Reg. No.

BCACAC 232

**Choice Based Credit System Third Semester B.C.A. Degree
Examination, April/May 2022
(2020-21 Batch Onwards)
DATA STRUCTURES (Group – I)**

Time : 3 Hours   Max. Marks : 80

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

PART – A   (10×2=20)

1. a) Define non primitive data structure. Give example.

   b) What is tri-diagonal matrix ? Give example.

   c) Consider the linear array LA(1 :10), Suppose Base(LA) = 100 , W = 4
      words per memory. Find the address of LA[5].

   d) Define circular linked list ? Give its diagrammatic representation.

   e) Write one advantage and disadvantage of binary search.

   f) What is free storage list ?

   g) How does Stack differ from Queue ?

   h) What do you mean by polish and reverse polish notation ?

   i) Convert the given infix expression to prefix form (A + B) / (C – D).

   j) What do you mean by internal nodes and external nodes ?

   k) What are the two methods to implement graphs in memory ?

   l) Define adjacency matrix.

PART – B   (4×15=60)
Unit – I

2. a) List and explain any five algorithmic notations.

   b) Explain with an example how to represent polynomial using array.

   c) What do you mean by traversing a linear array ? Write the algorithm to
      traverse a linear array.   (5+5+5)

P.T.O.

3. a) List and explain various operations performed on data structures.

   b) Explain selection logic in detail.

   c) Write an algorithm to insert an element into a linear array.   **(5+6+4)**

Unit – II

4. a) Explain insertion sort with an example.

   b) Write an algorithm to insert an item after a given node of a linked list.

   c) Write an algorithm for selection sort.   **(6+4+5)**

5. a) Write an algorithm for bubble sort.

   b) Trace the following list of numbers using radix sort technique:

      348, 143, 361, 423, 538, 128, 321, 543, 366.

   c) Write a note on double linked lists.   **(5+6+4)**

Unit – III

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

   b) Write an algorithm to delete an element from a queue using linked list.

   c) Write a note on a) Priority queue   b) Deque.   **(5+5+5)**

7. a) Evaluate the following postfix expression showing the stack status.

      P : 5, 6, 2, +, *, 12, 4, /, -

   b) Write algorithm to perform PUSH and POP operations on stack.

   c) Write an algorithm to insert an element into a queue using arrays.   **(5+5+5)**

Unit – IV

8. a) With an example explain linked representation of binary tree.

   b) Draw the binary search tree for the following list of numbers and traverse it in preorder, inorder and postorder 66, 26, 22, 34, 47, 79, 48, 32, 78.

   c) Explain the method of representing the graphs using sequential method with an example.   **(5+5+5)**

9. a) Write an algorithm for Breadth First Search (BFS) for a graph.

   b) What is adjacency matrix and path matrix, explain with an example.

   c) Define the following terms with respect to binary tree.

      i) Complete binary tree ii) Leaf node iii) Siblings iv) Path

      v) Depth of a tree.   **(6+4+5)**