(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

SECOND SEMESTER [BCA] JULY 2023

Paper Code: BCA-106 **Subject: Data Structure and Algorithm Using C**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

Q1 **Answer the following:-** **(2.5x10=25)**

(a) Define an Algorithm.
(b) What is Dynamic Memory Allocation method?
(c) List down any four application of data structure.
(d) Define Stack and Queue.
(e) Define Graphs and Tree.
(f) Define the hash function.
(g) What are the asymptotic notations?
(h) Define the Acyclic graph.
(i) What are Binary Trees?
(j) Define adjacency matrix.

UNIT-I

Q2 (a) What is Sparse Matrix and how will you represent Sparse Matrix by 2D Array? **(8.5)**

(b) What is Time Complexity also write the Time Complexity of Selection Sort, Bubble Sort, Insertion Sort, Heap Sort, Quick Sort, Merge Sort, Radix sort? **(4)**

OR

Q3 (a) Consider the following array: Arr= 14, 33,27, 35, 10, Sort this array using Bubble sort Algorithm. **(9.5)**

(b) Explain in Simple term how Hash Tables are implemented? **(3)**

UNIT-II

Q4 (a) What is Dynamic Memory Allocation and how can you determine the size of an allocated portion of memory? **(6.5)**

(b) Write the Difference between: **(6)**
(i) Static and Dynamic Memory Allocation
(ii) Calloc() and Malloc()

OR

Q5 (a) Write a Program in C to create and Display a Singly Linked List. **(6.5)**

(b) Write an algorithm for Binary Search and also write a simple Binary Search Program in C. **(6)**

UNIT-III

Q6 (a) Write a Program to Reverse a String using Stack. **(6)**

(b) Write the steps to Convert Infix Expression to a Postfix Expression and Convert an Infix Expression exp="a+b*c+d" to Postfix Expression. **(6.5)**

OR

Q7 (a) Write a Short note on: **(6)**
(i) Linear Queue
(ii) Circular Queue
(iii) Priority Queue

(b) What is Abstract Data Types and its features, also write the advantages and Disadvantages of Abstract Data Types. **(6.5)**

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OR

Q8 (a) Convert the infix expression A × B + A × (B × D + C × E) into Polish notation? **(6.5)**

(b) Why and when should I use Stack or Queue data structures instead of Arrays/Lists? **(6)**

UNIT-IV

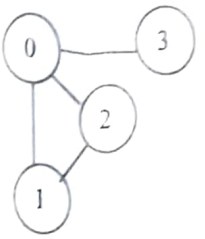
Q9 (a) Define the terms: **(8)**

(i) Graphs
(ii) Acyclic Graphs
(iii) AVL
(iv) Heap Tree

(b) What do you mean by degree of vertex? Define indegree and outdegree of vertex with example. **(4.5)**

OR

Q10 (a) What is Adjency Matrix, what are pros and cons of Adjency Matrix. Draw the Matrix representation of the graph for a given tree. **(8.5)**



(b) Explain how Heap Sort Works with the help of an example. **(4)**

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BCA-106
P2/2