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Total No. of Questions : 09]

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## Paper ID [MC302]

(Please fill this Paper ID in OMR Sheet)

MCA (Sem. - 3<sup>rd</sup>)

DATA STRUCTURE (MCA - 302)

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Attempt any One question from each Sections - A, B, C, & D.
- 2) Section - E is compulsory.

### Section - A

(1 × 10 = 10)

- Q1) Write an algorithm to delete the second last element of a linked list.
- Q2) What are deques and priority queues? Explain insertion and detection in a circular queue.

### Section - B

(1 × 10 = 10)

- Q3) How an AVL tree differs from a binary search tree? How AVL are represented in computer memory.
- Q4) Write an algorithm to find the depth of a binary tree?

### Section - C

(1 × 10 = 10)

- Q5) Write a program in C, when a graph is represented with the help of an adjacency matrix in the RAM to insert and delete an edge/vertex in a given graph.
- Q6) What objective should be sought in the design of a hash function? What are the different advantages and disadvantages of open addressing over chaining?

### Section - D

(1 × 10 = 10)

- Q7) Sort the following data items using insertion sort:  
44, 22, 76, 12, 52, 115, 35, 6, 98, 62
- Q8) What do you mean by an heap? Write an algorithm for a heapsort.

**Section - E**

**(10 × 2 = 20)**

- Q9)**
- a) What is recursion? What are its drawbacks?
  - b) What is a stack? Explain different operations on stack.
  - c) Explain the difference between array and linked list in terms of insertion and searching of any data item.
  - d) In finding out the complexity of any algorithm, explain the time space trade-off?
  - e) Define the terms Path Matrix and Strongly connected.
  - f) Differentiate between Binary and Binary Search Tree.
  - g) Describe the BIG Oh notation.
  - h) What do you mean by doubly linked list?
  - i) Which is more efficient Breadth first Search or Depth first Search? Why?
  - j) How does Heap sort work?

