PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
MCA Summer 2018 – 19 Examination

Semester: 03   **Date: 03/05/2019**
Subject Code: 05201205   **Time: 10:30am To1:00pm**
Subject Name: Analysis and Design of Algorithms   **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Answer the followings.

A. Write short notes.   **(05)**
   1. The Space factor when determining the efficiency of algorithm is measured by _____.
   2. What are the operations which are focused by algorithms?
   3. A _____algorithm works by recursively breaking down a problem into two or more sub-problems.
   4. Define live node.
   5. Define vertices and edges in a graph.

B. Multiple choice type questions/ Give the sentence true or false. (Each of 01 marks)   **(10)**
   1. The graphs represented using a sequential representation using matrices is called _____.
      (a) Adjacency Matrix   (b)Strassen Matrix
      (c) Cycle   (d) Directed Graph
   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 worst-case time complexity of Quick Sort is_____.
      (a). $O(n^2)$ (b). $O(n)$
      (c). $O(\log n)$ (d). $O(n \log n)$
   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 bottom up 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. Queue follows _____ structure.
      (a) LIFO   (b) FIFO
      (c) FILO   (d) LILO
   10. Which of the following is nonlinear data structure?
       a) Stacks   b) list   c) Graph   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.

    0 2 4 13
    1 0 6 4
    15 7 0 8
    6 3 12 0

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)

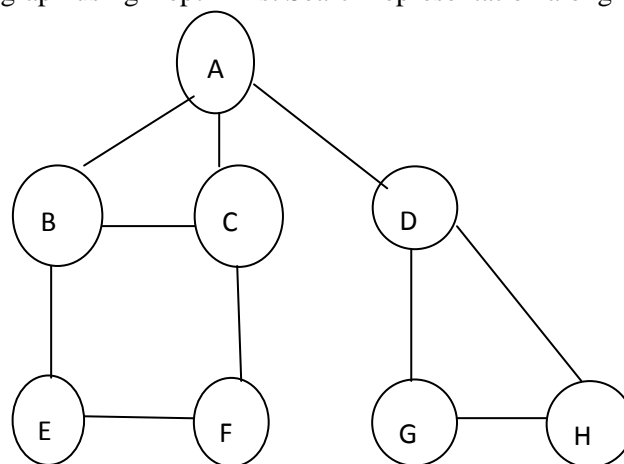**Q.4 Answer the following.**

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)