

**B.E. (Computer Engg.)**  
**ARTIFICIAL INTELLIGENCE**  
**(2003 Course) (410445)**

Time : 3 Hours]

[Max. Marks : 100

*Instructions to the candidates:*

- 1) Attempt three questions from Section I and three questions from Section II.
- 2) Answers to the two sections should be written in separate books.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Assume suitable data, if necessary.

**SECTION - I**

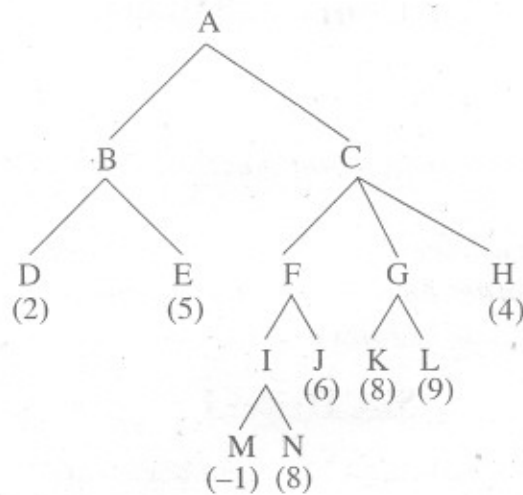
- Q1)** a) What is Logic programming? Explain backward and forward reasoning with an example. List the applications of Artificial Intelligence. [8]
- b) List and explain the seven characteristics of problems in AI. For any of the two problems, list out the problem characteristics : [8]
- |                             |                          |
|-----------------------------|--------------------------|
| i) Chess.                   | ii) Water Jug.           |
| iii) 8 Tile Sliding Puzzle. | iv) Travelling Salesman. |

OR

- Q2)** a) What are intelligent agents? Explain the architecture of a typical agent and give at least two examples where agents are used. [8]
- b) For the following problem have a state space representation and show how the farmer got everything across the river.
- A farmer wants to cross the river along with the fox, goat and cabbage. The boat has a capacity to carry a person and either of the three accompanying him. The fox-goat or goat-cabbage combination if left unattended may cause the problem of being eaten by the other. Taking these constraints into account, use a state space approach and solve the problem. [8]
- Q3)** a) Define Heuristics. Define a heuristic for 8 Sliding Tile puzzle problem and explain the A\* algorithm to solve the problem. [10]
- b) Apply constraint satisfaction method to solve the following crypt arithmetic problem :
- TWO + TWO = FOUR [8]

OR

- Q4) a) Explain Hill Climbing algorithm. Explain plateau, ridge, local maxima and global maxima. [8]
- b) Explain alpha beta cut off for the following example and show which nodes are cut off and solve considering A is maximizing node. [10]



- Q5) a) Consider the following sentences and translate the sentences into formulas in predicate logic and clause form. Prove “John likes Peanuts” using resolution. [8]
- 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 anything Bill eats.
- b) Write a script of going to a multiplex to watch a movie. [8]

OR

- Q6) a) Represent the following in semantic networks : [8]  
 A collage has a department Computer Engineering and Ravi is the head of the department. Varsha and Ruma are staff members of the department. Varsha is married to Ajay. Ajay is a Software Programmer. They have two children and they live on MG Road. Varsha wears glasses and is 5 feet 3 inches tall.
- b) Represent the following sentences in conceptual dependency : [8]
- i) Bird flew.
  - ii) Joe ate some soup with a spoon.
  - iii) Jane gave Tom an ice cream cone.
  - iv) Charlie drove the pickup fast.

## SECTION - II

- Q7) a)** Describe any of the two learning methods : [8]  
i) Rote Learning.  
ii) By taking advice.  
iii) By parameter adjustment.  
iv) Learning from example.
- b)** Consider the following representation of block world : [10]  
Start : ON (C, A) ^ ONTABLE (A) ^ ONTABLE (B)  
Goal : ON (A, B) ^ ON (B, C) ^ ONTABLE (C)  
Show how STRIPS (Goal Stack Planning) will solve this problem.

OR

- Q8) a)** Explain Waltz's algorithm with an example. Comment on the limitations of Waltz algorithm. [8]  
**b)** Consider the following representation of block world : [10]  
Start : ON (A, B) ^ ON (C, D) ^ ONTABLE (D) ^ ONTABLE (B)  
Goal : ON (C, B) ^ ON (D, A) ^ ONTABLE (B) ^ ONTABLE (A)  
Show how TWEAK (Non-Linear Planning) will solve this problem.
- Q9) a)** Explain in brief the various steps in natural language processing. [8]  
**b)** Give the grammar and show the parse tree for [8]  
i) John wanted to go to the movie with Sally.  
ii) Print the file on the printer.

OR

- Q10)a)** Explain the Robot architecture. [8]  
**b)** Explain an ATN with an example, Trace it for a sentence "The long file has printed". [8]
- Q11)a)** Give detailed architecture of Expert System and explain its components. [8]  
**b)** Explain in details artificial neural network architecture. [8]

OR

- Q12)a)** Give any two applications of neural network. [8]  
**b)** Explain the characteristics of Expert Systems and explain the expert systems ELIZA & MYCIN. [8]

