

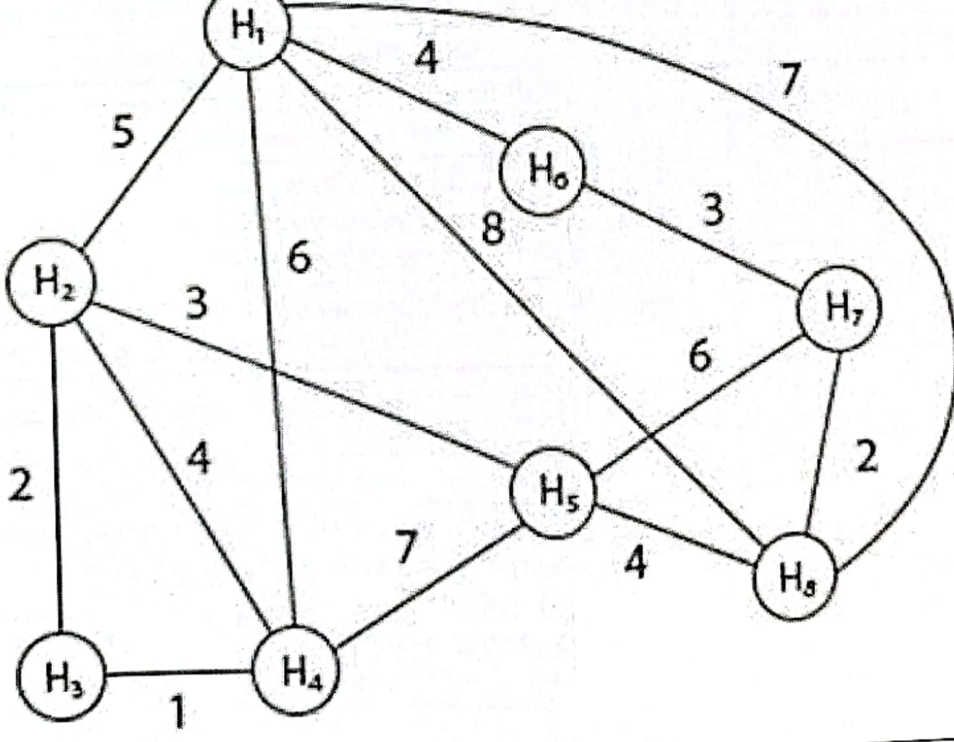


Time: _____ Max.Marks: 100

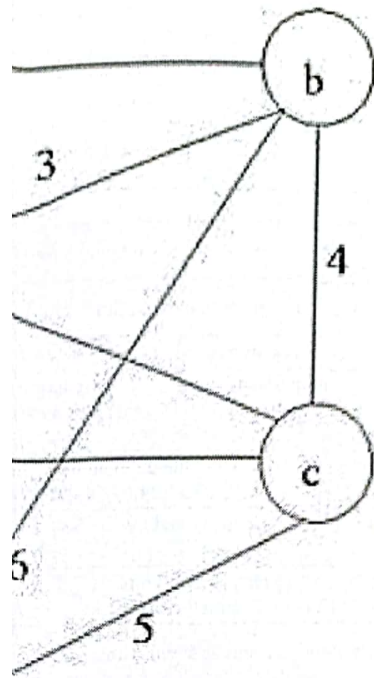
S.NO Answer All Questions Choice Options Marks CO CO BTL

1. Write an algorithm to find the sum of 'n' numbers with a given time complexities: i) $O(1)$ ii) $O(n)$ iii) $O(n^2)$ choice Q-2 10Marks CO1 3
2. Define time complexity. Describe different notations used to represent these complexities. Illustrate with suitable examples. 10Marks CO1 3
3. Write Pseudocode conversions of Algorithm Specifications. An array has exactly n elements and the elements has take from the set $\{0,1,2,\dots,n\}$. There are no duplicates in the array. Design an $O(n)$ worst case time algorithm to find which one of the elements from the above set is missing in the array. choice Q-4 15Marks CO1 3
4. Compare and contrast sequential and parallel machine with an example. List the sorted elements by using PRAM Sorting technique: $X = \{25, 21, 8, 5, 2, 13, 11, 16, 23, 31, 9, 4, 18, 12, 27, 34, 24, 67, 54, 43, 63, 46\}$ 15Marks CO1 3
5. Apply Greedy method to find an optimal solution generated by Job Sequencing when $n=6$, $(P1, P2, \dots, P6) = (20, 15, 10, 7, 5, 3)$ & $(D1, D2, D6) = (3, 1, 1, 3, 1, 3)$. choice Q-6 10Marks CO2 4
6. Find boundary points for convex hull for the given set of points: $\{(-7,9), (2,6), (7,4), (8,6), (7,-2), (4,-6), (1,1), (3,-2), (6,-10), (0,-6), (-8,0), (-7,3), (-2,2), (-8,4)\}$ using Graham Scan Algorithm. 10Marks CO2 4
7. Write divide and conquer merge sort algorithm and derive its time complexity (in all cases). choice Q-8 15Marks CO2 4
8. Let $A = \{a/119, b/96, c/247, d/283, e/72, f/77, g/92, h/19\}$ be the letters and its frequency of distribution in a text file. Compute suitable Huffman coding to compress the data efficiently 15Marks CO2 4
9. Discuss the 4 - queen's problem. Draw the portion of the state space tree for $n=4$ queens using backtracking algorithm. choice Q-10 10Marks CO3 4
10. Describe the travelling salesman problem and discuss how to solve it using dynamic programming? 10Marks CO3 4
11. Let $w = \{1, 2, 4, 6, 7, 9, 12\}$ and $m=16$. Find all possible subsets of w that sum to m . Do this using Sum Of Subsets. Draw the portion of the state space tree that is generated. choice Q-12 15Marks CO3 4

12. Apply dynamic programming to find minimum cost tour for the following graph



13. Construct state space tree for the 0/1 Knapsack problem instance by using LC Branch & Bound given when $n=4$; $P = (40, 42, 20, 12)$ $W = (4, 7, 5, 3)$ and $m=10$. choice Q-14 10Marks CO4 4
14. Why NP Hard problems are difficult to solve and justify your answer. choice Q-16 15Marks CO4 4
15. Solve the following instance of Traveling Salesperson Problem using Branch and Bound method.



			15Marks	CO4	4
			8Marks	CO4	4
tautology.			7Marks	CO4	4