(3 Hours) **Total Marks: 80** N.B: (1) Question No. 1 is compulsory. (2) Attempt any three questions out of the remaining five questions. (3) Figures to the right indicate full marks. (4) Make suitable assumptions wherever necessary. Q.1 Compare linear and non-linear data structures. [05] Explain the advantage of circular queue over linear queue. Write a [05] function in C language to insert an element in circular queue. Define binary search tree. Discuss the case of deletion of a node in binary [05] search tree if node has both the children. (d) Write a C function to search a node in doubly linked-list. [05] Q.2 (a) Construct AVL tree for the following sequence: [10] 67,34,90,22,45,11,2,78,37,122 Write algorithm for postfix evaluation. Demonstrate the same step by step [10] for the expression: 967 * 2/Q.3 Write a program to perform following operations on a circular linked list: [10] i) insert a node from the end of the list, ii) delete first node, iii) count the number of nodes with even values, iv) display the list. [10] Write a C program to simulate linear queue as linked list. Construct Huffman tree and find the Huffman codes for each symbol [10] given below with frequency of occurrence: Symbol p 25 Frequency 20 17 33 40 Explain the various ways to represent graph in the memory with example. [05] Construct binary search tree from given traversal sequences: [05] In-order traversal D E В A G Ί Η J Pre-order D В Α G traversal Apply linear probing to hash the following values in a hash table of size [10] 11 and find the number of collisions: 67,44,90,12,83,52,23,87,79. Define topological sorting. Perform topological sorting for the following [10] graph: Construct a B tree of order 3 by inserting the following given elements as: [10] 77,97,75,64,53,14,26,49,82,59. Show the B tree at each step of insertion. Write a function in C for DFS traversal of graph. Explain DFS graph [10] traversal with suitable example.

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