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

Reg. Number:	21BEC1133

Continuous Assessment Test (CAT) – I - FEB 2024

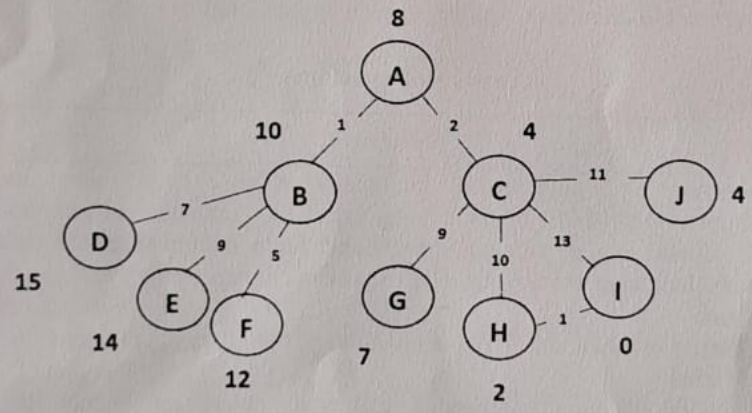
Programme	:	B. Tech (SENSE)	Semester	:	Winter 23-24
Course Code & Course Title	:	BECE309L & Artificial Intelligence and Machine Learning	Class Number	:	CH2023240502708, CH2023240502707, CH2023240502702, CH2023240502705, CH2023240502703
Faculty	:	Dr. VIJAYALAKSHMI A, Dr. REENA ROY R, Dr. MODIGARI NARENDRA, Dr. KANIMOZHI S, Dr. KAVITHA J C	Slot	:	F1+TF1
Duration	:	1 ½ Hours	Max. Mark		50

General Instructions: < Use this space to provide additional information such as graph sheet, data book etc.>

- Write only your registration number on the question paper in the box provided and do not write other information.
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks
1.		Consider a Sophia-Social humanoid robot. This robot uses computer algorithm for identifying faces, eye contact, and recognize individuals. It can process speech and have a conversations using natural language processing. The robot is designed to look and act like human. i. Discuss in detail the PEAS description of the given agent application. [4 Marks] ii. Justify all the properties of task environment for Sophia-Social humanoid robot. [6 Marks]	10
2.		A group of families planned to travel by road to Goa. From past experiences, they have learned that cars are more comfortable and suitable for long distance travel. In order to find the shortest route, they have kept the destination in mind while searching. Imagine that an intelligent agent has been installed in the car that shows the route and performs search and planning. i. Identify a suitable agent type that suits for the given scenario. [2 Marks] ii. For the given scenario, apply an appropriate agent prototype by sketching a neat diagram along with the algorithm. [8 Marks]	10
3.		The Missionaries and Cannibals Problem presents a scenario where three missionaries and three cannibals must cross a river using a boat that can carry at most two individuals. The objective is to transport all missionaries and cannibals from the left bank to the right bank without	20

		ever allowing the cannibals to outnumber the missionaries on either bank, as it would result in the missionaries being devoured. The problem's initial state entails all six individuals on the left bank, with the goal state being the successful transfer of all individuals to the right bank. i.Represent the problem as a state space problem. [5 Marks] ii. Draw a search tree for the given problem up to four levels. [5 Marks] iii. Apply depth limited search algorithm (L=3) to print the search path and discuss the performance of the algorithm. [5 Marks] iv. Apply breadth first search algorithm to print the search path for the generated search tree. [5 Marks]	
4.		i.Analyze the application of Greedy Best-First Search and A* algorithm in optimizing data transmission within a computer network as shown in the fig 1. Consider that routers as locations and communication links as variable cost paths. Evaluate the best cost path from a designated source router 'A' to a target router 'I'. In the given graph, the numbers written on edges represent the actual cost between the nodes and the numbers written on nodes represent the heuristic value. [8 Marks] ii. Differentiate the strength and limitations of Greedy BFS and A* and analyze the performance of both algorithms. [2 Marks]  Fig 1	10
		**********All the best **********	