

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SECOND SEMESTER EXAMINATION, MAY 2023

FIRST YEAR [BATCH 2022-25]

COMPUTER SCIENCE [HONOURS]

Date : 24/05/2023

Time : 11 am – 1 pm

Paper : CC3

Full Marks : 50

Answer **any five** questions :

[5×10]

1. a) Write an algorithm to evaluate postfix expression.
b) What is tail recursion? State how is it different from ordinary recursion. (4+6)
2. a) Construct an AVL tree with the following data:-8,4,7,9,2,5,6,3
b) How can a polynomial such as $5x^4 - 7x^2 + 9x - 11$ be represented by a linked list? (7+3)
3. a) Write an algorithm to merge two linear Linked list.
b) For a binary tree with “e” external path length and “i” internal path length prove that $e=i+2*n$ where n is the total number of internal nodes. (5+5)
4. a) Indicate how a binary tree may be converted into a linear data structure.
b) Given the pre-order and in-order sequence draw the resultant binary tree and write its post-order traversal:
Pre-order: A B D G H E I C F J K
In-order: G D H B E I A C J F K (5+5)
5. a) Calculate total number of swapping needed to sort the numbers 8,22,7,9,31,19,5,13 using bubble sort method.
b) A hash function f is defined as $f(\text{key}) = \text{key} \bmod 7$. With linear probing, is used to insert the keys 37, 38, 72, 48, 98, 11, 56, into a table index from 0 to 6. What will be the location of the key 11? (5+5)
6. a) Write three cases along with example to delete nodes from a binary search tree.
b) Write an algorithm to test whether a given binary tree is a binary search tree. (7+3)
7. a) Write down non recursive Algorithm of merge sort.
b) Write down recursive algorithm of Tower of Hanoi. (7+3)

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