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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) Problems with AI are (CO1, K1)

1

- (a) Computing Power
- (b) Trust Deficit
- (c) Limited Knowledge
- (d) All of the mentioned

(1.2) Applications of NLP are (CO1, K1)

1

- (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

(1.3) Blind term is general term for _____. (CO2, K1)

1

- (a) Uninformed search
- (b) Informed search
- (c) Heuristic search
- (d) None of the mentioned

(1.4) LIFO is _____ where as FIFO is _____. (CO2, K1)

1

- (a) Stack, Queue
- (b) Queue, Stack
- (c) Priority Queue, Stack
- (d) Stack. Priority Queue

(1.5) Search strategy commonly referred to as blind search is (CO3, K1)

1

- (a) Uninformed search
 - (b) Informed search
 - (c) Simple reflex search
 - (d) All of the mentioned
- (1.6) Choose following algorithm related to Artificial Intelligence. (CO3, K1) 1
- (a) Routing Algorithm
 - (b) Hill Climbing Algorithm
 - (c) Bubble sort Algorithm
 - (d) Recursive Algorithm
- (1.7) "All dogs have tails" represented as: (CO4, K1) 1
- (a) $\forall x: \text{dog}(x) \text{ has tail}(x)$
 - (b) $\forall x: \text{dog}(x) \text{ has tail}(y)$
 - (c) $\forall x: \text{dog}(y) \text{ has tail}(x)$
 - (d) None
- (1.8) Choose the property that is not of representation of knowledge: (CO4, K1) 1
- (a) Representational Verification
 - (b) Representational Adequacy
 - (c) Inferential Adequacy
 - (d) Inferential Efficiency
- (1.9) Planning in AI refers to (CO5, K1) 1
- (a) Writing code
 - (b) Decision making for actions
 - (c) Compilation
 - (d) Debugging
- (1.10) Goal stack planning uses (CO5, K1) 1
- (a) Queue
 - (b) Stack
 - (c) Graph
 - (d) Tree

2. Attempt all parts:-

- (2.1) Discuss about Sensors, Actuators and Effectors. (CO1, K2) 2
- (2.2) Differentiate between informed search and Uninformed Search. (CO2, K2) 2
- (2.3) Define two parameters used in alpha-beta pruning. (CO3, K1) 2
- (2.4) Translate the following sentence into predicates logic: " Everyone has exactly one best friend". (CO4, K1) 2
- (2.5) Define Dempster-Shafer theory. (CO5, K1) 2

SECTION-B

30

Answer any one of the following:-

- (3.1) Define an Intelligent Agent. Categorize and compare the basic types of agent programs with appropriate examples. (CO1, K2) 6

(3.2)	Write a short note on the foundation of AI. (CO1, K1)	6
Answer any one of the following:-		
(3.3)	Explain the hill climbing algorithm with example. (CO2, K2)	6
(3.4)	Describe Uniform Cost Search in detail. (CO2, K2)	6
Answer any one of the following:-		
(3.5)	Explain Traveling Salseman Problem problem in detail. Solve using any AI algorithm. (CO3, K2)	6
(3.6)	Define a well-defined learning system. Explain the steps involved in designing a well-defined learning system. (CO3, K2)	6
Answer any one of the following:-		
(3.7)	Differentiate semantic net and Frame with suitable example. (CO4, K2)	6
(3.8)	If it is hot, then it is humid. If it is humid, then it will rain. It is hot." Show that "It will rain" using Semantic Tableaux method in Propositional Logic. (CO4, K1)	6
Answer any one of the following:-		
(3.9)	Analyze the differences between Bayesian theory and Dempster-Shafer theory. (CO5, K4)	6
(3.10)	Apply goal stack planning to solve a simple problem. (CO5, K4)	6
<u>SECTION-C</u>		50
4. Answer any <u>one</u> of the following:-		
(4.1)	Differentiate between the following pairs of concepts based on their principles and applications: (CO1, K2) a. Artificial Intelligence vs. Machine Learning b. Artificial Intelligence vs. Deep Learning	10
(4.2)	Write explanatory notes on the following agent types: (CO1, K2) a. Simple Reflex Agent b. Model-based Reflex Agent c. Goal-based Agent	10
5. Answer any <u>one</u> of the following:-		
(5.1)	Write a short note on:a. Heuristic Search b. Greedy Search c. Hill Climbing Search. (CO2, K1)	10
(5.2)	Write a short note on- a. Bidirectional Search b. AO* Search. (CO2, K1)	10
6. Answer any <u>one</u> of the following:-		
(6.1)	Compare and contrast semantic networks, frames, and predicate logic as knowledge representation methods. Provide examples where each method excels in modeling real-world information. (CO3, K2)	10
(6.2)	Explain the Adversarial Search with example. (CO3, K2)	10
7. Answer any <u>one</u> of the following:-		
(7.1)	Explain propositional logic as used in knowledge representation. Illustrate the following operator properties with suitable examples: (CO4, K2) a. Commutativity b. Associativity c. Identity Element	10

- d. Distributive Law
- e. De Morgan's Law
- f. Double Negation Elimination

(7.2) Demonstrate inference rules used in First Order Logic with examples. (CO4, K3) 10

8. Answer any one of the following:-

(8.1) Explain multi-agent planning with suitable examples. (CO5, K2) 10

(8.2) Describe decision tree learning and its structure. (CO5, K2) 10

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