

**VIT**Vellore Institute of Technology  
(Deemed to be University under section 3 of UGC Act, 1956)  
CHENNAI

Reg. Number:

21BEC1851

**Continuous Assessment Test (CAT) – I -August 2024**

Programme	:	B.Tech (ECE/ECM)	Semester	:	Fall 24-25
Course Code & Course Title	:	BECE309L & Artificial Intelligence and Machine Learning	Class Number	:	CH2024250100170 CH2024250100200
Faculty	:	50441 VIJAYAKUMAR P 53099 NITISH KATAL	Slot	:	D1+TD1
Duration	:	90 Minutes	Max. Mark	:	50

**General Instructions:**

- Write only your registration number on the question paper in the box provided and do not write other information.

**Answer all questions**

Q. No	Sub Sec.	Description	Marks	Blooms Taxonomy Level
1.		Consider a vacuum cleaner robot designed to clean a room. (i) Explain how a simple reflex and Goal-Based agent would approach the task of cleaning the room? (7 Marks) (ii) Discuss the advantages of Goal-Based approach compared to the Simple Reflex Agent? (3 Marks)	10	L2
2.		Given two jugs with different capacities, the jugs can be filled, emptied, or poured from one to the other. Explain the suitable AI-based search algorithm that helps to solve the problem of measuring the specific amount of water using the jugs?	10	L2
3.		Imagine an autonomous delivery robot in a large, dynamic warehouse. The warehouse has shelves that change locations and obstacles that move around. The robot's task is to pick up items from various shelves and deliver them to specific locations. Explain the suitable AI based search strategy in a complex environment for the robot to navigate the warehouse, pick up items from various shelves, and deliver them to the drop-off points efficiently, considering the dynamic and stochastic nature of the environment?	10	L3
4.		Given a set of facts about parenthood, sibling relationships, and marriages, the agent should be able to infer additional relationships like aunts, uncles, cousins, etc. The agent must use predicate logic to express and infer relationships, such as "If X is a parent of Y, and Y is a parent of Z, then X is a grandparent of Z". Develop a knowledge base agent using connectives and quantifiers to answer complex queries about family relationships.	10	L3
5.		Sudoku is a number-placement puzzle where the goal is to fill a 9×9 grid with digits so that each column, each row, and each of the nine 3×3 subgrids contain all the digits from 1 to 9, as shown in Fig. 1.	10	L4



5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

Fig. 1 : A sample Sudoku grid

Create a formal Logic-based agent using declarative statements that can solve Sudoku puzzles by applying logical rules that determine where numbers can be placed based on the constraints of the puzzle.

\*\*\*\*\*All the best \*\*\*\*\*