

b) NOON + SOON + MOON = JUNE

12) Explain briefly the difference between procedural and declarative knowledge.

13) Discuss various approaches and issues in knowledge representation. Also discuss various Problems in representing knowledge.

14) Explain Non– Monotonic reasoning and discuss. Various logic associated with it. Compare between Monotonic and Non-monotonic reasoning.

15) Represent the following statements in predicate logic:

i) Marcus tried to assassinate Caesar.

ii) All Pompeian's were Roman.

iii) All Romans were either loyal to Caesar or hated him.

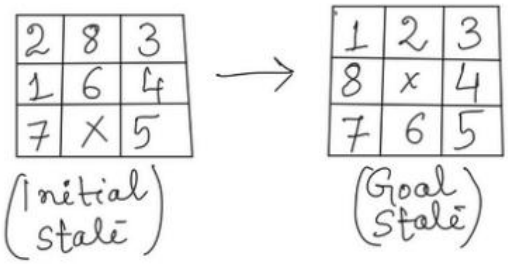
iv) Everyone is loyal to someone.

v) People only try to assassinate rulers they are not loyal to.

1) Represent all the sentences in clausal form

2) Use resolution to prove : "Marcus loves Caesar" and "Marcus hates Ceaser".

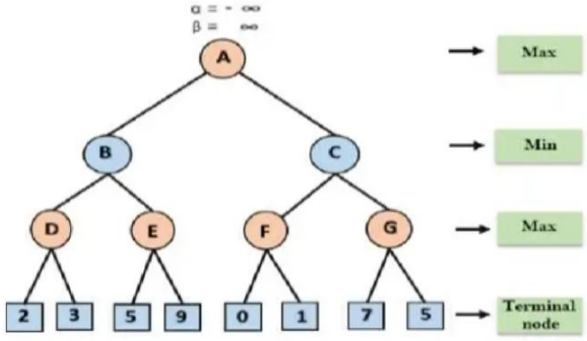
16) The initial state and goal state of an 8-puzzle problem is given below. Explain how can it be solved (i) using heuristics and (ii) without using heuristics.



17) What is an expert system in AI? Briefly discuss the architecture of an expert system.

18) What is Learning? Discuss the various types of learning in AI.

19) What is alpha beta pruning? Apply the pruning approach for the following graph and explain.



20) What is Frame? Create a frame for a person named Manohar who is a doctor. He is 40 years old. His wife's name is Ishita. They have two children Ram and Shyam. They live in Manoj Pandey street in the city of Pune in India. The zip code of the street is 723005.

21) Explain with suitable examples the concept of Forward chaining and Backward chaining.

22) Compare between Forward Versus Backward Reasoning.

23) What are scripts? Explain in detail, with an example.

24) Write a short note on

i) Expert systems

ii) Knowledge Acuisition

Iii) Genetic Algorithm

Iv) Semantic Net

25) Draw the semantic network for the given prolog facts.

(i) fly (yes,bird)

(ii) instance of (vertebrate, bird)

(iii) feathers (yes, bird)

(iv) instance of (bird, Emu)

(v) fly (no,emu)

(vi) is a (emu, ernie)

(vii) steals crisps (yes, ernie)

26) Consider the graph in Figure 2. A is the start node and H is the goal node. Table 1 contains the value of heuristics of h(n).

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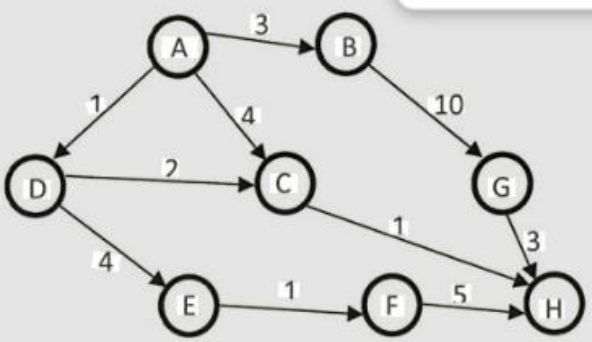

Figure 2

Table 1

Node	h(n)
A	3
B	5
C	1
D	3
E	2
F	4
G	7
H	0

a) Find the minimum path using A* Search Algorithm. Show all the steps. (6 Marks)

b) A* Search algorithm is used in various applications such as maps. A* Search Algorithm calculate the shortest distance between the initial state and the final state. State the advantages and disadvantages of A* Search Algorithm. (4 Marks)