Printed Pages - 3 NCS-501

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

Paper ID : 2012264 Roll No. | | | | | | | | | | |

B.TECH.

Regular Theory Examination (Odd Sem - V) 2016-17

DESIGN AND ANALYSIS OF ALGORITHM

Time : 3 Hours *Max. Marks : 100*

Section - A

1. **Attempt all parts. All parts carry equal marks. Write answer of each part in short.** **(10×2=20)**

   a) List out the disadvantages of divide and conquer algorithm.

   b) What are the fundamental steps involved in algorithmic problem solving?

   c) Write recursive function to find nth Fibonacci number.

   d) Define Binary heap.

   e) Briefly explain the Prim's algorithm.

   f) Define principle of optimality.

g) Write the names of various design techniques of algorithm.

h) Differences between branch & bound and backtracking technique.

i) What is the running time complexity of 8 queen's problem?

j) Define P, NP and NP complete in decision problem.

Section - B

Attempt any five questions from this section. **(5×10=50)**

2. Explain the concepts of quick sort method and analyze its complexity with suitable example.

3. Explain the concept of merge sort with example.

4. Insert the nodes 15, 13, 12, 16, 19, 23, 5, 8 in empty Red Black Tree and delete in the reverse order of insertion.

5. Write short note on Dijkstra 's algorithm shortest paths - Dijkstra's algorithm shortest path problems.

6. Write pseudocode for 8 queen problem.

7. Write non-deterministic algorithm for sorting.

8. What is backtracking? Write general iterative algorithm for backtracking.

9. Differentiate NP complete with NP hard.

Section-C

Note: Attempt any **2** questions from this section. **(2×15=30)**

10. i) State Bellman ford algorithm.

ii) Consider following instance for simple knapsack problem. Find the solution using greedy method.

N = 8

P = {11, 21, 31, 33, 43, 53, 55, 65}

W = {1, 11, 21, 23, 33, 43, 45, 55}

M = 110

11. What is travelling salesman problem? Find the solution of following travelling salesman problem using branch and bound method.

Cost matrix =

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

12. Prove that three coloring problem is NP Complete.