NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: IV - THEORY EXAMINATION (2021 - 2022)
Subject: Introduction to Artificial Intelligence

Time: 3 Hours   Max. Marks: 100

General Instructions:
1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 mark each.
3. Section B - Question No-3 is based on external choice carrying 6 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 10 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

| SECTION A | 20 |

1. Attempt all parts:-

| 1 | Agents behavior can be best described by _____ (CO1) | 1 |

        (a) Perception sequence
        (b) Agent function
        (c) Sensors and Actuators
        (d) Environment in which agent is performing

| 1 | The term AI was coined in the year (CO1) | 1 |

        (a) 1965
        (b) 1956
        (c) 1944
        (d) 1952

| 1 | Alpha-beta pruning is a modified version of the? (CO2) | 1 |

        (a) minimin algorithm
        (b) maximax algorithm
        (c) minimax algorithm
        (d) maximin algorithm

| 1 | What is the complexity of minimax algorithm? (CO2) | 1 |

        (a) Same as of DFS
        (b) Space – bm and time – bm
        (c) Time – bm and space – bm
        (d) None of the mentioned

| 1-e. | ___ is the ability to manipulate the knowledge represented to produce new knowledge corresponding to that inferred from the original. (CO3) | 1 |

        (a) Acquisition Efficiency
        (b) Inferential Efficiency
        (c) Representational Adequacy
        (d) Inferential Adequacy

| 1-f. | Which graph is used to represent semantic network? (CO3) | 1 |

        (a) Undirected graph
        (b) Directed graph
        (c) Directed Acyclic graph
        (d) Directed complete graph

1	Where does the Hidden Markov Model is used? (CO4)	1
	(a) Speech recognition	
	(b) Understanding of real world	
	(c) Both Speech recognition & Understanding of real world	
	(d) None of the mentioned	

1	Which algorithm is used for solving temporal probabilistic reasoning? (CO4)	1
	(a) Hill-climbing search	
	(b) Hidden markov model	
	(c) Depth-first search	
	(d) Breadth-first search	

1-i.   Which of the following is not type of learning? (CO5)   1

(a) Supervised learning
(b) Unsupervised Learning
(c) Reinforcement Learning
(d) Semi-unsupervised learning

1-j.   What are the composition for agents in artificial intelligence? (CO5)   1

(a) Program
(b) Architecture
(c) Both Program and Architecture
(d) None of the above

2. Attempt all parts:-

2.a.	Explain the Goal of Artificial Intelligence?	2
2.b.	A* algorithm is based on which search method?	2
2.c.	Define Conjunctive Normal Form and Disjunctive Normal Form.	2
2.d.	Which type of probability is used in Bayesian network? Explain in detail.	2
2.e.	What do you mean by reinforcement Learning?	2

<div align="center">SECTION B   30</div>

3. Answer any <u>five</u> of the following:-

3	How Turing test is used to evaluate intelligence of a machine? What properties a machine should have to pass the Total turing test? (CO1)	6
3	Explain Well -defined learning system and also list the steps with example. (CO1)	6
3	Explain the alpha-beta algorithms with sutaible example. (CO2)	6
3	Draw Hill Climbing State Space diagram (Graphical representation) and explain its different regions. (CO2)	6
3.e.	"If it is hot, then it is humid. If it is humid, then it will rain. It is hot." Show that "It will rain" using Semantic Tableaux method in Propositional Logic. (CO3)	6
3.f.	What are Cognitive problems in Artificial intelligence? Explain with suitable example. (CO4)	6
3.g.	Explain the Applications and Advantages of Genetic Algorithm. (CO5)	6

<div align="center">SECTION C   50</div>

4. Answer any <u>one</u> of the following:-

| 4 | Briefly explain what is Human Intelligence. Also, explain how Artificial Intelligence is based on the concept of Human Intelligence. (CO1) | 10 |
| 4 | List the ways in which we can plan smart cities using Artificial Intelligence. (CO1) | 10 |

5. Answer any <u>one</u> of the following:-

| 5 | What do you mean by Constraint Satisfaction? Solve the following CryptArithmetic | 10 |

Problem: SEND + MORE = MONEY. (CO2)

5   What is the role of Hill Climbing Algorithm in Artificial Intelligence. Also, explain the features of Hill climbing with its types and limitations. (CO2)   10

6. Answer any <u>one</u> of the following:-

6   Explain 8 Queens problem with its algorithm. (CO3)   10

6   You are given 3 jars with capacity of 8,5 and 3 litres respectively. The jar with capacity 8 litres is completely filled with water, the water is to be divided into 4 litres and 4 litres in jars of capacity 8l and 5l respectively. Write the steps to solve this AI Problem (CO3)   10

7. Answer any <u>one</u> of the following:-

7   Why Expert System is used? Draw and explain architecture of Expert System. (CO4)   10

7   Explain Forward Chaining and Backward Chaining with diagram. (CO4)   10

8. Answer any <u>one</u> of the following:-

8   What is a perceptron? What are the steps involved in training a perceptron in Deep Learning? (CO5)   10

8   What do you mean by Fuzzy Logic? Explain Fuzzy sets with suitable example. Which operations can be applied on Fuzzy sets? (CO5)   10