

Roll No:

Total No. of Questions :09]

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Paper ID [B0112]

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MCA (Sem. - 3rd)

DATA STRUCTURE (MCA - 302)

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Attempt any one question from each Section A, B, C & D.
- 2) Section - E is **Compulsory**.

Section - A

(1 × 10 = 10)

Q1) Suppose the names of few students of a class are as below

RAM, Sham, Mohan, Sohan, Vimal, Komal

It is assumed that the names of the students is represented as a single link list

- (a) Write a algorithm/program in C to insert the name of a student RAMAN between Sham and Mohan. Represent it graphically also
- (b) Write a algorithm/C routine to delete the name Vimal from the list of the students. Represent it graphically also

Q2) What are the various operations possible on queue. Explain with the help of algorithm

Section - B

(1 × 10 = 10)

Q3) What are the various binary tree traversal techniques. Discuss with example and algorithm.

Q4) (a) Suppose a binary tree T is in the memory. Write a recursive algorithm which find the number of nodes in T.

(b) What is binary search tree? How is it represented.

Section - C

(1 × 10 = 10)

Q5) Explain the following:

- (a) Adjacency Matrix
- (b) Traversal of a Graph.

Q6) Explain the Dijkstra's algorithm for shortest distance

Section - D

(1 × 10 = 10)

Q7) Explain the merge sort and bubble sort algorithms

Q8) Suppose a sequence of numbers is given like:

5, 10, 12, 18, 56, 68, 82, 85, 95

- (a) What are the various steps in which the number 85 will be found by the Binary search.
- (b) In how many steps the number 85 will be found in the linear search.
- (c) In how many steps it will be found in the binary search that the number 64 does not exist in this array in the array. Explain the algorithms also

Section - E

(10 × 2 = 20)

- Q9)**
- a) How a heap is created.
 - b) What are the front and rear pointers of queue?
 - c) What is need for Garbage collection?
 - d) What is the best and average case of binary search?
 - e) What is a Big O notation?
 - f) What is need for time complexity?
 - g) What is a threaded binary tree?
 - h) What is an AVL Tree?
 - i) How a binary tree can be represented as array structure.
 - j) What is a B Tree?

