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**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**

**(An Autonomous Institute Affiliated to AKTU, Lucknow)**

**B.Tech**

**SEM: VI - THEORY EXAMINATION (2022-2023.)**

**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. | The main tasks of an intelligent agent is/are _____ (CO1)                                                                                       | 1 |
|      | (a) Perceiving the environment<br>(b) Make decisions<br>(c) Acting on the environment<br>(d) All of the above                                   |   |
| 1-b. | Which of the following mathematical problems defined as a set of objects whose state must satisfy a number of constraints or limitations. (CO1) | 1 |
|      | (a) Local Search Problem<br>(b) Constraints Satisfaction Problem<br>(c) Game Theory<br>(d) Uninformed search problem                            |   |
| 1-c. | Which is the best way to go for Game playing problem? (CO2)                                                                                     | 1 |
|      | (a) Linear approach<br>(b) Heuristic approach                                                                                                   |   |

- (c) An Optimal approach
- (d) Space, Space
- 1-d. Breadth-first search always expands the \_\_\_\_\_ node in the current fringe of the search tree. (CO2) 1
- (a) Shallowest
- (b) Child node
- (c) Deepest
- (d) Minimum cost
- 1-e. First order logic Statements contains \_\_\_\_\_. (CO3) 1
- (a) Predicate and Preposition
- (b) Subject and an Object
- (c) Predicate and Subject
- (d) None of the above
- 1-f. Semantics of propositional logic is used to compute \_\_\_\_\_. (CO3) 1
- (a) Syntax of any sentence
- (b) size of any sentence
- (c) the truth of any sentence
- (d) All of the mentioned
- 1-g. Which is true for Decision theory? (CO4) 1
- (a) Decision Theory = Probability theory + utility theory
- (b) Decision Theory = Inference theory + utility theory
- (c) Decision Theory = Uncertainty + utility theory
- (d) Decision Theory = Probability theory + preference
- 1-h. Bayesian Belief Network is also known as ? (CO4) 1
- (a) belief network
- (b) decision network
- (c) Bayesian model
- (d) All of the above
- 1-i. Which of the following search belongs to totally ordered plan search? (CO5) 1
- (a) Forward state-space search
- (b) Hill-climbing search
- (c) Breadth-first search
- (d) Depth-first search

- 1-j. Predicting whether a tumour is malignant or benign is an example of \_\_\_\_ (CO5) 1
- (a) Supervised Regression learning
  - (b) Supervised Classification learning
  - (c) Reinforcement learning
  - (d) Unsupervised learning

**2. Attempt all parts:-**

- 2.a. Define an Agent. (CO1) 2
- 2.b. Draw state space search tree for 4 Queens Problem. (CO2) 2
- 2.c. What is Contingency? (CO3) 2
- 2.d. List out the nodes in HMM. (CO4) 2
- 2.e. Define planning in AI (CO5) 2

**SECTION B**

**30**

**3. Answer any five of the following:-**

- 3-a. Explain Strong and Weak Intelligence. List some applications of Artificial intelligence. (CO1) 6
- 3-b. Explain Model Based Agent with Suitable Example. (CO1) 6
- 3-c. What is Means-Ends Analysis in Artificial Intelligence? (CO2) 6
- 3-d. What are the components of a Game software? (CO2) 6
- 3.e. What are the limitations of Predicate Logic? (CO3) 6
- 3.f. Describe architecture of expert system. (CO4) 6
- 3.g. What are Decision Tree parameters? (CO5) 6

**SECTION C**

**50**

**4. Answer any one of the following:-**

- 4-a. What is constraint satisfaction problem in AI? (CO1) 10
- 4-b. How Artificial intelligence and Machine Learning differ from each other? (CO1) 10

**5. Answer any one of the following:-**

- 5-a. Explain Best First Search technique with suitable example. (CO2) 10
- 5-b. Explain Uniform cost search algorithm with suitable example. Discuss advantages and disadvantages of UCS. (CO2) 10

**6. Answer any one of the following:-**

- 6-a. What is Existential Quantifiers in First Order Logic? Explain with example. (CO3) 10

6-b. What is Semantic Tableaux and Resolution in Propositional Logic? (CO3) 10

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

7-a. Explain knowledge based systems with an example. (CO4) 10

7-b. What is Utility function?What are the assumptions of utility theory? (CO4) 10

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

8-a. What is Supervised Learning? Explain the techniques of supervised learning with example. (CO5) 10

8-b. Elaborate conditional planning. What are the three kinds of environment? (CO5) 10

2022-23 Jan\_June