

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020

Subject Code:3150703
Date:29/01/2021
Subject Name:Analysis & Design of Algorithms
Time:10:30 AM TO 12:30 PM
Total Marks: 56
Instructions:

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) What is an algorithm? Why analysis of algorithm is required?	03
	(b) What is asymptotic notation? Find out big-oh notation of the $f(n) = 3n^2 + 5n + 10$	04
	(c) Write an algorithm for insertion sort. Analyze insertion sort algorithm for best case and worst case.	07
Q.2	(a) What is the difference between selection sort and bubble sort?	03
	(b) Write iterative and recursive algorithm for finding the factorial of N. Derive the time complexity of both algorithms.	04
	(c) Solve following recurrence relation using iterative method $T(n) = 2T(n/2) + n$	07
Q.3	(a) How divide and conquer approach work?	03
	(b) Trace the quick sort for data $A = \{6, 5, 3, 11, 10, 4, 7, 9\}$	04
	(c) Explain master theorem and solve the recurrence $T(n) = 9T(n/3) + n$ with master method	07
Q.4	(a) Write the characteristics of greedy algorithm.	03
	(b) Trace the merge sort for data $A = \{6, 5, 3, 11, 10, 4, 7, 9\}$	04
	(c) Find minimum spanning tree for the given graph in fig-1 using prim's algorithm	07

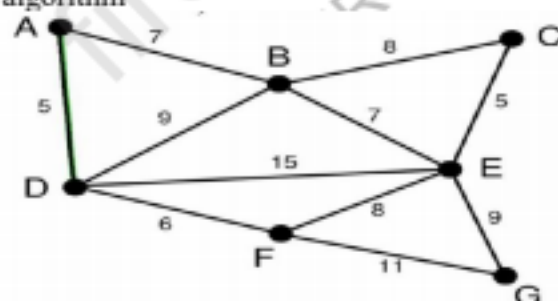


Fig-1

Q.5	(a) How huffman code is memory efficient compare to fixed length code?	03
	(b) Give difference between greedy approach and dynamic programming.	04
	(c) Find the Huffman code for each symbol in following text ABCCDEBABBFBACBEBDFAAAABCDEEDCCBFEBFCAE	07
Q.6	(a) What is principal of optimality? Explain its use in Dynamic Programming Method.	03
	(b) Find out minimum number of multiplications required for multiplying: $A[1 \times 5]$, $B[5 \times 4]$, $C[4 \times 3]$, $D[3 \times 2]$, and $E[2 \times 1]$.	04
	(c) Solve following knapsack problem using dynamic programming algorithm with given capacity $W=5$, Weight and Value are as follows :	07



- Q.7** (a) What is finite automata? How it can be used in string matching? **03**
(b) Differentiate BFS and DFS **04**
(c) Explain Backtracking Method. What is N-Queens Problem? Give solution of 4-Queens Problem using Backtracking Method. **07**
- Q.8** (a) Explain Minimax principal. **03**
(b) Define P, NP, NP-complete, NP-Hard problems. **04**
(c) Explain rabin-karp string matching algorithm. **07**

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