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BCACACN 202

**Second Semester B.C.A. Degree Examination, September 2022
(NEP – 2020) (2021 – 22 Batch Onwards)
DATA STRUCTURE USING C (DSCC)**

Time : 2 Hours

Max. Marks : 60

Note : Answer **any six** questions from Part – A and **one full** question from **each** Unit in Part – B.

PART – A

1. a) Define linear data structure and non linear data structure. (2×6=12)
- b) What is sparse matrix ? Give example.
- c) What is a Circular Linked List ? Give diagrammatic representation of a circular linked list.
- d) Differentiate linear search and binary search.
- e) Define Dequeue. What are its types ?
- f) Write prefix and postfix of :
(X + Y/Z * W ^ P).
- g) What is binary search tree ? Give an example.
- h) Define the following :
 - i) Leaf node
 - ii) Directed graph.

**PART – B
Unit – I**

2. a) Given a two dimensional array A[10] [20], base address of A being 1000 and width of each element is 4 bytes, find the location of A[8] [10] when the array is stored in (i) row wise (ii) column wise.
- b) List the properties of recursive function. Write a recursive algorithm to find the factorial of a number.
- c) Write bubble sort algorithm. Explain with an example. (4+4+4)

P.T.O.



3. a) Explain the memory representation of one dimensional array.
b) Explain algorithmic notations for selection control structure.
c) Trace the following numbers using insertion sort :

70, 11, 33, 77, 88, 22.

(4+4+4)

Unit – II

4. a) Write and explain an algorithm to search for an element in a given list of N numbers using linear search method.
b) Explain with a neat diagram to delete a node following a given node in a singly linked list.
c) Explain memory representation of linked list in memory with a neat diagram.

(4+4+4)

5. a) Write a note on singly linked list.
b) Write binary search algorithm to search for an element in a given list of N numbers.
c) Write an algorithm to insert a node at the beginning of a singly linked list.

(4+4+4)

Unit – III

6. a) What is a Queue ? Write algorithms to insert and delete an item into/from a linear queue.
b) Evaluate the following postfix expression using STACK :

3, 1, +, 2, ^, 7, 4, -, 2, *, +, 5, -

(6+6)

7. a) What is a Stack ? Write algorithms to implement STACK operations using array.
b) Write and explain an algorithm to convert given infix expression to postfix expression using STACK with an example.

(6+6)



Unit – IV

8. a) Write recursive algorithms to perform preorder and postorder traversal of a binary tree.

b) Given the following traversals of a binary tree, write the corresponding binary search tree. Also write post order traversal.

PRE ORDER : A B C D E F G H I

IN ORDER : D C E B A F H I G

c) Write an algorithm for breadth first search for a graph. **(4+4+4)**

9. a) Draw a binary search tree for the following list of numbers and traverse it in Preorder, Inorder and Postorder :

40, 50, 33, 99, 22, 77, 60, 11, 55

b) What is adjacency matrix and path matrix ? Give an example for each.

c) Write an algorithm for a depth first search for a graph. **(5+3+4)**
