JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MOOC End Term Examination- 2025

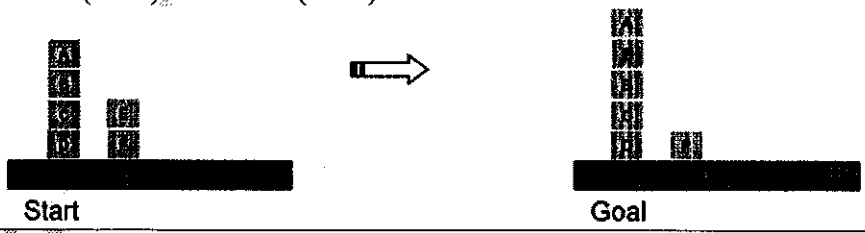
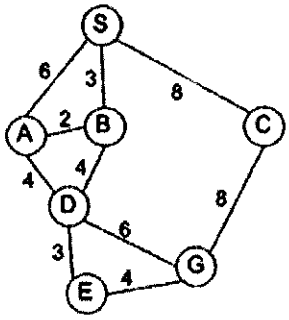
B.Tech-VII Semester (CSE/IT)

COURSE CODE(CREDITS): 20B2WCI702 (3) MAX. MARKS: 70

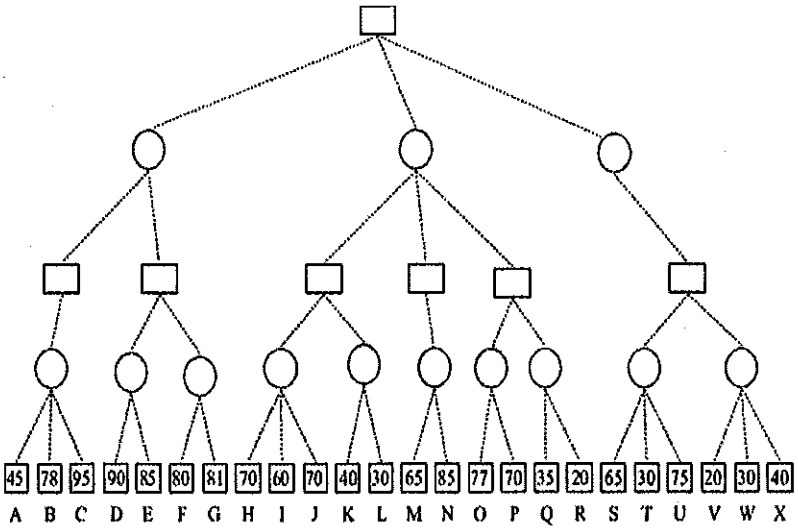
COURSE NAME: ARTIFICIAL INTELLIGENCE SEARCH METHODS FOR PROBLEM SOLVING

COURSE INSTRUCTORS: HRI/KTS/SRJ MAX. TIME: 3 Hours

Note: ***(a)*** *All questions are compulsory. Use of calculator is allowed.*
(b)Marks are indicated against each question in square brackets.
(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
Q1	(a) Draw a neat and clean diagram to show the relationship among an autonomous agent, world, goal, other agents, and other events. (b) What is the output of the following on a set and list Head second(1,[101, 102, 103], null) (c) Write the computed values of a, h, t, and c on a set and list. (a, h : t, c) = (1,[101, 102, 103], null)	5+2+2=9
Q2	Draw a state space representation to solve the water jug problem. The problem has three jugs with capacity 8, 5, and 3 liters. The 8 liter jug is filled with water. The 5 liter and 3 liter jugs are empty. Measuring 4 liter water in both 8 liter and 5 liter jug is the goal state. Note that there are no label marks on the jugs and water should not be dropped at any stage from the jugs.	7
Q3	Solve the following Block World Problem shown in the Fig. with a given start state and a goal state using Hill-Climbing Search Algorithm having the heuristic function h = Add n if the block is on a correct structure of n blocks; Subtract n if the block is on a wrong structure of n blocks Given h(Start) = -1 and h(Goal) = 10  Start Goal	7
Q4	Find the solution path from Source Node (S) to Goal Node (G) using A* Algorithm. 	7

3

Q5	(a) Write an algorithm for Simulated Annealing. (b) How does it balance exploitation and exploration? Discuss mathematically.	5+5=10
Q6	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	4+4=8
Q7	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?  	7
Q8	Describe various rules of inference in Logic.	7
Q9	Consider the following statements are true in a given knowledge base in Propositional Logic. Alice likes mathematics and she likes stories. If she likes mathematics and she likes algebra. If she likes algebra and likes physics she will go to college. She does not like stories or she likes physics. She does not like chemistry and history. Is the statement true/false "Alice will go to college"? Prove.	8