

PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
MCA Winter 2017 – 18 Examination

Semester: 3**Subject Code: 05201205****Subject Name: Analysis and Design of Algorithms****Date: 03/01/2018****Time: 10.30am to 01.00pm****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. What is asymptotic analysis?
2. What is performance measurement?
3. What is general characteristic of greedy algorithms?
4. Define order of an algorithm.
5. What is algorithm?

B. Multiple choice type questions/ Give the sentence true or false.**(10)**

1. Breadth First Search starts traversal from the root node and then explore the search in the level by level manner. True/False.
2. Expanded node is a generated node that is not to be expanded or explored any further. True/False.
3. Live node is a node that has been generated but whose children have not yet been generated. True/False.
4. A null graph is a simple undirected graph in which every pair of distinct vertices is connected by a unique edge. True/False..
5. Time complexity of binary search algorithm is:
 - a. $O(\log n)$
 - b. $O(n \log n)$
 - c. $O(n)$
 - d. $O(n^2)$
6. Time complexity of quick sort algorithm is:
 - a. $O(\log n)$
 - b. $O(n \log n)$
 - c. $O(n)$
 - d. $O(\log n^2)$
7. A connected acyclic graph with N vertices has _____ edges.
 - a. N
 - b. $N - 1$
 - c. $N - 2$
 - d. $N - 3$
8. Knapsack problem is example of _____.
 - a. Divide and conquer
 - b. Greedy algorithm
 - c. Dynamic programming
9. Binary search algorithm requires sorted array. True/False.
10. In a tree, node having zero children is called _____.
 - a. Root
 - b. Parent
 - c. leaf
 - d. branch

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

1. Define dynamic programming.
2. Define divide and conquer.
3. Analyze the time complexity of following algorithm:
 $C=0;$
 $\text{for}(i=0; i < N; i++)$
 $\quad \text{for}(j=N/2; j > 0; j--)$
 $\quad \quad C++;$

(02)

4. How is complexity of an algorithm defined? (3)
5. Solve matrix chain multiplication for following matrices:
A1 – 25 X 30
A2 – 30 X 35
A3 – 35 X 10
A4 – 10 X 15 (3)
- Generate M table**
6. Differentiate between Breadth First Search and Depth First Search. (3)
- Q.3 Answer the following. (Any three) (15)**
1. Explain Depth First Search algorithm.
 2. Write a short note on Knapsack problem and its solution.
 3. What is Branch-and-Bound? Explain FIFO Branch-and-Bound and LIFO
 4. What is backtracking? Explain N-queen problem algorithm. Solve 4-queen problem.

Q.4 Answer the following.

- A. Explain dijkstra's algorithm. (05)
- B. What is Minimal Spanning Tree? What is purpose of kruskal's algorithm? Write and explain kruskal's algorithm and its complexity. (10)

OR

Define following terms:

1. Big Oh
2. Omega (Ω)
3. Theta (θ)
4. Input size
5. NP-hard class (10)