BCA [Honours]
[CBCS]
B.Sc. Third Semester End Examination-2023
(Regular & Supplementary Paper)
PAPER-C5T
Data Structure

Full Marks: 40   *Time: 02 Hrs*

The figures in the right hand margin indicate marks
Candidates are required to give their answers in their own words as
far as practicable
Illustrate the answers wherever necessary

Group A

1) Answer any FIVE questions of the following: 5x2= 10

i)   In array representation of binary tree, what will be the addresses of left child and right child of a node present at array index K?

ii) Show the graphical representation of a linked list conaining the polynomial $5 \cdot x^4 - 2 \cdot x^2 + 3 = 0$.

iii) In binary search, How many comparisons are required for an unsuccessful search in a sorted array of K elements?

iv) What is linear probe in hashing?

v) Justify the validity (or non validity) of the statement: "first node of preoreder traversal sequence and postorder traversal sequence of a given binary tree is same".

vi) Find the prefix representation of the of the arithmetic expression $(x-y)/((a-b) \times z)$

vii) Write one advantage and one limitation of Recursion.

viii) State best case, average case and worst case time complexity of selection sort?

Group B

Answer any FOUR questions of the following: 4x5 = 20

2) Consider an empty stack which can hold maximum three elements. Show the content of stack and top pointer after each of the following operations

   a. Pop( ),

   b. Push (5),

   c. Push (2),

   d. Push (7),

   e. Push (6), and

   f. Pop ( )

3) Consider that an input array B [ ] contains m elements. Write an algorithm to sort this array using insertion sort.

4) In-order traversal of a binary tree is H, A, C, E, D, L, G, K, M and the post order traversal of the same binary tree is H, A, E, L, D, C, M, K, G, Construct the binary tree.

5) What is the use of hashing data structure. When does collision occur in hashing? What is linear probing approach to resolve collision?   2+1+2

6) What are the steps to convert a general tree into binary tree?

7) Give the pre & postfix form of the expression (a+(b*(c-e))/f)

Group C

Answer any ONE question of the following: 1x10 = 10

8) a. Write recursive algorithm for pre-order and post-order traversals of a binary tree.   2½+ 2½

   b. Write an algorithm to delete a node from a non empty linked list.   5

9) Given the input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function of h (X)=X (mod 10) show the resulting:

   a. Separate Chaining hash table

   b. Open addressing hash table using linear probing?