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Total Number of Pages: 02

M.TECH  
CSPC101

1<sup>st</sup> Semester Regular / Back Examination – 2016-17  
ANALYSIS AND DESIGN OF ALGORITHM  
BRANCH: COMPUTER SCIENCE AND ENGG  
Time: 3 Hours  
Max Marks: 70  
Q.CODE:Y868

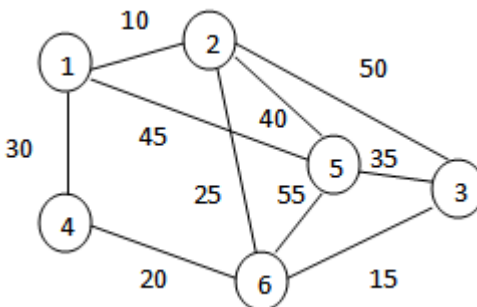
Answer Question No.1 which is compulsory and any five from the rest.  
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

- List out the two Draw backs of binary search algorithm
- Define Big-Oh notation
- Differentiate linear search and binary search techniques
- What are the different ways of measuring the running time of an algorithm?
- State the best case, worst case and average case time complexity of QUICK SORT using BIG-Oh notation.
- Write three properties of NP-Complete problems.
- If  $f(n) = 7n^3 + 5n^2 + 6n + 8$ , then proof that  $f(n) = O(n^3)$
- Solve the following recurrence equation using master method  
 $T(n) = 2T(n/2) + O(n^2)$
- What is the difference between performance analysis and performance measurement of an algorithm
- How the greedy paradigm algorithm differs from that of dynamic programming

- Q2 a) Consider the knapsack instance  $n=3$ ,  $(w_1, w_2, w_3) = (2, 3, 4)$ ,  $(p_1, p_2, p_3) = (1, 2, 5)$  and  $m=6$ . Explain 0/1 knapsack algorithm to solve the above instance. (5)
- b) Explain 8 Queens problem with example. (5)

Q3 Write and explain the Prim's algorithm. Applying the algorithm construct a minimal spanning tree for graph given below (10)



Q4 Discuss the steps in developing a Dynamic Programming Algorithm. Explain the sequence of chain matrix multiplication with a chain of four matrices A, B, C and D with size of matrix is  $5 \times 4, 4 \times 6, 6 \times 2$  and  $2 \times 7$  respectively. (10)

- Q5 a) Write and solve a recurrence equation of the recurrence algorithm for Fibonacci series (5)  
 b) Solve the following recurrence equation using recurrence tree method (5)  
 $T(s)=2T(s/3)+5s$
- Q6 a) Determine an LCS of (1,0,0,1,0,1,0,1) and (0,1,0,1,1,0,1,1,0) and what is its complexity (5)  
 b) Illustrate the operation of MIN-HEAPIFY(A,5) on the array given below: (5)  
 $A=(14,15,13, 9,12,6,15,18,21,8,22,32)$  and calculate its time complexity
- Q7 What is Divide and conquer algorithm? Write the algorithm for divide and conquer algorithm and its time complexity? sort the following elements using merge sort principle and write its algorithm and complexity analysis (10)
- Q8 Write short notes on any two (5 x 2)  
 a) Tries  
 b) Randomized algorithm  
 c) NP complete and NP-hard  
 d) Internet algorithm