5. Attempt any two parts: (10x2=20)

(a) What is NP-completeness ? Discuss vertex-cover problem in detail.

(b) Explain RABIN-KARP algorithm for the string matching. Give suitable example.

(c) Write a note on the following :

(i) Polynomials and Fast Fourier Transform

(ii) Randomized algorithm

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NMCA-312

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 214318

Roll No.

M.C.A. (Semester-III)

SPL. THEORY EXAMINATION, 2014-15

DESIGN & ANALYSIS OF ALGORITHMS

Time : 3 Hours] *[Total Marks : 100*

Note : Attempt all questions.

1. Attempt any four parts : (5x4=20)

(a) What do you know by asymptotic notations? Define different kinds of asymptotic notations.

(b) Solve the following recurrence relation by iteration method:

$T(n) = T(n-1) + n^2$

(c) Sort the following numbers using heap sort:

40,60,300,45,35,20,10,5,90,80

(d) Explain quick sort algorithm with a suitable example.

(e) Write down the algorithm for counting sort.

(f) Discuss insertion sort with suitable example and algorithm.

2. Attempt any four parts. (5x4=20)

(a) What is red black tree ? Define its properties. Also prove that a red black tree with n internal nodes has height at most 2log (n+1).

(b) Write down the algorithm for insertion of elements (data) in Red Black Tree.

(c) Design a B-Tree of order 5 with the following data :

27,35,41,80,09,64,42,12,34,19,39,21,27,57,31,47,68,49

(d) Discuss the EXTRACT-MIN operation in Binomial Heap with algorithm.

(e) Discuss the concept of CONSOLIDATE operation in EXTRACT-MIN of Fibbonacci Heap.

(f) Explain DECREASE-KEY OPERATION in Fibbonacci Heap.

3. Attempt any two parts : (10x2=20)

(a) What is dynamic programming ? Discuss MATRIX-CHAIN-MULTIPLICATION problem with algorithm and suitable example.

(b) Discuss Longest common subsequence problem with algorithm and suitable example.

(c) Write notes on the following :

(i) Greedy Algorithms

(ii) Branch and Bound

4. Attempt any two parts. (10x2=20)

(a) Discuss Prim's Algorithm with suitable example.

(b) Describe the following :

(i) Maximum Flow

(ii) Travelling Salesman Problem

(c) Write down the Dijkstra Algorithm. Explain with suitable example.