JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-7th Semester (CSE/IT)

COURSE CODE (CREDITS): 18B1WCI742 (3)

MAX. MARKS: 25

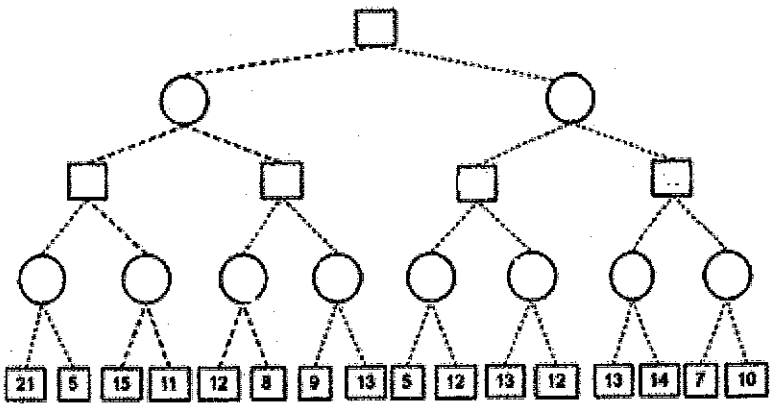
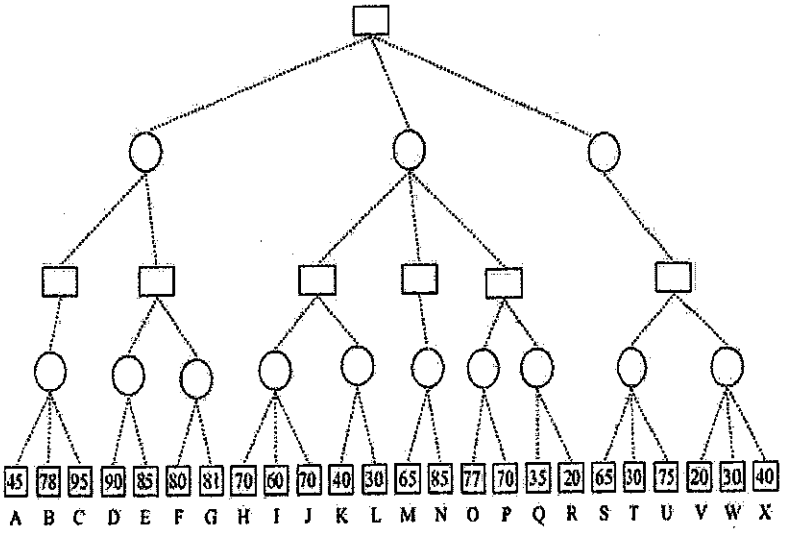
COURSE NAME: Artificial Intelligence

COURSE INSTRUCTORS: HRI/KTS/SRJ MAX. TIME: 1 Hour 30 Min

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

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

Q.No	Question	CO	Marks
Q1	(a) Write an algorithm for Simulated Annealing. (b) How does it balance exploitation and exploration?	CO1	2+2
Q2	To solve a Boolean Satisfiability (SAT) problem with a genetic algorithm, represent variable assignments as chromosomes and use a fitness function based on how many clauses are satisfied. An example would be an assignment for the formula (p1 ∨ p2 ∨ ¬p3) ∧ (¬p1 ∨ p2 ∨ p3), where a chromosome like '011' (false for p1, true for p2, true for p3) could satisfy the first two clauses, yielding a fitness score of 2. The genetic algorithm then evolves this population through selection, crossover, and mutation to find an assignment that satisfies all clauses.	CO2	4
Q3	(a) Write A* heuristic algorithm. (b) What should the heuristic function be like if A* is to always find a least cost path for fulfilling the admissibility of A* in terms of underestimating or overestimating the distance from a node N to the goal node?	CO2	2+2
Q4	Find the two Travelling Salesman Problem (TSP) solutions on the randomly paired population Parent-P1(Top) and Parent-P2(Bottom) using Cycle Crossover. O D G L A H K M B J F C N I E H G M F O A D K I C N E L B J	CO2	2+2

Q5	Determine the value of the game tree to the following figure by applying the MiniMax backup rule.  	CO2	4
Q6	In the game tree given in the following image, the leaves are labelled with the values from the evaluation function. The letter labels [A... X] below the leaves are names of the leaves. Show the order in which algorithm Minimax and Alpha-Beta pruning will inspect the nodes, explaining all the decisions made, along with diagrams where appropriate. What is the minimax value of the game?  	CO2	5