VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science and Engineering

Fall Semester 2024-25

CAT I . SLOT: E2+TE2

Programme Name & Branch: B. Tech. (BCB, BCE, BCI, BCT, BDS & BKT)

Course Name & Code: Artificial Intelligence BCSE306L

Class Number (s): VL2024250101495, 5795, 1424, 1468, 1472, 1453, 1428, 1484, 1487, 1433, 1480, 1458, 1478, 1503, 1482, 1437, 1476, 1492, 3566

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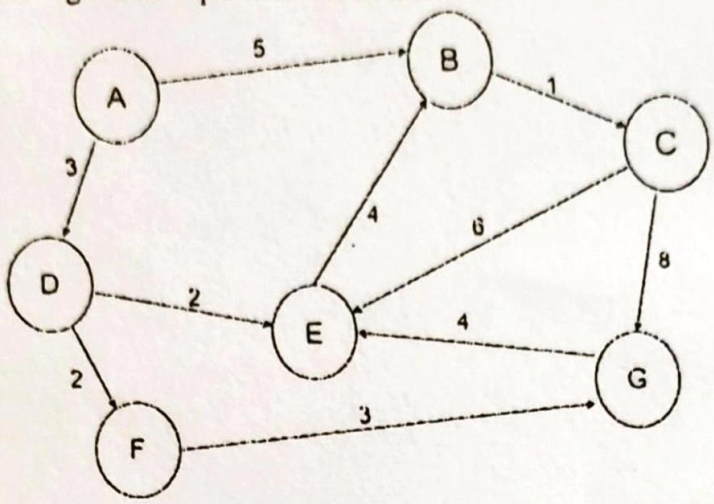
Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s):

Answer all the Questions

Q.No.	Question	Max Marks
1.	You are given with five different tasks like (i) Crossword puzzle (ii) N Queens Problem (iii) Tower of Hanoi (iv) Ludo List the **PEAS** description and the properties for the given tasks to their environment characteristics with suitable justification.	10
2.	A taxi company wants to optimize its drivers' routes to reduce fuel consumption, minimize travel time, and enhance customer satisfaction. List the **challenges and plans** in developing an AI system for a real-time route optimization system that assists drivers in selecting the most efficient routes while considering dynamic factors like traffic, road conditions, toll plazas and weather conditions? Discuss with diagram the **most suitable type of agent** that can be used for this type of system.	10
3	a) Given two unmarked jugs, one which holds 7 litres, and another which holds 11 litres, an unlimited supply of water, how do you measure exactly 4 litres in 7 litres jug? Represent the solution using state space search method and explain the steps. (5 Marks)	10

b) Consider the following graph. The starting node is A and the goal node is G. Find the actual and traversed paths from A to G using uniform cost search along with the algorithm's performance measures. (5 Marks)



4. Using A* algorithm solve the given the 15 puzzle problem consisting of 1-15 numbered tiles on a square box (one tile space is blank). The objective of this problem is to change the arrangement of tile from initial state to goal state by using series of legal moves (one tile at a time). The initial and goal states arrangement is shown below, consider g(n) = Depth of node and h(n) = Number of misplaced tiles. 10

	1	3	4
5	2	6	7
8	9	10	11
12	13	14	15

Initial State

1	2	3	4
5	6	7	
8	9	10	11
12	13	14	15

Goal State

5. Show that hill-climbing approach suffers from local optima in solving a problem. Use a global heuristic function to solve the same problem to reach the goal state. 10