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

# END TERM EXAMINATION

## SECOND SEMESTER [BCA] JUNE 2024

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

**Time: 3 Hours** **Maximum Marks: 60**

**Note: Attempt all questions as directed. Internal Choice is indicated.**

Q1 Answer the following **(Attempt any four)** **(4x5=20)**

(i) Give properties of good Algorithm. Explain how performance analysis of algorithm can be measured.

(ii) Explain all Dynamic memory allocation function with example

(iii) An array X [-15.....10, 15.....40] requires four byte of storage. If beginning location is 1300 determine the location of X [5][25] by using row major order and column major order.

(iv) Explain Adjacency Matrix and Adjacency List by taking a suitable example.

(v) Differentiate Linear and Non-linear data structure. Give four application of Data Structure.

(vi) Explain Binary Search Tree and construct a Binary Search Tree from the following set of letters.

**J, R, D, G, T, E, M, H, P, A, F, Q**

(vii) Explain the advantage and disadvantage of different types of queues.

(viii) Define hashing and explain at least four techniques to perform hashing and also give two methods of collision resolution.

### UNIT-I

Q2 a) Consider a given list of numbers in sorted order **(5)**

**10,20,30,40,50,60,70,80,90**

Write a program to search an element 80 in a given list using binary search. Show all the steps.

b) Write a program to perform the selection sort on the following list. Show all the pass. **(5)**

**45,67,23,30,42,15,78,39,48**

**OR**

Q3 Explain sparse matrix and its various types with example. Give function to convert it into its 3-tuple memory representation. **(10)**

### UNIT-II

Q4 Write a program in C to implement the following functions on Doubly linked list **(10)**

a) Insert a node at end

b) Delete a node from the beginning

c) Insert a node on the basis of information

**OR**

Q5 Write a program to do following operations on Single linked list **(2x5=10)**

a) Reversal of Linked List

b) Linear search on linked list

**P.T.O.**

## UNIT-III

Q6 a) Write an algorithm to convert infix expression to postfix expression. Convert the following infix expression into postfix expression using stack:
**A+ (B*C-(D/E^F)*G)*H** **(6)**
Note: ^ symbol is used for exponent.

b) Evaluate the following postfix expression
**ABC+DE*/- for A=2, B=5, C=3, D=2, E=4.**
Show stack at each step. **(4)**

**OR**

Q7 a) What is circular queue and State the advantage of Circular Queue over linear queue? Illustrate with any example. **(5)**

b) Write a program to implement insertion operation in a Circular Queue using array **(5)**

## UNIT-IV

Q8 a) Draw a tree T with the following traversals:
Inorder : **10, 25, 35, 40, 45, 61, 68, 71** **(5)**
Preorder: **45, 25, 10, 35, 40, 61, 71, 68**

b) Drawan AVL tree with the following sequence:
Insert: **20, 15, 25, 30, 16, 18, 19** **(5)**
Delete: **30**

**OR**

Q9 Create a B-Tree of order 5 for the following sequence of keys
**C S D T A M P I B W N G R K E H O L J Y Q Z F X V U** **(10)**

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