JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-IV Semester (CSE/IT/BT/ Mathematics and Computing)

COURSE CODE (CREDITS): L-25B11CI413 (3)

MAX. MARKS: 15

COURSE NAME: Artificial Intelligence and Machine Learning

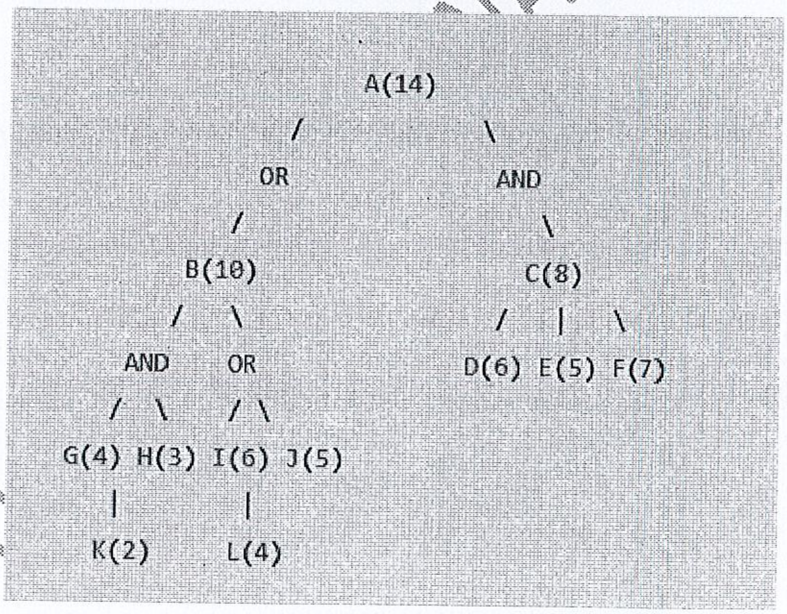
COURSE INSTRUCTOR: Dr. Ravindara, Dr. Aman, Dr. Monika, Ms. Vani

MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculators is not allowed

Q.No	Question	CO	Marks
Q1	Consider the following AND-OR graph. Numbers in brackets represent heuristic values **h(n)**. Find optimal solution graph using AO*.  **Edge Costs:** • A→B = 2, A→C = 3 • B→G = 2, B→H = 3 • B→I = 2, B→J = 2 • G→K = 2 • I→L = 3	2	4

135

	• C→D = 2, C→E = 2, C→F = 3		
Q2	Apply Steepest Ascent Hill Climbing to maximize the following 2-D function: $$f(x,y) = 25 - (x-1)^2 - (y-2)^2 + xy$$ **Initial State:** (x,y)=(0,0) **Step Size:** 1 unit **Neighboring States:** (x±1,y),(x,y±1) only (no diagonal moves)	2	4
Q3	**A)** Branching factor b=4, goal depth d=3. How many nodes are expanded by BFS? **B)** The goal node is at depth d=4. How many times is the **root node expanded** in Iterative Deepening DFS? **C)** Using **Depth First Search (DFS) implemented with a stack**, find the **path from node A to node E** in the following graph. Assume neighbors are pushed onto the stack in **left-to-right order.**	1	4
Q4	**A)** Design **PEAS** for an **Autonomous Delivery Drone** and explain which component is most critical for safety and why. **B)** Classify the self-driving car environment in terms of: Observability, Determinism, Episodic/Sequential, Static/Dynamic, Discrete/Continuous — and justify any two classifications.	1	3

**********************************Best of Luck**********************************