R

11099/NJ

D–21/2111

DATA STRUCTURES AND ALGORITHMS

Paper–203

Semester–III

(Only for ECM)

Time Allowed : 3 Hours]   [Maximum Marks : 50

Note : The candidates are required to attempt **three** questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.
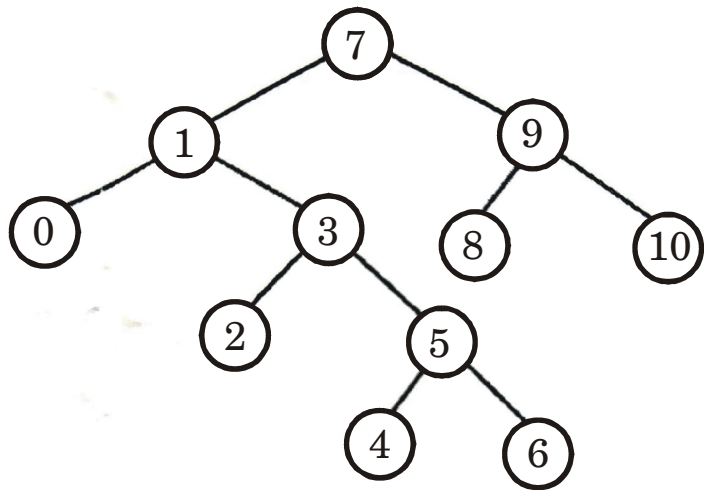
SECTION—A

1. Describe the procedure to access the Array elements. Also list the pros and cons of Arrays.   5
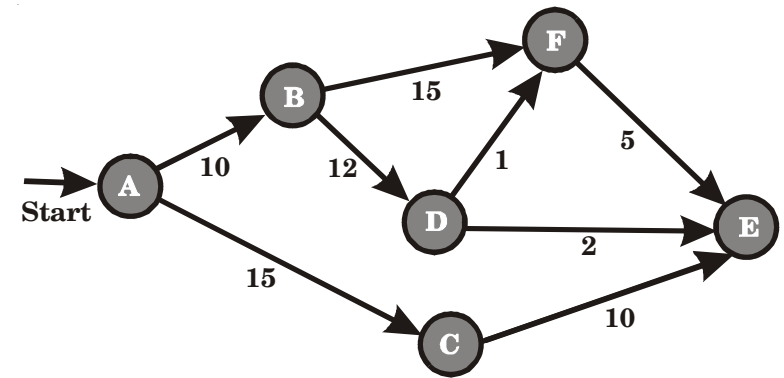
2. What is Stack? Why is it known as LIFO? Write algorithm of PUSH, POP, ISFULL and ISEMPTY operation on stack.   5

3. What is Doubly Linked list? Write an algorithm to insert and delete a node in Doubly Linked List.   5

4. Apply Merge sort and Radix sort on the following Data and show the contents of the array every pass :   5

   55, 23, 67, 17, 81, 100, 94, 53, 44, 30.

5. Describe the procedure in detail to delete items from a hash table.   5

SECTION—B

6. What are Binary Trees? Find the in-order, pre-order and post-order traversal of Binary Tree shown in figure :   5

7. Describe the process of deletion of nodes from Binary Search Tree using appropriate examples.

5

8. What are Graphs? Describe different types of graphs in detail.

5

9. Use Dijkastra's algorithm to find the shortest path in the below graph using vertex A as the source.

5

10. What is File system? Explain File system architecture in detail.

5

SECTION—C

11. Answer the following questions : 10×2=20

    (i) Differentiate linear and non-linear Data structure.

    (ii) What is Pseudocode? How it differs from an Algorithm?

    (iii) Convert following infix expression to prefix expression : $((a+b)/d)-((e+f)+g)$.

(iv)   What are the advantages and disadvantages of linked list Data structure over an array?

(v)   What is the advantage of binary search over linear search?

(vi)   Differentiate between comparison based sorting and Non-comparison based sorting.

(vii)   What is Max heap?

(viii)   Why do hash functions need to be simple?

(ix)   What is BFS? How it differs from DFS?

(x)   What is the relationship between file organization and file management system?