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Total No. of Questions : 09

MCA (2019) (Sem.–2)

DATA STRUCTURES

Subject Code : MCA-203

M.Code : 72878

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTIONS-A, B, C & D contains TWO questions each carrying TEN 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.**
3. **Use of non-programmable scientific calculator is allowed.**

SECTION-A

1. a) Define stack. Briefly explain the primitives operations on stack. (5)

   b) Explain the working of simple queue. (5)

2. Explain a doubly linked list. What are the pros and cons over a singly linked list? (10)

SECTION-B

3. Write an algorithm to traverse a pre-order Threaded Binary Tree. (10)

4. Write an algorithm to construct a binary tree for the inputs

   14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, 5

   Indicating a message for duplicate members. Draw the tree constructed by the above program. (10)

SECTION-C

5. Write an algorithm for Dijkstra's shortest distance algorithm with example. (10)

6. What is adjacency matrix? Discuss the graph representation using matrix and lists. (10)

SECTION-D

7. Write an algorithm to sort a set of elements using address calculation radix sort. (10)

8. What is Hashing? What are the various hash functions? Discuss each with the help of suitable example. (10)

SECTION-E

9. Write briefly :

a) Define Omega notation for complexity.

b) Which linear data structure is not conductive for insertion and deletion?

c) What is a string? How string is initialized and declared?

d) Explain the working of simple queue.

e) Give the node structure of an expression tree.

f) Define complete b-tree.

g) Define Heap Sort.

h) Define Trade-off of Algorithm.

i) Define Array Pointers.

j) What are Graph operations?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.