Seat No:_____ **Enrollment No:_____**

PARUL UNIVERSITY

FACULTY OF IT & COMPUTER SCIENCE

MCA Summer 2017 – 18 Examination

Semester: 03 **Date: 08/06/2018**
Subject Code: 05201205 **Time: 2.00 pm to 4.30 pm**
Subject Name: Analysis and Design of Algorithms **Total Marks: 60**

Q.1 Answer the followings.

A. Write short Answers. **(05)**

1. The Space factor when determining the efficiency of algorithm is measured by _____.
2. A _____algorithm works by recursively breaking down a problem into two or more sub-problems.
3. Define live node
4. Big oh (O) and Big Omega (Ω) are known as _____ notations.
5. Define weighted graph

B. Multiple choice type questions/ Give the sentence true or false. (Each of 01 marks) (10)

1. The worst-case time complexity of Quick Sort is_____.
   (a). $O(n^2)$ (b). O(n)
   (c). O(log n) (d). O(n logn)
2. Binary Search algorithm works on the principal of _____.
   (a) Divide and Conquer Strategy (b) Greedy approach
   (c) Dynamic Programming (d) Sorting Algorithm
3. A spanning tree is a _____.
   (a) graph (b) subtree
   (c) subgraph (d) tree.
4. The graphs represented using a sequential representation using matrices is called _____.
   (a) Adjacency Matrix (b)Strassen Matrix
   (c) Cycle (d) Directed Graph
5. Greedy algorithm always gives optimal solution. True or False?
6. A Graph with multiple cycles is called acyclic graph. True or False?
7. Divide and conquer method follows top down approach. True or False?
8. A path in a digraph in which the edges are distinct is called a _____.
   (a) complex path (b) simple path
   (c) Null path (d) Null edge
9. Stack is also called as –
   (a) LIFO (b) FIFO
   (c) FILO (d) LILO
10. Which of the following is nonlinear data structure?
    a) stacks b) list c) tree d) strings

Q.2 Answer the followings. **(15)**

1. Write pseudocode to print Fibonacci series. (02)
2. What is the difference between dynamic programming and greedy algorithm. (02)
3. What is an Algorithm? List type of Algorithm. (02)
4. Define: Backtracking ALgorithm. (03)
5. Define the term: Worst case, Average case, Best case (03)
6. Explain recursion with example. (03)

Q.3 Answer the following. (Any three) **(15)**

1. Explain 4 queen problem with example
2. Solve Travelling Salesman Problem given by following distance matrix using dynamic programming.

$$C = \begin{pmatrix} 0 & 2 & 9 & 10 \\ 1 & 0 & 6 & 4 \\ 15 & 7 & 0 & 8 \\ 6 & 3 & 12 & 0 \end{pmatrix}$$

3. Perform quick sort on : 54,26,93,17,77,31,44,55,20
4. Perform binary search on below data.
3,8,56,78,23,34,10,85,40,15,96,55 (key-15)

Q.4 Answer the following.

A. Explain FIFO BB with example. **(05)**

B. Using greedy algorithm find an optimal solution for knapsack instance n=7, M=15 (P1, P2, P3, P4, P5, P6, P7) = (10, 5, 15, 7, 6, 18, 3) and (w1, w2, w3, w4, w5, w6, w7) = (2, 3, 5, 7, 1, 4, 1) **(10)**

OR

B. Represent following graph using Depth First Search representation along with its algorithm **(10)**