Printed Page:- 04

# M.Tech. (Integrated)

# SEM: VI - THEORY EXAMINATION (2022-2023)

### Subject: Artificial Intelligence

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA (An Autonomous Institute Affiliated to AKTU, Lucknow)

Roll. No:

Subject Code:- AMICSAI0602

### Time: 3 Hours

## **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

# 1. Attempt all parts:-

- 1-a. Who is known as the -Father of AI" (CO1)
  - (a) Fisher Ada
  - (b) Alan Turing
  - (c) John McCarthy
  - (d) Allen Newell

# 1-b. Applications of NLP are (CO1)

- (a) Interactive Voice Response (IVR) systems
- (b) Google Translate

(c) word processors that verify the correctness of syntax in text, like Microsoft Word

(d) All of the mentioned

### 1-c. Which of the following is/are Uninformed Search technique/techniques? (CO2) 1

- (a) Breadth First Search (BFS)
- (b) Depth-first search

20

Max. Marks: 100

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- (c) Bidirectional Search
- (d) All of the mentioned
- 1-d. When will Hill-Climbing algorithm terminate? (CO2)
  - (a) Stopping criterion met
  - (b) Global Min/Max is achieved
  - (c) No neighbor has higher value
  - (d) All of the above
- 1-e. What is transposition rule? (CO3)
  - (a) From p  $\rightarrow$  q, infer ~q  $\rightarrow$  p
  - (b) From p  $\rightarrow$  q, infer q  $\rightarrow$  ~p
  - (c) From  $p \rightarrow q$ , infer  $q \rightarrow p$
  - (d) From  $p \ \rightarrow \ q, \ infer \ {\sim}q \ \rightarrow \ {\sim}p$
- 1-f. Reinforcement Learning is\_\_\_\_\_ (CO5)
  - (a) Prediction based learning technique
  - (b) Feedback based learning technique
  - (c) History result based learning technique
  - (d) None of the above
- 1-g. Translate the following statement into FOL. "For every a, if a is a philosopher, 1 then a is a scholar" (CO3)

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- (a)  $\forall$  a philosopher(a)--> scholar(a)
- (b)  $\exists$  a philosopher(a)--> scholar(a)
- (c) All of the mentioned
- (d) None of the mentioned
- 1-h. Semantic Network represents \_\_\_\_\_ (CO4)
  - (a) Syntactic relation between concepts
  - (b) Semantic relations between concepts
  - (c) All of the mentioned
  - (d) None of the mentioned
- 1-i. Which of the following is a type of knowledge-based system? (CO4)
  - (a) Expert systems
  - (b) Decision trees
  - (c) Neural networks
  - (d) Fuzzy logic systems

1-j. Which of the following is a technique for representing uncertain knowledge that uses linguistic terms such as "very likely" or "somewhat unlikely" to express degrees of certainty? (CO5)

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- (a) Bayesian networks
- (b) Fuzzy logic
- (c) Dempster-Shafer theory
- (d) Decision trees

#### 2. Attempt all parts:-

- 2 2.a. Write three applications of Natural Language Processing? (CO1) 2.b. Write two differences between Breadth first and Depth first search. (CO2) 2 2.c. Differentiate between Proposition logic and Predicate logic? (CO3) 2 2.d. Draw truth Table for following proposition:  $P \rightarrow (Q \rightarrow R) \rightarrow S$  (CO4) 2 2.e. List out names of any 4 Machine Learning algorithms. (CO5) 2 **SECTION B** 30 3. Answer any five of the following:-What are the different branches of Artificial Intelligence? Discuss some of 3-a. 6 branches and progress made in their fields. (CO1) 3-b. What are the different approaches to Artificial Intelligence? (CO1) 6 Explain any Heuristic search algorithm in detail with suitable example. (CO2) 3-c. 6 Draw Hill Climbing State Space diagram (Graphical representation) and explain 3-d. 6 its different regions. (CO2) 3.e. Explain Monkey Banana Problem in detail. (CO3) 6 John or Mary or both will go to cinema. If John goes then Jenny will go. Mike will 3.f. 6 go if Mary goes. Mike does not go to cinema. Conclude that Jenny will go to cinema. (CO4) What do you understand by Mutation and Crossover in Genetic Algorithm? 3.g. 6 (CO5) SECTION C 50 4. Answer any one of the following:-4-a. Describe the applications of Artificial Intelligence? (C01) 10 4-b. Differentiate between- Artificial Intelligence, Machine Learning and and Deep 10 Learning (CO1)
- 5. Answer any one of the following:-

5-a.	Explain the algorithm for Means-Ends Analysis with 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. Describe Declarative Knowledge, structural Knowledge, Procedural Knowledge, 10 Meta Knowledge, Heuristic Knowledge with example? (CO3)
- 6-b. Define the Constraint Satisfaction Problems. Describe the different elements in 10 the definition along with example. (CO3)

#### 7. Answer any one of the following:-

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

#### 8. Answer any one of the following:-

- 8-a. What are Bayesian networks? How do they represent uncertain 10 knowledge? (CO5)
- 8-b. What is hierarchical planning? How does it differ from goal stack planning? 10 Provide an example of a real-world application where it is used. (CO5)

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