PRIYADARSHINI COLLEGE OF ENGINEERING, NAGPUR

Department: Computer Technology | Semester: V | Section: A and B

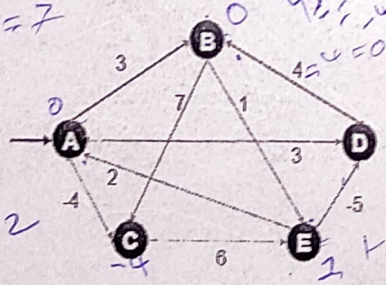
CAT-II (2022-23)

Subject : Design and Analysis of Algorithms | Subject Code : BECT501T

Duration : 1.5Hrs | Max. Marks : 35

Note:
1) All questions are compulsory.
2) All questions carry marks as indicated.

			Questions	Marks	CO	BL
Q.1	A	I	Which of the following algorithm design technique is used in finding all pairs of shortest distances in a graph? a) Backtracking b) Greedy c) Dynamic programming d) Divide and conquer	1M	CO3	II
		II	Which of the following is/are property/properties of a dynamic programming problem? a) Optimal substructure b) Overlapping subproblems c) Both optimal substructure and overlapping subproblems d) Greedy approach	1M	CO3	III
	B		Differentiate between Greedy approach and Dynamic programming.	5M	CO3	III
	C		Determine LCS of X = (a, b, a, b, a, a, b) and Y = (a, b, a, b, b, a, a)	7M	CO3	III
			OR			
Q.2	A	I	The Floyd-Warshall algorithm for all-pair shortest paths computation is based on : a) Backtracking b) Greedy b) Dynamic programming d) Divide and conquer	1M	CO3	II
		II	Consider two strings A="qpqrr" and B= "pqprqrp" . Let x be the length of the longest common subsequence (not necessarily contiguous) between A and B and let y be the number of such longest common subsequences between A and B. Then x+10y = _____ a) 43 b) 44 c) 34 d) 35	1M	CO3	III
	B		Find the shortest distance using Bellman-Ford algorithm for given graph. (Assume source vertex A)	5M	CO3	III
	C		Find All pair shortest Paths using Floyd Warshall algorithm for given graph:	7M	CO3	III



	A	B	C
A	0	4	7
B	1	0	2
C	6	∞	0

			Questions	Marks	CO	BL
Q.3	A	I	In what manner is a state-space tree for a backtracking algorithm constructed? a) Depth First Search b) Breadth First search d) Twice around the tree d) Nearest neighbour First	1M	CO4	II
		II	A node is said to be _____ if it has a possibility of reaching a complete solution. a) Non-promising b) Promising c) Succeeding d) Preceding	1M	CO4	II
	B		Explain Graph coloring method with example. Give backtracking-based algorithm for it.	5M	CO4	II
	C		Discuss 4-Queen's problem and give its algorithm using Backtracking approach.	7M	CO4	II
			OR			
Q.4	A	I	Backtracking algorithm is implemented by constructing a tree of choices is called as _____? a) State-space tree b) State-Chart Tree c) Backtracking Tree d)Node Tree	1M	CO4	II
		II	Which of the problems cannot be solved by backtracking method? a) n-queen Problem b) Sum of Subset Problem c) Hamiltonian Circuit Problem d) Travelling Salesman Problem	1M	CO4	II
	B		Explain backtracking algorithm for sum of subsets problem. State its implicit and explicit constraints.	5M	CO4	II
	C		Discuss Hamiltonian cycle. Also write an algorithm for finding Hamiltonian cycle of a graph.	7M	CO4	II
Q.5	A	I	Problems that cannot be solved in polynomial time are known as? a) Intractable Problems b) Tractable Problems c) Decision Problems d) Complete Problems	1M	CO5	II
		II	_____ is the class of decision problems that can be solved by non-deterministic polynomial algorithms. a) NP b) P c) NP-Hard d) NP-Complete	1M	CO5	II
	B		What is Non deterministic algorithm? Give non deterministic algorithm for searching problem.	5M	CO5	II
			OR			
Q.6	A	I	To which of the following class does a CNF-satisfiability problem belong? a) NP b) P c) NP-Hard d) NP-Complete	1M	CO5	II
		II	The problem 3-SAT and 2-SAT are a) NP b) P c) NP-Hard d) NP-Complete	1M	CO5	II
	B		Explain the concept of Polynomial Reduction and how it can be used for showing NP completeness of problem.	5M	CO5	II

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