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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 (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) Which computer system beat Grandmaster Gary Kasparov in a chess game in 1997? (CO1, K1) 1
- (a) Shakey
- (b) Deep Thought
- (c) Deep Blue
- (d) STRIPS
- (1.2) _____ was the first test to proposed to evaluate Artificial Intelligence. (CO1, K1) 1
- (a) IQ Test
- (b) Theorem proving
- (c) Loebner Prize
- (d) Turing Test
- (1.3) _____ is the process of imaging sequences of operators applied to the initial state and checking which sequence reaches a goal state. (CO2, K1) 1
- (a) Search
- (b) Plan
- (c) State
- (d) State space
- (1.4) A node with no children in the tree is known as (CO2, K1) 1
- (a) Decision Node
- (b) Root Node
- (c) Terminal Node
- (d) Parent Node

- (1.5) _____ propositional logic operator has highest preferences. (CO3, K2) 1
- (a) $\wedge$
 - (b) $\vee$
 - (c) $\neg$
 - (d) $\Rightarrow$
- (1.6) The structure of sentences is known as _____. (CO3, K1) 1
- (a) Inference
 - (b) Logic
 - (c) Syntax
 - (d) Semantics
- (1.7) Suppose an automated taxi agent needs to go from a station A to station B, and he knows the way from A to B, so this comes at (CO4, K2) 1
- (a) knowledge level
 - (b) logical level
 - (c) Implementation level
 - (d) None of the mentioned
- (1.8) The physical representation of logic and knowledge is known as (CO4, K2) 1
- (a) knowledge level
 - (b) logical level
 - (c) Implementation level
 - (d) None of the mentioned
- (1.9) What is the other name for forward state-space search? (CO5, K1) 1
- (a) Progression planning
 - (b) Regression planning
 - (c) Test planning
 - (d) None of the mentioned
- (1.10) Decision trees are a type of: (CO5, K1) 1
- (a) unsupervised learning algorithm
 - (b) supervised learning algorithm
 - (c) semi-supervised learning algorithm
 - (d) reinforcement learning algorithm

2. Attempt all parts:-

- (2.1) Define Rationality. (CO1, K1) 2
- (2.2) Define Pruning in a search tree. (CO2, K1) 2
- (2.3) Enlist the different ways of knowledge representation in AI. (CO3, K2) 2
- (2.4) What are the different levels of a knowledge based agent? (CO4, K1) 2
- (2.5) How do Ant Colony Optimization agents work? (CO5, K2) 2

SECTION-B

30

Answer any one of the following:-

- (3.1) Write the PEAS description of Internet Book shopping agent. (CO1, K3) 6

(3.2)	Define the following terms: Environment, Sensor and actuator. (CO1, K1)	6
Answer any one of the following:-		
(3.3)	Describe Alpha-Beta Pruning in AI. (CO2, K2)	6
(3.4)	Explain Mini-max algorithm in AI. (CO2, K2)	6
Answer any one of the following:-		
(3.5)	Represents the following facts in predicate logic: a. Rajiv only likes cricket game b. Roses are red c. John is father of Bob.(CO3, K3)	6
(3.6)	Explain the differences between Semantic Network Representation and Logical Representation. (CO3, K3)	6
Answer any one of the following:-		
(3.7)	Explain (i) knowledge base (ii) Inference engine (CO4, K2)	6
(3.8)	Explain backward chaining and its properties. (CO4, K2)	6
Answer any one of the following:-		
(3.9)	What is the difference between supervised and unsupervised learning? (CO5, K2)	6
(3.10)	Describe Neural Net Learning and Genetic Learning. (CO5, K2)	6
SECTION-C		50
4. Answer any <u>one</u> of the following:-		
(4.1)	Explain the steps for formulating a problem as a Search problem with an example. (CO1, K2)	10
(4.2)	Describe the following agent's Knowledge representation (a) Atomic (b) Propositional (c) Relational (d) First-order. (CO1, K2)	10
5. Answer any <u>one</u> of the following:-		
(5.1)	Distinguish between Breadth First Search and Depth First Search.(CO2, K3)	10
(5.2)	Explain Breadth First Search and Depth First Search with example and also write its advantages & disadvantages. (CO2, K2)	10
6. Answer any <u>one</u> of the following:-		
(6.1)	Explain Monkey banana problem in detail. (CO3,K3)	10
(6.2)	Describe the Properties of Knowledge Representation. (CO3, K2)	10
7. Answer any <u>one</u> of the following:-		
(7.1)	Compare forward chaining and backward chaining in detail. (CO4, K4)	10
(7.2)	What is an expert system? Explain it with its block diagram. (CO4, K2)	10
8. Answer any <u>one</u> of the following:-		
(8.1)	Draw the structure of a decision tree and explain the working with an example. (CO5, K2)	10
(8.2)	Explain the working principles of ant colony optimization in detail. (CO5, K3)	10