7. a) Prove that TSP ∈ NPC. [5

b) Write an algorithm to Extract largest item from a min heap. [5

8. Write notes on: [2.5 × 4

a) Greedy method

b) Divide & conquer

c) Back tracking

d) Depth first Search

xxxxx

KiiT

VI-B Tech (Supplementary)
D&AA CS 602
(CSE, IT)

IXTH SEMESTER EXAMINATION-2010

DESIGN & ANALYSIS OF ALGORITHMS

[CS 602]

Full Marks: 70 Time: 3 Hours

Answer any SIX questions including Question No.1 which is compulsory.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

1. a) Arrange the following functions in increasing order of growth. [2 × 10

$\log n,\ n^2,\ n \log n,\ 2^n$

b) Match the following

(1) Greedy Approach	(1) N-Queen Problem
(2) Dynamic Programming	(2) Merge Sort
(3) Back tracking	(3) Optimal storage on tapes
(4) Divide & Conquer	(4) 0-1 knapsack

c) Write the basic steps to solve the divide and conquer problem.

d) Insert the following Elements to the min heap structure

$\langle 80, 40, 20, 60, 50 \rangle$

e) Write the application of spanning tree.

f) Compare greedy method with dynamic programming.

g) Write the different areas of algorithms.

h) Find the places of 5-queens in a 5×5 chess board such that no 2-queens can attack each other.

i) Define P & NP

j) Differentiation between 0/1 knapsack & fractional knapsack.

2. a) Explain the notation O (Big-Oh), Ω (Omega) and θ (theta). [5

b) Write a merge sort algorithm to merge two sorted arrays of size n/2 and n/2 respectively. Find the time complexity. [5

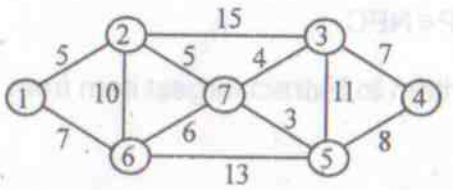
3. a) For the following recurrence, find the time complexity. [5

$$T(n) = \begin{cases} 1, & n \le 4 \\ 2T(n/4) + cn & n > 4 \end{cases}$$

b) What is the optimal huffman code for the following set of frequencies [5

a:4, b:9, c:2, d:40, c:15, f:20

4. a) For the following graph find out minimum cost spanning tree, step wise using Prim's algorithm starting from vertex 3. [5

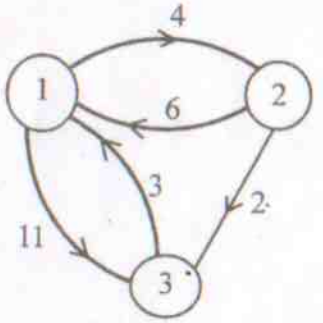


b) Write the binary search algorithm and find its complexity. [5

5. a) The following table shows the start time and End time of different activities. Find how many minimum number of resources are required to perform all activities. [5

Activity	a	b	c	d	e	f	g	h	i	j	k	l	m
Start time	2	4	18	15	5	7	1	17	20	8	9	12	15
End time	9	6	21	19	9	8	5	19	24	11	14	16	19

b) Find all pair shortest paths using floyd warshal algorithm. [5



6. a) Write a backtracking algorithm for the sum of subset. [5

b) Find the longest common subsequence of <01101010> and <101001001> using dynamic programming. [5