Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

## MCA (2013 and 2014 Batch) (Sem.-2) DATA STRUCTURES Subject Code : MCA-203 Paper ID : [B0135]

## Time: 3 Hrs.

Max. Marks : 100

## **INSTRUCTION TO CANDIDATES :**

- 1. SECTIONS-A, B, C & D contains TWO questions each carrying TWENTY marks each and students has to attempt any ONE question from each SECTION.
- 2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

# **SECTION-A**

- Q1. What is Algorithm Complexity? How is it measured? Discuss the time space trade off by taking suitable example.
- Q2. What is Stack? What are its applications? Explain how stack is implemented using linked list.

## **SECTION-B**

- Q3. What is Tree? What are its different types? Explain how tree is represented in memory?
- Q4. Explain the following :
  - a) B+ Tree and its applications.
  - b) Traversal of Tree.

## **SECTION-C**

- Q5. Define Graph. How is it different from a tree? Explain how graph is represented in memory. What are the different types of graphs?
- Q6. Write and explain Dijkastra's algorithm for finding shortest path in a graph.

#### **SECTION-D**

- Q7. What is searching? Write and explain an algorithm to search an item from an array using linear search technique. Discuss its complexity.
- Q8. What is Selection Sort? Write and explain the working of selection sort for sorting the following list of numbers: 44, 22, 76, 12, 52, 115, 35, 6, 98, 62.

#### **SECTION-E**

#### **Q9.** Answer briefly :

- a) Define data structure.
- b) What is recursion? What are its limitations?
- c) What is doubly linked list?
- d) Define priority queue. What are its uses?
- e) Write an algorithm to delete a node from singly linked list.
- f) Define the terms Path Matrix and Strongly connected components in graph.
- g) Explain how stack is different from queue.
- h) Write the complexity of bubble sort, quick sort and insertions sort algorithms.
- i) What is Adjacency list?
- j) What is the difference between DFS and BFS?