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Subject Code:- AMTCSE0102

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: I - THEORY EXAMINATION (2022 - 2023)

Subject: Artificial Intelligence

Time: 3 Hours

Max. Marks: 70

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

15

1. Attempt all parts:-

- 1-a. Strong Artificial Intelligence is (CO1) 1
- (a) the embodiment of human intellectual capabilities within a computer
 - (b) a set of computer programs that produce output that would be considered to reflect intelligence if it were generated by humans
 - (c) the study of mental faculties through the use of mental models implemented on a computer
 - (d) all of the mentioned
- 1-b. First Order Logic is also known as _____. (CO2) 1
- (a) First Order Predicate Calculus
 - (b) Quantification Theory
 - (c) Lower Order Calculus
 - (d) All of the mentioned
- 1-c. A search algorithm takes _____ as an input and returns _____ as an output. (CO3) 1
- (a) Input, output

- (b) Problem, solution
 (c) Solution, problem
 (d) Parameters, sequence of actions
- 1-d. Knowledge and reasoning also play a crucial role in dealing with _____ environment. (CO4) 1
- (a) Completely Observable
 (b) Partially Observable
 (c) Neither Completely nor Partially Observable
 (d) Only Completely and Partially Observable
- 1-e. What is the other name for forward state-space search? (CO5) 1
- (a) Progression planning
 (b) Regression planning
 (c) Test planning
 (d) None of the mentioned

2. Attempt all parts:-

- 2.a. Discuss Utility-based Agent. (CO1) 2
- 2.b. List some of the rules of Inference. (CO2) 2
- 2.c. Define advantages of A* Search. (CO3) 2
- 2.d. Draw block diagram that represents the working of an expert system. (CO4) 2
- 2.e. Explain the concept of Bayes Network. (CO5) 2

SECTION B

20

3. Answer any five of the following:-

- 3-a. Explain Simple Reflex Agent with Suitable Example. (CO1) 4
- 3-b. Give a brief introduction to the Turing test in Artificial Intelligence. (CO1) 4
- 3-c. Explain water jug problem in artificial intelligence with example. (CO2) 4
- 3-d. Explain production rule in missionaries cannibals problem in artificial intelligence. (CO2) 4
- 3.e. Differentiate Informed & Uninformed search with examples. (CO3) 4
- 3.f. Explain the architecture of knowledge based system. (CO4) 4
- 3.g. Explain multi-agent system and list the characteristics. (CO5) 4

SECTION C

35

4. Answer any one of the following:-

- 4-a. Differentiate between Goal based and Utility based Agent. (CO1) 7
- 4-b. Give some advantages and disadvantages of Artificial Intelligence.(CO1) 7
- 5. Answer any one of the following:-**
- 5-a. Explain the types of Inference rules in propositional logic. (CO2) 7
- 5-b. Demonstrate the working of Semantic Tableaux and Resolution in Predicate Logic. (CO2) 7
- 6. Answer any one of the following:-**
- 6-a. Define A* search and also explain various stages of A* search with an example. (CO3) 7
- 6-b. Define breadth-first search algorithm and also brief its advantages and disadvantages. (CO3) 7
- 7. Answer any one of the following:-**
- 7-a. Elaborate the working of backward chaining with examples. (CO4) 7
- 7-b. Define hidden markov model and also brief the applications of HMM. (CO4) 7
- 8. Answer any one of the following:-**
- 8-a. Elaborate ant colony optimization.Which information is used by the agents ants to make moves in ant colony optimization algorithm? (CO5) 7
- 8-b. Detail about the swarm intelligence with three key aspects. (CO5) 7