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 (2023 - 2024)

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-a. If a robot is able to change its own trajectory as per the external conditions, then the robot is considered as __ (CO1) 1

(a) Mobile

(b) Non-Servo

(c) Open Loop

(d) Intelligent

1-b. Tic Tac Toe Problem- Game Playing Strategy are (CO1) 1

(a) Maximize winning possibility assuming that opponent will try to minimize (Minimax Algorithm)

(b) Ignore the unwanted portion of the search tree (Alpha Beta Pruning)

(c) Evaluation(Utility) Function

(d) All of the mentioned

1-c. What is the heuristic function of greedy best-first search? (CO2) 1

(a) f(n) != h(n)

(b) f(n) < h(n)

(c) f(n) = h(n)

(d) f(n) > h(n)

1-d. A* algorithm is based on _____ (CO2) 1

(a) Breadth-First-Search

(b) Depth-First-Search

(c) Uniform Cost Search

(d) Best-First-Search

1-e. ___ is the ability to acquire new knowledge using automatic methods wherever possible rather than reliance on human intervention. (CO3) 1

(a) Acquisition Efficiency

(b) Inferential Efficiency

(c) Inferential Adequacy

(d) None of the above

1-f. How do you represent “all dogs have tails”? (CO3) 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-g. What are the components of an Expert System? (CO4) 1

(a) Inference Engine

(b) Thematic Role Frames

(c) All of the mentioned

(d) None of the mentioned

1-h. Which of the following statements correctly define knowledge representation in AI? (CO4) 1

(a) It is the way in which facts and information are stored in the storage system of the agent

(b) It is the way in which we feed the knowledge in machine understandable form

(c) We modify the knowledge and convert it into the format which is acceptable by the machine

(d) All of the above

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

(a) Epistemic uncertainty

(b) Aleatory uncertainty

(c) Fuzzy uncertainty

(d) Linguistic uncertainty

1-j. Which of the following is a form of planning that works by breaking down a complex problem into smaller sub-problems? (CO5) 1

(a) Goal stack planning

(b) Hierarchical planning

(c) State space search planning

(d) Continuous planning

2. Attempt all parts:-

2.a. What are the components of Knowledge pyramid? (CO1) 2

2.b. The iterative deepening algorithm is a combination of DFS and BFS algorithms. Comment on the statement. (CO2) 2

2.c. What is Problem Solving? (CO3) 2

2.d. What do you mean by Inheritable knowledge? (CO4) 2

2.e. What is Partial Order Planning? (CO5) 2

SECTION B **30**

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

3-a. Discuss core components of Learning System? What do you mean by well defined Learning System? (CO1) 6

3-b. Describe 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-c. Differentiate Between Hill Climbing and Stimulated Annealing? (CO2) 6

3-d. Explain Uniform Cost Search with Example and also write its properties ? (CO2) 6

3.e. Mary will get her degree only if she registers as a student and pass her exam. She has registered herself as a student. She has passed her Exam. Show that she will get her degree. by using Resolution method. (CO3) 6

3.f. What do you mean by Knowledge Representation? Explain different types of Knowledge with suitable examples. (CO4) 6

3.g. What is a decision tree? How is it used in machine learning? (CO5) 6

SECTION C 50

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

4-a. How Artificial intelligence, Machine Learning, and Deep Learning differ from each other? (CO1) 10

4-b. Explain the different steps to design a well- defined Learning System in detail. (CO1) 10

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

5-a. Explain the working of Minimax Algorithm with suitable example. (CO2) 10

5-b. Write down the steps for A* algorithm with example? (CO2) 10

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

6-a. Consider following set of sentences in English: If Jim is a student then he is registered in a college. Jim did not register in a college. Jim is not a student. Show that whether they are mutually consistent or inconsistent. (CO3) 10

6-b. What do you mean by Resolution in Predicate Logic? Explain using algorithm. (CO3) 10

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

7-a. Write a note on forward chaining and backward chaining. (CO4) 10

7-b. How will you differentiate between Rule Based Systems and Frame Based Systems? Explain in detail. (CO4) 10

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

8-a. How does state space search work in the planning process? Describe its advantages and limitations. (CO5) 10

8-b. What is multi-agent planning? How does it differ from other planning techniques? (CO5) 10