S.E. / COMP / Sem - III / 'C' Scheme / Sub:- DS / Date:- 18/11/25 / S.H. 2025
QP. Code:- 10082556

(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 with proper justifications

Q1	A	State the advantages of linked lists over arrays.	[05]
	B	Create a binary search tree by inserting node values in sequence- 56;32,12,90,-9,78,66,110,44,95.	[05]
	C	Write a program in C to check balanced parentheses using stack.	[05]
	D	Explain double ended queue.	[05]
Q2	A	Write a program to perform following operations on the Singly linked list a) Create the list b) Delete first element c) Insert element at end d) Search an element with value=66 in the list	[10]
	B	Explain the concept of B-tree. Crate a B-tree of order-4 by inserting keys- 5, 3, 21, 9, 13, 22, 7, 10, 11, 14, 8, 16.	[10]
Q3	A	Write a program in C to evaluate a postfix expression.	[10]
	B	Explain the concept of Huffman coding and describe the steps for constructing a Huffman tree. Given the following characters with frequencies, construct the Huffman tree and generate the Huffman codes for the given characters: A:20, B:15, C:5, D:15, E:45	[10]
Q4	A	Construct an AVL tree by inserting the following elements in sequence, showing the tree after each insertion and rotation: 21, 26, 30, 9, 4, 14, 28, 18,10, 7.	[10]
	B	Write a program in C to implement stack ADT using an linked list.	[10]
Q5	A	Explain the different types of linked list with diagram. Also state the advantages of circular and doubly linked list over singly linked list.	[10]
	B	Write a program in C to implement linear queue using array.	[10]
Q6	A	Explain graph representation techniques with suitable example.	[10]
	B	A hash table has 11slots, and the following keys are inserted in this order: 43, 36, 92, 87, 11, 47, 12, 13, 14. Using linear probing as the collision resolution technique, show the final arrangement of keys in the hash table. Use the hash function h(x) = x % 11. Also count number of collisions.	[10]

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