

END TERM EXAMINATION

FIFTH SEMESTER [BCA] DECEMBER-2012

Paper Code: BCA309 Subject: Design & Analysis of Algorithm

Time : 3 Hours Maximum Marks :75

Note: Attempt five questions including Q.no.1 which is compulsory. Select one question from each unit.

- Q1 (a) What are the time complexities of Quick Sort?
- (b) Define asymptotic notations used for bestcase, average case and worst case analysis of algorithms.
- (c) What do you mean by Huffman codes?
- (d) What is String Matching?
- (e) Write the difference between spanning tree and binary tree.
- (f) What is Divide and Conquer Program?
- (g) Solve the recurrence relation by iteration $T(n)=T(n-1)+n^4$.
- (h) What are Red Black Trees?
- (i) Define Spanning Tree?
- (j) Write a linear search algorithm and find its complexity. (2.5x10=25)

UNIT-I

- Q2 (a) Write an algorithm to find mean and mode from a list of n elements. (5)
- (b) Sort the following data using heap sort:- 88, 12, 91, 23, 10, 36, 45, 55, 15, 39, 81, 97, 61. (7.5)

OR

- Q3 (a) Apply quick sort algorithm on the following list:- (6.5)
10, 2, 12, 7, 4, 6, 9, 5, 1, 3, 11, 0.
- (b) Show that the Merge Sort algorithm follows divide and conquer paradigm. (6)

UNIT-II

- Q4 (a) Find the Longest Common Subsequence of Author Affet refers to the affiliation of author- $X = \langle A, B, C, D, A, B \rangle$, $Y = \langle B, D, C, A, B, A \rangle$. (5)
- (b) Explain the Strassen's Algorithm for Matrix Multiplication on 3 Matrices A, B and C of size (2*3), (3*4) and (4*2). Find the size of final Matrix and the number of multiplications (not any addition) performed. (7.5)

OR

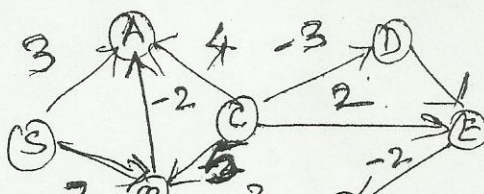
- Q5 (a) Discuss Strassen's Algorithm for Matrix Multiplication. Show that two nxn matrices can be multiplied in $O(n \log_2^7)$ time. (6.5)
- (b) Among the 'breadth first search' and 'depth first search', which technique is used in order traversal of a binary tree and how? (6)

UNIT-III

- Q6 (a) Find the Huffman Code for:- (6)

Variable	A	B	C	D	E	F	G	H
Frequencies	0.25	0.25	0.14	0.14	0.055	0.055	0.055	0.055

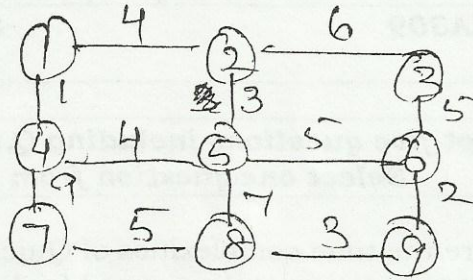
- (b) Find the shortest path from S to F for the following figure:- (6.5)



OR

Q7 (a) Find Spanning tree for the following figure:-

(6.5)



(b) Discuss the Dijkstra's algorithm for finding the shortest path. (6)

Q8 (a) Give the Knuth-Morris-Pratt algorithm for pattern matching. Discuss its performance and failure functions. (7.5)

(b) Analyze the time Complexity of Rabin Karp algorithm. (5)
