.

Printed Page:-4 **Subject Code:- AMICSAI0602**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
M.Tech Integrated
SEM: VI - THEORY EXAMINATION (2025 - 2026)
Subject: Artificial Intelligence

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*
1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*
2. *Maximum marks for each question are indicated on right -hand side of each question.*
3. *Illustrate your answers with neat sketches wherever necessary.*
4. *Assume suitable data if necessary.*
5. *Preferably, write the answers in sequential order.*
6. *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:-

(1.1) The application/applications of Artificial Intelligence is/are (CO1, K1) 1

(a) Expert Systems
(b) Gaming
(c) Vision Systems
(d) All of the mentioned

(1.2) State the rule applied in the case of a Simple Reflex Agent.(CO1,K2) 1

(a) Simple-action rule
(b) Simple &Condition-action rule
(c) Condition-action rule
(d) None of the above

(1.3) Among the given options, which search algorithm requires less memory?(CO2,K2) 1

(a) Depth-first search
(b) Breadth-first search
(c) Linear Search
(d) Optimal Search

(1.4) Point out the element that enhances the efficiency of heuristic-based searches.(CO2,K2) 1

(a) Quality of nodes
(b) Quality of heuristic function
(c) None of the mentioned
(d) Simple form of nodes

.

(1.5) Define the transposition rule with suitable examples.(CO3,K3) 1

(a) From $p \rightarrow q$, infer $\sim q \rightarrow p$

(b) From $p \rightarrow q$, infer $q \rightarrow \sim p$

(c) From $p \rightarrow q$, infer $q \rightarrow p$

(d) From $p \rightarrow q$, infer $\sim q \rightarrow \sim p$

(1.6) How do you represent "all dogs have tails";?(CO3,K2) 1

(a) ∀x: dog(x) has tail(x)

(b) ∀x: dog(x) has tail(y)

(c) ∀x: dog(y) has tail(x)

(d) None

(1.7) Which is used to compute the truth of any sentence? (CO4,K2) 1

(a) Semantics of propositional logic

(b) Alpha-beta pruning

(c) First-order logic

(d) Both Semantics of propositional logic & Alpha-beta pruning

(1.8) Which is used to construct the complex sentences?(CO4,K2) 1

(a) Symbols

(b) Connectives

(c) Logical connectives

(d) All of the mentioned

(1.9) Identify a technique for building expert systems that provides a framework to organize knowledge.(CO5,K1) 1

(a) Expert system shells

(b) Decision trees

(c) Neural networks

(d) Genetic algorithms

(1.10) Identify a planning technique that generates a sequence of actions to form a plan.(CO5,K2) 1

(a) Goal stack planning

(b) Hierarchical planning

(c) State space search planning

(d) Conditional planning

2. Attempt all parts:-

(2.1) Define the concept of Human Intelligence.(CO1,K1) 2

(2.2) Define bidirectional Search?(CO2,K2) 2

(2.3) Explain the conditions under which a formula is said to be consistent and inconsistent while using Truth Table method.(CO3,K3) 2

(2.4) Explain various types of quantifiers with an example of each. (CO4, K2) 2

(2.5) Define fuzzy logic along with example.(CO5,K1) 2

SECTION-B 30

Answer any one of the following:-

(3.1)	State the role of machine intelligence in human life. (CO1, K2)	6
(3.2)	Describe the role of computer vision in artificial intelligence.(CO1,K2)	6

Answer any one of the following:-

(3.3)	Explain the DFS algorithm with example.(CO2,K1)	6
(3.4)	Explain the hill climbing algorithm with example.(CO2,K2)	6

Answer any one of the following:-

(3.5)	Explain Missionaries Cannibals problem in detail.(CO3,K1)	6
(3.6)	Explain Monkey Banana Problem in detail. (CO3,K2)	6

Answer any one of the following:-

(3.7)	Expalin the steps of resolution along with CNF steps..(CO4,K2)	6
(3.8)	Define the application of the FOPL. Present types of Knowledge using relevant examples.(CO4,K2)	6

Answer any one of the following:-

(3.9)	Explain various Planning Techniques in detail.(CO5,K2)	6
(3.10)	Explain the Applications and Advantages of Genetic Algorithm. (CO5, K4)	6

SECTION-C 50

4. Answer any one of the following:-

(4.1)	Explain Goal Based Agent and Utility based Agent architecture with proper diagram.(CO1,K2)	10
(4.2)	Define Natural language processing. Mention its application domain in AI. List problems which arise in natural language understanding for autonomous machines like robots, intelligent computers. (CO1, K4)	10

5. Answer any one of the following:-

(5.1)	How does the Means-Ends Analysis work?(CO2,K2)	10
(5.2)	Write down the difference between BFS and DFS. (CO2,K2)	10

6. Answer any one of the following:-

(6.1)	Explain various ways of Knowledge Representation with an example of each.(CO3,K2)	10
(6.2)	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,K3)	10

7. Answer any one of the following:-

(7.1)	Convert each of the formula to CNF and DNF i.) P→ (QVR) ii.) ((PVQ)→ (RVS)) .(CO4,K3)	10
(7.2)	Explain the algorithm of Resolution in Propositional logic with suitable example.(CO4,K2)	10

8. Answer any one of the following:-

(8.1)	Discuss Probabilistic reasoning in Artificial intelligence in detail.(CO5,K2)	10

.

(8.2)	Identify the difference between inductive, deductive, and abductive learning.(CO5,K3)	10