

Code No: 114CT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech II Year II Semester Examinations, December - 2017****DESIGN AND ANALYSIS OF ALGORITHMS****(Information Technology)****Time: 3 Hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) What is Big-oh Notation? [2]
- b) Define degenerated tree. [3]
- c) Analyze the time complexity of Prims Algorithm. [2]
- d) List any two differences of prims and Krushkal's algorithm. [3]
- e) What are the similarities between greedy and dynamic programming. [2]
- f) Write the steps of Dynamic Programming. [3]
- g) Define dead node. [2]
- h) Write the general method of branch and bound. [3]
- i) What is intractable problem? [2]
- j) What are the 2 stages of non-deterministic algorithm? [3]

PART-B**(50 Marks)**

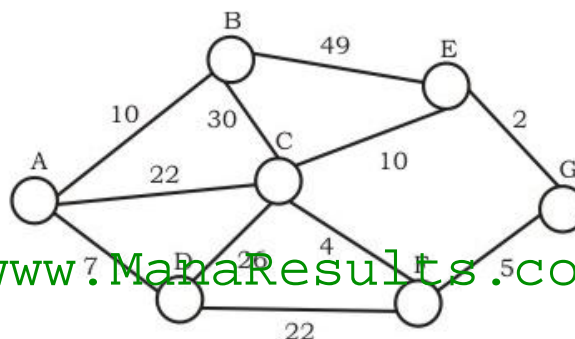
2. Write in detail about Master Theorem. Solve the following recurrence relation using master's theorem.
 - a) $T(n) = 2T(n/2) + n\log(n)$.
 - b) $T(n) = 8T(n/2) + n^2$
 - c) $T(n) = 9T(n/3) + n^3$. [10]

OR

3. Show how quick sorts the following sequence of keys in ascending order 65, 70, 75,80,85,60,55,50 and 45. Analyze the time complexity. [10]
4. Find the optimal solution of the Knapsack instance $n=3$, $m=20$, $(p_1,p_2,p_3)=(25,24,15)$ and $(w_1,w_2,w_3)=(18,15,10)$. [10]

OR

5. What is minimum spanning tree? Explain Krushkals's Algorithm and apply for the graph given in figure below. [10]



6. Consider $n=4$ and $(q_1, q_2, q_3, q_4)=(do, if, int, while)$. The values of r p's and q 's are given as $p(1:4) = (2, 3, 1, 1, 1)$. Construct the optimal binary search tree. [10]

OR

7. Explain in detail all pair shortest path problem with an example. [10]
8. The edge length of the directed graph are given by matrix. Find the optimal tour using branch and bound. [10]

∞	20	30	10	11
15	∞	16	4	2
3	5	∞	2	4
19	6	18	∞	3
16	4	7	16	∞

OR

9. Draw and explain the portion of the tree for 4-queens problem that is generated during backtracking. [10]
10. What is NP-Hard class? Give any three examples. [10]

OR

- 11.a) Briefly explain Cooks-theorem.
b) Discuss about Max Clique Problem. [5+5]

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