Reg. No. ☐☐☐☐☐☐☐☐☐☐☐☐

BCACACN 202

Second Semester B.C.A. Degree Examination, July/August 2023
(NEP 2020) (2021 – 22 Batch Onwards)
DATA STRUCTURES 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. Give an example. 　　　　　　　　**(6×2=12)**

　b) Consider the linear array AA(5:50). Find the number of elements in an array.

　c) What is sparse matrix ? Give example.

　d) Write one advantage and disadvantage of binary search.

　e) What is Linked List ? List the different types.

　f) Write the algorithm for POP operation in Stack using array.

　g) Define the terms with respect to tree :
　　　i) leaf node
　　　ii) depth of a tree.

　h) Define adjacency matrix.

PART – B

Unit – I

2. a) Write the classification of data structure and briefly explain it.

　b) Write an algorithm for Bubble sort.

　c) Explain the selection logic with example. 　　　　　　　　　　　**(4+4+4)**

3. a) Explain the representation of two dimensional array in memory.

　b) Trace the following list of numbers using selection sort technique :
　　77, 33, 44, 11, 88, 22, 66, 55. 　　　　　　　　　　　　　　　　**(6+6)**

Unit – II

4. a) What is Linear Search ? Write the algorithm for linear search.

   b) Explain any two dynamic memory allocation functions used in 'C' with syntax and example.

   c) Write the algorithm to insert a node at the beginning of the linked list. **(4+4+4)**

5. a) Explain binary search with an example.

   b) Write an algorithm to delete a node following a given node of a linked list.

   c) Explain the representation of linked list in memory. **(4+4+4)**

Unit – III

6. a) Write an algorithm to evaluate postfix expression using stack.

   b) Write an algorithm to perform insertion operation on queue using array.

   c) Convert the infix expression to postfix : $a * b - c \wedge d + e/f$. **(4+4+4)**

7. a) Using Stack convert the given infix expression to postfix.

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

   b) Write an algorithm for PUSH operation onto a Stack using Linked List.

   c) Evaluate the following Postfix expression showing the Stack status.
   P : 5, 6, 2, +, *, 1, 4, 2, /, ^, * **(4+4+4)**

Unit – IV

8. a) Draw the Binary Search Tree for the following numbers and Traverse it in Preorder, Inorder and Postorder :

   60, 40, 100, 80, 45, 35, 120, 105

   b) Explain the method of representing the graphs using sequential method with an example. **(6+6)**

9. a) Draw the binary tree for the expressions given below. Also traverse in preorder, postorder and inorder :

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

   b) Write an algorithm for breadth first search (BFS) for a graph. **(6+6)**