

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII (Old) EXAMINATION – WINTER 2019

Subject Code: 181604
Date: 27/11/2019
Subject Name: Design And Analysis Of Algorithm
Time: 02:30 PM TO 05:00 PM
Total Marks: 70
Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What do you mean by performance analysis of an algorithm? Explain average case, worst case and best case analysis with the help of suitable example. **07**
- (b) Define: (1) Algorithm (2) Heap Tree (3) Time complexity (4) Space complexity (5) Set (6) Function (7) Relation **07**

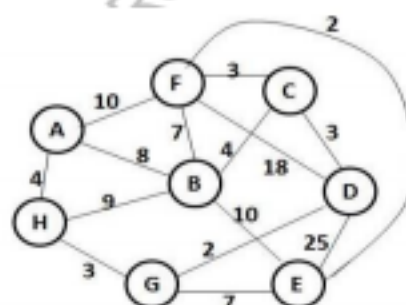
- Q.2** (a) Define an amortized analysis. Briefly explain its different techniques. Carry out aggregate analysis for the problem of implementing a k-bit binary counter that Counts upward from 0. **07**
- (b) Sort the letters of word "EDUCATION" in alphabetical order using insertion sort. **07**

OR

- (b) Sort the given elements with Heap Sort Method: 20, 50, 30, 75, 90, 60, 25, 10, and 40. **07**
- Q.3** (a) Multiply 981 by 1234 by divide and conquer method. **07**
- (b) Discuss Assembly Line Scheduling problem using dynamic programming with example. **07**

OR

- Q.3** (a) Describe longest common subsequence problem. Find longest common subsequence of following two strings X and Y using dynamic programming. X=abbacdcba, Y=bcdbbcaac. **07**
- (b) Define minimum spanning tree. Find minimum spanning tree using Prim's algorithm of the following graph. **07**



- Q.4** (a) For the following chain of matrices find the order of parenthesization for the optimal chain multiplication (15,5,10,20,25) **07**
- (b) Solve the following Knapsack Problem using greedy method. Number of items = 5, knapsack capacity $W = 100$, weight vector = {50, 40, 30, 20, 10} and profit vector = {1, 2, 3, 4, 5} **07**

OR

- Q.4** (a) Following are the details of various jobs to be scheduled on multiple processors such that no two processes execute at the same on the same processor. **07**

Jobs	J_1	J_2	J_3	J_4	J_5	J_6	J_7
Start time	0	3	4	9	7	1	6
Finish time	2	7	7	11	10	5	8



Show schedule of these jobs by using a number of processing units approach.

- (b) Working modulo $q = 11$. How many spurious hits does the Rabin-Karp matcher encounter in the text $T = 3141592653589793$ when looking for the pattern $P = 26$? **07**
- Q.5** (a) Explain: Acyclic Directed Graph, Articulation Point, Dense Graph, Breadth First Search Traversal, And Depth First Search Traversal. **07**
- (b) Explain in Brief: P-Problem, NP-Problem, Polynomial reduction. **07**
- OR**
- Q.5** (a) Explain Backtracking Method. What is N-Queens Problem? Give solution of 8 Queens Problem using Backtracking Method. **07**
- (b) Show the comparisons the naive string matcher makes for the pattern $P=0001$ in the text $T=000010001010001$ **07**

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