Roll No. | | | | | | | | | | | |

Total No. of Questions: 09 **Total No. of Pages: 02**

MCA (Sem. 5)
DESIGN AND ANALYSIS OF ALGORITHMS
Subject Code: MCA-502
Paper ID: 74382

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **Sections A, B, C and D contains TWO questions each carrying TEN marks each. Attempt at least ONE question from each Section.**
2. **Section E is COMPULSORY consisting of TEN Questions carrying TWO marks each.**

SECTION A

1. Build a binary search tree using following nodes:
10, 20, 30,40,50,60, 70,80,90.

2. a) What are various applications of AVL Trees? Explain.
b) Write the procedure for building a max heap by taking suitable example.

SECTION B

3. a) What is meant by Time-Space Trade off? Explain.
b) Explain different notations used for complexity.

4. Compare the performance of bubble sort and merge sort using following list:
5, 15, 45, 35, 65, 55, 95, 45.

SECTION C

5. Discuss the greedy approach for 0-1 Knapsack problem in detail.

6. a) Explain dynamic programming solution to any computation problem.
b) Sort the following list of integers using Heapsort.
50,5,40,3,2, 70,55,90,30.

SECTION D

7. Illustrate Depth First Search by taking suitable example.

8. Write an algorithm for finding shortest path between two nodes in a graph.

SECTION E

9.

a) Describe briefly two applications of tree data structure.

b) What are Red-Black Trees?

c) What is the complexity of building a BST?

d) What is meant by exponential running time?

e) How Greedy approach differs from Divide and Conquer?

f) Write a short note on working of Radix sort.

g) Differentiate between NP-Hard and NP-Complete.

h) Name two applications at ions of breadth first search.

i) Compare the complexities of Insertion sort and Selection sort.

j) What is the application of Dijkstra algorithm?