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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 (2024 - 2025)

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

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1. Attempt all parts:-

- 1-a. Which powerful AI agent established computer domination in the world of chess? (CO1, K1) 1
- (a) DeepMind
- (b) DeepBlue
- (c) Watson
- (d) AlphaGo
- 1-b. An agent whose action depends only on the current percept is known as _____. (CO1, K1) 1
- (a) Model-based agent
- (b) Goal-based agent
- (c) Utility-based agent
- (d) Simple reflex agent
- 1-c. A set of all possible states of a given problem is known as (CO2, K1) 1
- (a) State
- (b) Space search
- (c) State space
- (d) State tree
- 1-d. Depth first search uses _____Queue. (CO2, K1) 1
- (a) FIFO

- (b) LIFO
(c) HIFO
(d) FILO
- 1-e. The structure of sentences is known as_____. (CO3, K1) 1
(a) Inference
(b) Logic
(c) Syntax
(d) Semantics
- 1-f. First order logic Statements contains_____. (CO3, K1) 1
(a) Predicate and Preposition
(b) Subject and an Object
(c) Predicate and Subject
(d) None of the above
- 1-g. Operation performed by KBA are (CO4, K1)) 1
(a) Tell and Ask
(b) Ask and Perform
(c) Tell, Ask and Perform
(d) None of the mentioned
- 1-h. What is the primary advantage of a rule-based system? (CO4, K1) 1
(a) It can handle complex, uncertain, or incomplete information.
(b) It requires less human effort to develop and maintain.
(c) It can learn and improve from experience over time.
(d) It can perform tasks that are impossible for humans to accomplish.
- 1-i. What is the other name of the backward state-space search? (CO5, K1) 1
(a) Regression planning
(b) Progression planning
(c) State planning
(d) Test planning
- 1-j. In reinforcement learning, an agent learns through: (CO5, K2) 1
(a) rewards and punishments
(b) labeled examples
(c) unstructured data
(d) none of the above
2. Attempt all parts:-
- 2.a. Write down the application of AI. (CO1, K1) 2
- 2.b. Define Heuristic. (CO2, K1) 2
- 2.c. Briefly explain Semantic networks. (CO3, K1) 2

- 2.d. What are the operations performed by knowledge based agent? (CO4, K1) 2
- 2.e. What is planning in AI? (CO5, K1) 2

SECTION-B

30

3. Answer any five of the following:-

- 3-a. Explain the features of Well-defined learning problem with example.(CO1, K1) 6
- 3-b. Describe AI, Deep learning and Machine learning and its relation with block diagram. (CO1, K4) 6
- 3-c. Describe Alpha-Beta Pruning in AI. (CO2, K2) 6
- 3-d. Explain Mini-max algorithm in AI. (CO2, K2) 6
- 3.e. Represents the following in FOPL: a.) Lipton is a tea b.) Lata is a child who drinks tea c.) Ruma disliked Lata. (CO3, K3) 6
- 3.f. Draw the architecture of knowledge based system and define each block. (CO4, K2) 6
- 3.g. Describe ant colony optimization agents. (CO5, K3) 6

SECTION-C

50

4. Answer any one of the following:-

- 4-a. Write the PEAS description of the following agent types: (i) a medical diagnosis system (ii) Satellite image analysis system (iii) Part-picking robot. (CO1, K3) 10
- 4-b. Explain the steps for formulating a problem as a Search problem with an example. (CO1, K2) 10

5. Answer any one of the following:-

- 5-a. 10
- Draw the state space of given problem.
 - Assume that the initial state is A and the goal state is G. Show how Greedy search strategies would create a search tree to find a path from the initial state to the goal state. (CO2, K3)

State	next	cost
A	B	4
A	C	1
B	D	3
B	E	8
C	C	0
C	D	2
C	F	6
D	C	2
D	E	4
E	G	2
F	G	8

State	h(n)
A	8
B	8
C	6
D	5
E	1
F	4
G	0

- 5-b. Given an example of a real world problem which can be effectively solved by Hill Climbing Algorithm. Explain the terms plateau and ridge. (CO2, K3) 10
6. Answer any one of the following:-
- 6-a. Explain Missionaries Cannibals problem in detail. (CO3, K3) 10
- 6-b. Explain Monkey banana problem in detail. (CO3,K3) 10
7. Answer any one of the following:-
- 7-a. What do you understand by knowledge based system. Explain with its architecture. (CO4, K2) 10
- 7-b. Write short note on (i) Knowledge Representation (ii) Ontological engineering (iii) Epistemological engineering (CO4, K1) 10
8. Answer any one of the following:-
- 8-a. Why we use decision tree in AI? Also explain how decision tree algorithm work? (CO5, K2) 10
- 8-b. Explain ant colonization algorithm. Also write pseudo code for this. (CO5, K3) 10