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**Sem. - 4th**

**Branch : Computer Engg.**

**Subject : Data Structure using C**

Time : 3 Hrs.

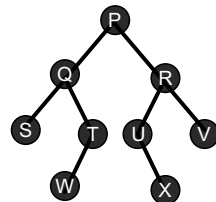
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**SECTION-A**

**Note:** Multiple Choice Questions. All questions are Compulsory.  
(10x1=10)

Q.1 Find the postorder traversal of the binary tree shown below. (CO-5)

- a. PQRSTUUVWX
- b. WRSQPVTUX
- c. SWTQXUVRP
- d. STWUXVQRP



Q.2 To obtain a prefix expression, which of the tree traversals is used? (CO-5)

- a. Level-order traversal
- b. Pre-order traversal
- c. Post order traversal
- d. In-order traversal

Q.3 Which of the following traversing algorithm is not used to traverse in a tree? (CO-5)

- a. Post Order
- b. Pre Order
- c. All of the above
- d. Randomized

Q.4 When do you use a sparse array? (CO-2)

- a. When there are unique elements in the array.
- b. When the array has more occurrence to zero elements.
- c. When the data type elements differ.
- d. When elements are sorted.

Q.5 What will be in the output screen if the following sequence of operations are executed? (CO-4)

Push (a,s.);

Push (b,s.);

Pop ();

Push (c,s);

a. Abc

b. b

c. ac

d. acb

Q.6 Variable that stores the address of another variable is called (CO-1)

a. Pointer

b. Array

c. Stack

d. Function

Q.7 Array is a \_\_\_\_ data structure. (CO-2)

a. Linear

b. Non Linear

c. Both of above

d. None of the above

Q.8 PUSH operation in a already full stack may result in (CO-4)

A. Overflow

a. Underflow

b. Element will be inserted

c. None of these

Q.9 In infix to postfix conversion when an operand is read, which of the following is done? (CO-5)

a. It is placed on to the output.

b. It is placed in operator stack

c. It is ignored

d. Operator stack is emptied.

Q.10 Of the following choices, which operator has the lowest precedence? (CO-1)

a. ^

b. +

c. /

d. #

**SECTION-B**

**Note:** Objective type Questions. All Questions are compulsory.  
(10x1=10)

Q.11 The identifier whose value does not change during execution of program is called \_\_\_\_ (CO-1)

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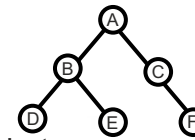
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- Q.12 For a linear array A(15, 16, 27 \_\_\_\_, 25). Find the total number of elements. (CO-2)
- Q.13 When the function calls itself it is called \_\_\_\_ (CO-1)
- Q.14 Linked list is a \_\_\_\_ data Structure. (CO-3)
- Q.15 Node of a linked list contains \_\_\_\_ and \_\_\_\_ parts. (CO-3)
- Q.16 Expand the term LIFO \_\_\_\_ (CO-4)
- Q.17 Deletion operations in a Stack is called \_\_\_\_ (CO-4)
- Q.18 Give an example of sorting method which uses partitioning. (CO-6)
- Q.19 Give the post fix notation of the given infix notation.  $A + B / C - D$ . (CO-5)
- Q.20 Each node of a binary tree can have at most \_\_\_\_ children. (CO-5)

## SECTION-C

**Note:** Short Answer type Question. Attempt any twelve questions out of fifteen Questions. (12x5=60)

- |      |  |        |
|------|--|--------|
| Q.21 | Explain the various types of data structures.                            | (CO-1) |
| Q.22 | Give five differences between a Array and a Linked List.                 | (CO-3) |
| Q.23 | Explain linear and non linear data structures.                           | (CO1)  |
| Q.24 | Give algorithm for adding a element in the beginning of the linked list. | (CO-3) |
| Q.25 | Define Array. Give algorithm for traversing an array.                    | (CO-2) |
| Q.26 | Give algorithm for deleting an element form the stack.                   | (CO-4) |
| Q.27 | What is the limitation of a linear queue. How is it removed.             | (CO-4) |
| Q.28 | Give inorder, postorder and preorder traversal of the following tree.    | (CO-5) |



- Q.29 Give difference between sequential search and binary search. (CO-6)
- Q.30 Sort the following list of elements using bubble sort. Show result after each step. (CO-6)  
16 15 12 19 18 50 17
- Q.31 Define the following terms (CO-5)
- a. Binary Tree
  - b. Balanced Binary Tree
  - c. Complete Binary Tree
- Q.32 Give the algorithm to insert an element in a array. (CO-2)
- Q.33 Discuss the underflow and overflow conditions in Data Structures? (CO-4)
- Q.34 Give the algorithm for evaluation of an expression? (CO-4)
- Q.35 Discuss the following terms associated with a tree (CO-5)
- 1. Path
  - 2. Level
  - 3. Degree of a Node
  - 4. Terminal Node
  - 5. Root Node

## SECTION-D

**Note:** Long Answer Type Questions. Attempt any Two Questions out of three Questions . (2x10=20)

- Q.36 What are different types of Arrays? Explain how element of arrays are stored in memory? (CO-2)
- Q.37 Explain binary search technique with suitable example? Give algorithm. (CO-6)
- Q.38 Convert the following expressions into postfix notation using Stack. (CO-4)
- $A + B * C + D / E - F$

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**4th Sem. / Trade : Computer Engg.**

**Subject : Data Structure using C**

Time : 3 Hrs.

M.M. : 100

**SECTION-A**

**Note:** Objectives questions. All questions are compulsory (10x1=10)

- Q.1 The identifier whose value does not change during execution of program is called \_\_\_\_\_ (CO-1)
- Q.2 For a linear array A [15, 16, 27, ....., 25], Find the total number of elements. (CO-2)
- Q.3 When the function calls itself it is called \_\_\_\_\_ (CO-4)
- Q.4 Linked list is a \_\_\_\_\_ data Structure. (CO-3)
- Q.5 Node of a linked list contains \_\_\_\_\_ and \_\_\_\_\_ parts. (CO-3)
- Q.6 Expand the term LIFO \_\_\_\_\_ (CO-4)
- Q.7 Deletion operation in a Stack is called \_\_\_\_\_ (CO-4)
- Q.8 Give an example of sorting method which uses partitioning. (CO-6)

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- Q.9 Give the post fix notation of the given infix notation.  $A+B / C - D$  (CO-4)

- Q.10 Each node of a binary tree can have at most \_\_\_\_\_ children. (CO-5)

**SECTION-B**

**Note:** Very Short answer type questions. Attempt any ten parts 10x2=20

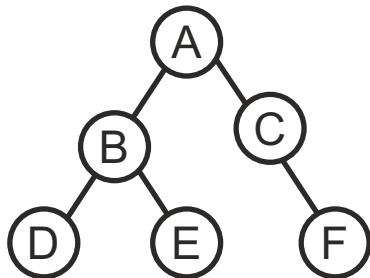
- Q.11 Define Algorithm (CO-1)
- Q.12 Name any four linear data Structures (CO-1)
- Q.13 Define linked list. (CO-3)
- Q.14 What are the various operations that can be performed on an Array. (CO-2)
- Q.15 Give the formula for calculating the address of an element in column Major form representation of array. (CO-2)
- Q.16 Give the node structure of a linked list. (CO-3)
- Q.17 Define Queue. (CO-4)
- Q.18 Give two applications of a stack. (CO-4)
- Q.19 Define Complete Binary Tree. (CO-5)
- Q.20 Define Degree of a Tree (CO-5)
- Q.21 What is the precondition for performing binary search operation on a given list of elements. (CO-6)
- Q.22 What are the advantages of Doubly Linked List. (CO-3)

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### SECTION-C

**Note:** Short answer type questions. Attempt any eight questions. 8x5=40

- Q.23 Explain the various types of data structures. (CO-1)
- Q.24 Give five differences between a Array and a Linked List. (CO-2)
- Q.25 Explain linear and non linear data structures. (CO-1)
- Q.26 Give algorithm for adding a element in the beginning of the linked list. (CO-3)
- Q.27 Define Array. Give algorithm for traversing an array. (CO-2)
- Q.28 Give algorithm for deleting an element form the stack. (CO-4)
- Q.29 What is the limitation of a linear queue. How is it removed. (CO-4)
- Q.30 Give inorder, postorder and preorder traversal of the following tree. (CO-5)



- Q.31 Give differences between sequential search and binary search. (CO-6)

- Q.32 Sort the following list of elements using bubble sort. Show result after each step. (CO-6)

6 10 2 9 1 5 7

### SECTION-D

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

- Q.33 What are different types of Arrays? Explain how element of arrays are stored in memory? (CO-2)
- Q.34 Explain Sequential search technique with suitable example? Give algorithm. (CO-6)
- Q.35 Convert the following expressions into postfix notation using Stack (CO-4)

$A + B * C + D / E - F$

- Q.36 Write short note on (CO-1)
- a) Structured programming
  - b) Tower of Hanoi

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**4th Sem. / Computer**

**Subject : Name: Data Structures using C**

Time : 3 Hrs.

M.M. : 100

**SECTION-A**

**Note:** Objectives type questions. All questions are compulsory. (10x1=10)

- Q.1 Data structure means\_\_\_\_\_. (CO2)
- Q.2 Define data type. (CO3)
- Q.3 Define the terms siblings. (CO5)
- Q.4 Write the use of pointers. (CO3)
- Q.5 Tree is a \_\_\_\_\_data structure (liner/nonliner). (CO5)
- Q.6 Define leaf node. (CO5)
- Q.7 An array may be a collection of similar data (True/false). (CO3)
- Q.8 What is meant by an index of an array.(CO3)
- Q.9 Variable that stores the address of another variable is called\_\_\_\_\_. (CO3)

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Q.10 LIFO stands for\_\_\_\_\_. (CO3)

**SECTION-B**

**Note:** Very Short answer type questions. Attempt any ten questions out of twelve questions. (10x2=20)

- Q.11 Differentiate between variable and constant. (CO3)
- Q.12 What do you mean by top down design. (CO2)
- Q.13 What is meant by heap. (CO4)
- Q.14 Write down two applications of stacks. (CO3)
- Q.15 What are circular queues. (CO3)
- Q.16 Give the use of recursion. (CO2)
- Q.17 Write the purpose of avail list in a linked list. (CO3)
- Q.18 Define structured programming. (CO2)
- Q.19 Name any three operations performed on linked list. (CO3)
- Q.20 Define path of a tree. (CO5)
- Q.21 Name three sorting algorithms. (CO6)
- Q.22 Define binary search. (CO6)

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## SECTION-C

**Note:** Short answer type questions. Attempt any eight questions out of ten questions. (8x5=40)

- Q.23 Write the applications of linked list. (CO3)
- Q.24 Explain in brief various types of arrays. (CO3)
- Q.25 Differentiate between stack and queue. (CO3)
- Q.26 Differentiate between prefix and postfix expression. (CO3)
- Q.27 Write an algorithm to PUSH an element into the stack. (CO1)
- Q.28 Write a program to print factorial of a number using recursion. (CO2)
- Q.29 When does underflow condition comes in data structure. (CO3)
- Q.30 What is meant by complete binary tree. (CO5)
- Q.31 Differentiate between linked list and array. (CO3)
- Q.32 Write an algorithm to delete an element from array. (CO1)

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## SECTION-D

**Note:** Long answer type questions. Attempt any three questions out of four questions. (3x10=30)

- Q.33 Explain in detail various operations associated with linked list. (CO3)
- Q.34 Write a program in C for multiplication of two matrices. (CO1)
- Q.35 Discuss the quick sort algorithm with an example. (CO6)
- Q.36 Write short note on the following: (CO3)
- (a) Doubly linked list.
  - (b) Application of queues.

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**4th Sem. / Computer**

**Subject : Data Structure Using C**

Time : 3 Hrs.

M.M. : 100

### **SECTION-A**

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

- Q.1
- a) Define primitive data structure.
  - b) Various that stores the address of another variable is called \_\_\_\_\_.
  - c) FIFO stands for \_\_\_\_\_.
  - d) "Two dimensional array has two subscript". This statement is true or false.
  - e) Deque stands for \_\_\_\_\_
  - f) What is root node.
  - g) Define height of a tree.
  - h) What is the use of header node.
  - i) "The last node of circular linked list contains the address of first node". This statement is true or false.

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- j) Write one difference between static and dynamic memory allocation.
- k) Write the purpose of avail list in a linked list.
- l) What is under flow?
- m) What do you mean by searching.
- n) Define complexity of an algorithm
- o) Why tree structure is known as a non-linear data structure?
- p) Give formula to calculate the size of one dimensional array.
- q) What is the significance of top in stacks.
- r) Define column major order.

### **SECTION-B**

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

- Q.2
- i) Write short note on:
    - a) Top down approach.
    - b) Bottom up approach.
  - ii) Distinguish between data structure and data type.

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- iii) Give the post order expression of  $A*B+C/D$ .
- iv) How elements of a queue can be removed .
- v) Explain various types of trees.
- vi) Differentiate between linear search and binary search.
- vii) Write down the representation of linked list in memory.
- viii) What do you mean by variable. Explain the difference between local variable and global variable.
- ix) Explain dequeue in brief
- x) What is bubble sort. Write its advantages and disadvantages .
- xi) Write down the post order tree traversal algorithm.
- xii) What are binary search trees? Write down its properties. Also give its advantage.
- xiii) How an element is deleted from a doubly linked list. Explain with an example.
- xiv) What is doubly linked list. What are its applications.
- xv) How two dimensional array are stored in memory.

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## SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

- Q.3 Explain heap sort along with its algorithm.
- Q.4 Explain how you will search an element from binary search tree.
- Q.5 What is recursion? Write an algorithm to find factorial of a no. using recursion.
- Q.6 Describe the various operations performed on data structure.
- Q.7 Differentiate between the following.
  - i) Iteration and recursion
  - ii) Linear data structure and non-linear data structure.

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**4th Sem. / Comp.**

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**SECTION-A**

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

Q.1 Define the following:-

- a) Top down design
- b) Data structure
- c) Global variables
- d) Constants
- e) Graphs
- f) Two dimensional array
- g) Lower Bound of array
- h) Index of array
- i) Doubly linked list

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- j) Circular queue.
- k) Polish Notation
- l) Recursion
- m) Extended Binary Tree
- n) Heap
- o) Linear Search
- p) Balanced Binary Tree
- q) Post order
- r) Leaf nodes

**SECTION-B**

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

- Q.2
- i) What is stack? Give the implementation of stack.
  - ii) What is structured programming.
  - iii) What are primitive and non primitive Data Structures.

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- iv) Differentiate between Linked list and array.
- v) Write down the applications of Linked list.
- vi) Differentiate between recursion and Iteration.
- vii) What is the difference between single dimension array and two dimension array?
- viii) Why under flow condition comes in any data structure?
- ix) What are the difference between constant and variables?
- x) Explain any two applications of stack.
- xi) Write sequential search algorithm.
- xii) Write method for conversion from infix to postfix notation.
- xiii) Explain pop operation of stack. Write an algorithm of this operation.
- xiv) What is a Tree? What is height and path of a tree. Explain with example.

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- xv) What is sorting? Write an algorithm for insertion sort.

### SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

- Q.3 What is selection sort? Explain its working by taking suitable example.
- Q.4 What do you mean by sequential and linked representation of binary tree in memory. Explain.
- Q.5 List various operations associated with linked list.
- Q.6 Write an algorithm to delete an element in a linear array.
- Q.7 Explain how you will insert an element into binary search tree.

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**4th Sem. / Computer Engg.**  
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**SECTION-A**

**Note:** Very Short Answer type questions. Attempt any 15 parts. (15x2=30)

- Q.1
- a) Variable.
  - b) Algorithm.
  - c) File.
  - d) Stack.
  - e) Pre order Traversal.
  - f) Pointer.
  - g) Circular Queue.
  - h) Siblings.
  - i) Sorting.

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- j) Linked list.
- k) Base address of Array.
- l) Path of a Tree.
- m) Binary Search.
- n) Height of a Tree.
- o) Upper bound of an Array.
- p) Priority queue.
- q) Insertion Sort.
- r) Tower of Hanoi.

**SECTION-B**

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

- Q.2
- i) What is extended binary tree?
  - ii) Explain Doubly Linked list.
  - iii) Define recursion. Explain with example.
  - iv) Explain various operations performed on Array.

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- v) Difference between Stack & Queue.
- vi) Write an algorithm to delete an element in queue.
- vii) Difference between infix, Prefix & Postfix expression.
- viii) Explain Radix Sort.
- ix) Explain insertion Sort technique.
- x) How linked list is represented in memory.
- xi) Write an algorithm to insert an element at the end of Linked List.
- xii) Write the applications of Linked List.
- xiii) Write an algorithm to delete an element from Array.
- xiv) When does Underflow condition comes in Data Structure.
- xv) Convert the following expression in PREFIX.

$$A-(B+C-(D * E) / H)$$

## SECTION-C

**Note:** Long answer type questions. Attempt any three questions. 3x10=30

- Q.3 Explain Circular Queue with examples. Write an algorithm to insert & delete an element in circular queue.
- Q.4 Write a program for multiplication of two matrices.
- Q.5 Explain how an element is inserted in Binary Search Tree.
- Q.6 Explain various operations associated with Linked List.
- Q.7 Write short notes on :-
  - (a) Structured Programming
  - (b) Operations on Stack.