

## Continuous Assessment Test (CAT) – I Jan 2025

Programme	:	MCA	Semester	:	Winter Sem 24-25
Course Code & Course Title	:	PMCA611L – Artificial Intelligence	Class Number	:	CH2024250501750
Faculty	:	Dr.B.Saleena	Slot	:	F1+TF1
Duration	:	90 minutes	Max. Mark	:	50

### General Instructions:

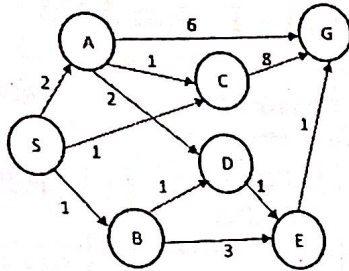
- Write only your registration number on the question paper in the box provided and do not write other information.

### Answer ALL the questions

Q. No	Sub Sec.	Description	Marks
1.		<p>Assume that you are the head of Chennai City traffic management department, and the city traffic has been increased with growing traffic congestion, leading to longer commute times, increased pollution, and higher stress levels for residents. The government has decided to implement AI-driven solutions to tackle these issues and make transportation more efficient and sustainable.</p> <p>Discuss the specific AI technologies that can be utilized to address the following challenges and explain how they can be applied to:</p> <p>(i) Manage traffic flow (5 marks)</p> <p>(ii) Optimize public transportation (5 Marks)</p>	10
2.		<p>Imagine that you have been appointed to the position of AI scientist at the Department of Defence. You are responsible for developing an agent program that will determine the route of a vehicle used to attack enemies during a war.</p> <p>(i) Describe in detail the PEAS description of the given agent. (4 Marks)</p> <p>(ii) Suggest a suitable intelligent agent type to develop the above application and justify your answer with a neat diagram. (6 Marks)</p>	10
3.		<p>Following nodes in the graph represent users of the social network: A, B, C, D, E, F, G, H. The edges represent friendship between the users.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <ul style="list-style-type: none"> <li>A is friends with B and C</li> <li>B is friends with A, D, and F</li> <li>C is friends with A and F</li> <li>D is friends with B, E, and G</li> </ul> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <ul style="list-style-type: none"> <li>E is friends with D</li> <li>F is friends with B, C, and G</li> <li>G is friends with D, F, and H</li> <li>H is friends with G</li> </ul> </div> </div> <p>(i) Create a social network graph for the above scenario. (2 Marks)</p> <p>(ii) Find the path from A to H using Breadth First Search and Depth First Search. Illustrate the step by step procedure for the same using appropriate data structures. (8 Marks)</p>	10

4.

Consider the following graph. The start state is S and the goal state is G. The heuristic values are given in the table below.



S	A	B	C	D	E	G
10	8	5	5	4	2	0

Use the below search algorithms to find the shortest path from S to G.

- Uniform Cost Search
- Greedy Best First Search
- A\* Search

(i) Illustrate the step by step procedure for solving the problem. Show the order in which the nodes are expanded and the contents of fringe in each expansion. (15 Marks)

(ii) Discuss the optimality of the three algorithms with respect to the above graph. (5 Marks)

20

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