Printed Page:-04 **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 (2024 - 2025)
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.*

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SECTION-A 20

1. Attempt all parts:-

1-a. Who is known as the -Father of AI? (CO1, K1) 1

(a) Fisher Ada
(b) Alan Turing
(c) John McCarthy
(d) Allen Newell

1-b. Artificial Intelligence is about_____. (CO1, K2) 1

(a) Playing a game on Computer
(b) Making a machine Intelligent
(c) Programming on Machine with your Own Intelligence
(d) Putting your intelligence in Machine

1-c. The initial value of alpha in the minimax algorithm is? (CO2, K1) 1

(a) Negative Infinity
(b) 0
(c) Positive Infinity
(d) 1

1-d. Reinforcement learning is a _____ (CO2, K2) 1

(a) Prediction based learning technique
(b) Feedback based learning technique
(c) History result based learning technique

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(d) All 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, K2) 1

(a) Acquisition Efficiency

(b) Inferential Efficiency

(c) Representational Adequacy

(d) Inferential Adequacy

1-f. A ___ is a collection of attributes or slots and associated values that describe some real-world entity. (CO3, K2) 1

(a) Frame

(b) Semantic networks

(c) Partitioned Semantic Networks

(d) None of the above

1-g. Which of the following statements about quantifiers in predicate logic is **correct**? (CO4, K2) 1

(a) There are three types of quantifiers: Universal, Existential, and Conditional.

(b) Universal quantification asserts that a predicate is true for all elements in the domain.

(c) Existential quantification means that a predicate is false for every value in the domain.

(d) Quantifiers are only used in propositional logic, not in predicate logic.

1-h. Which of the following is true for Utility Theory in AI? (CO4, K2) 1

(a) Utility theory aims to represent and measure the choices and ideas of an intelligent entity(agent)

(b) It offers a framework for making decisions in situations of ambiguity by putting utilities(values) on several possible results

(c) It is a mathematical function used in Artificial Intelligence (AI) to represent a system's preferences or objectives

(d) All of the mentioned

1-i. Which of the following is not a type of uncertainty in AI? (CO5, K4) 1

(a) Epistemic uncertainty

(b) Aleatory uncertainty

(c) Fuzzy uncertainty

(d) Linguistic uncertainty

1-j. Which of the following is a technique for representing uncertain knowledge in AI systems? (CO5, K3) 1

(a) Decision trees

(b) Bayesian networks

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(c) Back-propagation

(d) Heuristic search

2. Attempt all parts:-

2.a.	Define Simple Reflex Agent? (CO1, K2)	2
2.b.	Explain disadvantages of DFS? (CO2, K3)	2
2.c.	Illustrate Well Formed formula in FOPC. (CO3, K3)	2
2.d.	Examine truth Table for following proposition: P→ (Q→ R) →S (CO4, K3)	2
2.e.	Evaluate Bayesian network? (CO5, K5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Define Artificial Intelligence and its goals? (CO1, K2)	6
3-b.	List difference between Machine Learning and Artificial Intelligence? (CO1, K3)	6
3-c.	Differentiate Between Hill Climbing and Stimulated Annealing? (CO2, K4)	6
3-d.	Explain Uniform Cost Search with Example and also write its properties ? (CO2, K3)	6
3.e.	Extrapolate Travelling Salesperson Problem with an example. (CO3, K3)	6
3.f.	Given " If it is Sunday and nice weather then we go swimming. Today is Sunday. Weather is nice" show that "we will go swimming is logical consequence of above text. (CO4, K5)	6
3.g.	What is reinforcement learning? Propose an example of a real-world application where it is used. (CO5, K3)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	State learning agent with its architecture? (CO1, K2)	10
4-b.	What is PEAS? Explain different agent types with their PEAS descriptions? (CO1, K3)	10

5. Answer any one of the following:-

5-a.	Explain the steps for A* algorithm with example and also write its properties, advantages, disadvantages ? (CO2, K3)	10
5-b.	Explain Best First Search algorithms with an example. How does it compare to other search algorithms like A in terms of efficiency and application? (CO2, K4)	10

6. Answer any one of the following:-

6-a.	Describe Declarative Knowledge, structural Knowledge, Procedural Knowledge, Meta Knowledge, Heuristic Knowledge with example? (CO3, K2)	10
6-b.	Generalize the concept of Adversarial Search and provide an example to demonstrate its application. (CO3, K4)	10

7. Answer any one of the following:-

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7-a.	Write a note on forward chaining and backward chaining. (CO4, K2)	10
7-b.	Why Expert System is used? Draw and explain architecture of Expert System. (CO4, K3)	10

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

8-a.	What is Dempster-Shafer theory, and how does it differ from Bayesian networks in handling uncertainty? (CO5, K4)	10
8-b.	What is goal stack planning, and how does it differ from other types of planning (e.g., means-ends analysis)? (CO5, K4)	10

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