

Roll No. ....

Total No. of Questions : 09]

[Total No. of Pages : 02

MCA (Sem. - 2<sup>nd</sup>)

DATA STRUCTURES

SUBJECT CODE : MCA - 203 (2012 Batch)

Paper ID : [B0135]

Time : 03 Hours

Maximum Marks : 100

**Instruction to Candidates:**

- 1) Attempt any One question each from Sections A, B, C & D.
- 2) Section - E is compulsory.
- 3) All questions carry equal marks.

**Section - A**

**Q1)** Write a program in C++ to implement a Stack. It should be possible to insert and delete elements in a stack and also be able to count the no. of elements in the stack through the program.

**Q2)** Define Circular queue and Priority queue. Also explain various operations possible on a Circular Queue with the help of algorithms.

**Section - B**

**Q3)** Define Binary search tree. Write an algorithm to search for a particular element in a given binary search tree. Explain it with the help of an algorithm.

**Q4)** Explain the Pre-order and Post-order traversal algorithms of tree with the help of an example.

**Section - C**

**Q5)** Write a short note on :

- a) Graph representation using Adjacency matrix.
- b) Breadth - First Search algorithm.

**Q6)** Write the Dijkstra's Algorithm for shortest path calculation of a graph. Explain it with the help of an example.

**R-1375**

**P.T.O.**

**Section - D**

**Q7)** Sort the given list of numbers using quick sort.  
44, 77, 33, 11, 45, 66, 22, 88, 99, 37.

**Q8)** Define heap. Write an algorithm to perform heap sort on a given list of numbers.

**Section - E**

- Q9)**
- a) What do you mean by time space trade off?
  - b) What is the purpose of garbage collection?
  - c) Differentiate between arrays and linked lists.
  - d) What is the significance of height balanced tree?
  - e) List various types of graphs.
  - f) What is depth - first search?
  - g) List the limitations of Binary search algorithm.
  - h) How is selection sort different from insertion sort?
  - i) Explain the concept of merge sort.
  - j) Define hashing.



**R-1375**

**2**