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Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

MCA (Integrated)

SEM: V - 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 20

1. Attempt all parts:-

1-a. A technique that was developed to determine whether a machine could or could not demonstrate the artificial intelligence known as the: (CO1, K2) 1

(a) Boolean Algebra
(b) Turing Test
(c) Logarithm
(d) Algorithm

1-b. An AI agent perceives and acts upon the environment using: (CO1, K2) 1

(a) Sensors
(b) Perceiver
(c) Actuators
(d) Both Perceiver and Actuators

1-c. Search which will select the lowest expansion node at first for evaluation is ____. (CO2, K3) 1

(a) Greedy-best-first-search
(b) Depth-first search
(c) Breadth-first search
(d) None of the mentioned

1-d. _____complexity is a measure of time for an algorithm to complete its task. (CO2, K1) 1

(a) Cost
(b) Path
(c) Time
(d) Space

1-e. The following elements which constitutes the frame structure is: (CO3, K1) 1

(a) Procedures and default values
(b) Facts or Data
(c) Frame names
(d) Frame reference in hierarchy

1-f. ___ are an alternative to predicate logic as a form of knowledge representation.(CO3, K3) 1

(a) Partitioned Semantic Networks
(b) Frame
(c) Semantic networks
(d) None of the above

1-g. Knowledge and reasoning also play a crucial role in dealing with _____ environment. (CO4, K2) 1

(a) Completely Observable
(b) Partially Observable
(c) Neither Completely nor Partially Observable
(d) Only Completely and Partially Observable

1-h. The Bayesian network graph does not contain any cyclic graph. Hence, it is known as: (CO4, K2) 1

(a) DCG
(b) DAG
(c) CAG
(d) SAG

1-i. In which agent does the problem generator is present: (CO5, K2) 1

(a) Learning agent
(b) Observing agent
(c) Reflex agent
(d) None of the above

1-j. Choose the correct option regarding machine learning (ML) and artificial Intelligence: (CO5, K1) 1

(a) ML is a set of techniques that turns a dataset into a software
(b) AI is a software that can emulate the human mind
(c) ML is an alternate way of programming intelligent machines
(d) All of the above

2. Attempt all parts:-

2.a.	Differentiate between Utility Based agents and Goal Based agents. (CO1, K2)	2
2.b.	Explain the working of A* algorithm. (CO2, K2)	2
2.c.	Explain various types of quantifiers with suitable examples. (CO3, K2)	2
2.d.	Define various types of knowledge. (CO4, K1)	2
2.e.	What do you mean by Reinforcement Learning? (CO5, K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Give some real-world applications of AI. (CO1, K3)	6
3-b.	Explain the different types of Agents in Artificial Intelligence. (CO1, K2)	6
3-c.	Explain the DFS algorithm with example. (CO2, K2)	6
3-d.	Explain the problems associated with Hill Climbing Algorithm. (CO2, K3)	6
3.e.	Given " If it is Sunday and nice weather then we go swimming. Today is Sunday. Weather is nice", show that "we will go swimming" is logical consequence of above text. (CO3, K3)	6
3.f.	Describe Architecture of Expert System in detail. (CO4, K2)	6
3.g.	Write the difference between Supervised and Unsupervised Machine Learning? (CO5, K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Explain the different steps to design a well- defined Learning System in detail. (CO1, K2)	10
4-b.	How is AI being used in the field of Natural Language Processing (NLP)? Provide examples of NLP applications in real-world systems. (CO1, K3)	10

5. Answer any one of the following:-

5-a.	Write down the difference between BFS and DFS.(CO2, K2)	10
5-b.	Explain the Minimax Algorithm in detail. (CO2, K2)	10

6. Answer any one of the following:-

6-a.	Describe Water Jug Problem with suitable example. (CO3, K3)	10
6-b.	Explain 8 Queens problem with its algorithm. (CO3, K3)	10

7. Answer any one of the following:-

7-a.	Explain Forward Chaining and Backward Chaining with diagram. (CO4, K2)	10
7-b.	Illustrate Hidden Markov Model (HMM) and its components with suitable example. (CO4, K3)	10

8. Answer any one of the following:-

8-a.	Describe what do you mean by Neural Net learning and Genetic learning? (CO5, K2)	10

8-b. List the difference between Inductive, Deductive and Abductive learning. (CO5, K2) 10