BACHELOR OF COMPUTER APPLICATION
Second Semester
DATA STRUCTURE THROUGH C
(BCA- 07)

Duration: 3Hrs.

Full Marks: 70

PART A (Objective) =20
PART-B (Descriptive)=50

PART-B (Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

1. Answer the following questions (any five):   2×5=10

    a) What is an algorithm? Define complexity.
    b) What is recursion?
    c) Define Deque and Priority Queue.
    d) What do you mean by a Linked list? How is a linked list represented in memory using an array?
    e) Explain a Threaded binary Tree.
    f) What do you mean by a Binary search Tree?
    g) What is a Graph? When is a Graph said to be connected?

2. Answer the following questions (any five):   3×5=15

    a) Consider the infix expression Q: A+(B*C-(D/E ^F)*G)*H. Transform Q into its equivalent postfix expression P.
    b) Define i) Header Linked list ii) Doubly Linked list iii) Circular Linked list.
    c) Write down the inorder, preorder and postorder traversal of the following binary tree:
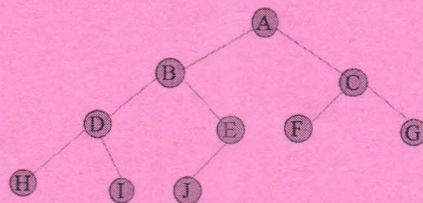
d) What is the difference between a strictly binary tree and a complete binary tree?

e) Define the following: i) Degree of a node ii) Path iii) Height of a tree

f) Define the following: i) Weighted Graph ii) Multigraph iii) Directed Graph

g) Write an algorithm to insert an element into a Linear array.

3. Answer the following questions (any five):   5×5 =25

a) Write an algorithm to perform push() and pop() operation on a stack.

b) Write an algorithm to insert an element into a queue.

c) Write a function in C to create a single linked list.

d) Write a function in C for the binary search method.

e) Insert the following nodes in an AVL tree: jan, feb, mar, apr, may, jun, jul, aug, sep, oct, nov, dec.

f) Write an algorithm for the Breadth-First search method.

g) Write an algorithm to sort elements using Insertion sort method.

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Duration: 20 minutes   **Marks – 20**

PART-A (Objective)

Time: 20 mins   **Total Marks: 20**

I. Choose the correct answer from the following: **1×20=20**

1. Two main measures for the efficiency of an algorithm are-
   a) Processor and memory   b) Complexity and Capacity
   c) Time and Space   d) Data and space

2. Which of the following data structure is not a linear data structure?
   a) Arrays   b) Linked lists
   c) Both of above   d) None of above

3. Which of the following data structure is a linear data structure?
   a) Trees   b) Graphs   c) Arrays   d) None of above

4. The operation of processing each element in the list is known as
   a) Sorting   b) Merging   c) Inserting   d) Traversal

5. Finding the location of the element with a given value is
   a) Traversal   b) Search   c) Sort   d) None of above

6. Stack is an ordered collection of items forming a list that is:
   a) Top-in-first-out   b) One-end-first-out
   c) Last-in-first-out   d) None of above

7. Queue is an ordered collection of items forming a list that is:
   a) Last-in-first-out   b) First-in-first-out
   c) First-in-last-out   d) None of above

8. In the postfix expression evaluation of the operations is performed:
   a) According to preset convention   b) From left to right
   c) As set by parentheses   d) All of above

9. The postfix form of the expression (A*B)*(C+D)
   a) ABCD**+   b) AB*CD+*
   c) AB*CD*+   d) None of above

10. Elements on a dequeue can be added or removed:
    a) At either end   b) In the middle
    c) Both a and b   d) None of above

11. A linked list whose last node points back to the first node is called:
    a) Circular list   b) Two-way-list
    c) Two-way-header list   d) None of above

12. What is the depth of the tree in Fig.:1?

Fig.:1

    a) 6   b) 5   c) 3   d) 7

13. In Fig.:1, degree of the tree is:
    a) 0   b) 1
    c) 2   d) 3

14. In a graph if e=[u,v] , then u and v are called
    a) End points of e   b) Adjacent nodes
    c) Neighbours   d) All of above

15. To represent heirarchical relationship between elements which data structure is suitable?
    a) Deque   b) Priority queue
    c) Tree   d) All of above

16. A binary tree whose every node has either zero or two children is called
    a) Complete binary tree   b) Binary search tree
    c) Threaded tree   d) None of above

17. An algorithm that calls itself directly or indirectly is known as
    a) Sub algorithm   b) Recursion
    c) Polish notation   d) Traversal algorithm

18. In a binary tree certain null entries are replaced by special pointers which point to nodes higher in the tree. These special pointers are called

    a) Leaf   b) Branch

    c) Path   d) Thread

19. A height-balanced tree is also called a

    a) Binary tree   b) B-Tree

    c) AVL tree   d) None of above

20. Which of the following data structures a Depth-fist-search algorithm uses

    a) Stack   b) Queue

    c) Both a and b   d) None of above

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